



The Northeast Fish Rapper

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President's Message

NED President Jason Vokoun

Jason Vokoun

Maybe it's the fall colors out my window right now, or the work we are busy doing planning the combined divisional meeting and 50th Anniversary meeting of the Southern New England Chapter on Feb 26-28, 2017, but I long to talk about fisheries science (better yet collect some data.) While I value the professional connections I get from volunteering within the American Fisheries Society very highly, much of my service to our society is filled with routines and work-stuff far removed from the water. Meeting planning, conference calls, investment strategies, and the carbon footprint of an e-poster kiosk (no I am not making that up) all tend to create distance between me and why I entered the fisheries profession. So it is with this in mind I wanted to brainstorm a little how we can get AFS back to talking fisheries at least as often as we talk about all the other stuff that makes our professional society run.

IDEA 1) Assign someone to report on an emerging fisheries issue in their job on every conference call or meeting agenda you create. Just do it! Carve out 10 minutes to talk fisheries. This sort of mandate ensures that what really matters in the workplace is not forgotten. Bureaucracy is perhaps a necessary companion in professional life- but we can't let it dominate the reason we got into this field in the first place!

IDEA 2) Learn how to do something new. Our profession changes, and the science topics and associated tools morph over time. Make this the year that the standard annual report gets a serious upgrade! Go to a continuing education workshop (AFS offers a surprising diversity of opportunities) or listen to a webinar. Then report back to your office- in fact, make sharing with your colleagues an office requirement.

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President's Message

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IDEA 3) Experience a new fishery by actually going fishing, clamming, or crabbing. I know this sounds fantastical- but for many of us, losing touch with an important group of constituents, anglers and commercial fishers, is bad for our professional effectiveness. So I say to you- there exists an implicit mandate to get out there and try something new. It also might just be fun.

IDEA 4) Get back to basics with your projects and workflow. Sometimes after many years at the agency or organization and countless projects later, I think we forget we are in fact fisheries scientists, and as such we participate in the scientific method. Examine a current project and take a hard look at it from, dare I say, a grad school perspective! Do you have a strong and relevant hypothesis? Are you collecting the right data to support or refute established ideas of how your fishery system operates? Are you generating new knowledge to move conservation decision making forward? If not- why not?

So there you have it- four ways to put talking about fisheries back into our professional lives, because it deserves to be there- side by side with all the forms, reports, purchase requisitions, and assorted AFS chapter business. So...when we bump into each other at an upcoming chapter or divisional meeting, or hopefully the upcoming annual meeting in Tampa FL (start working on that “why I must go” speech for travel authorization soon) you already know what I want to talk about.

Jason Vokoun is an Associate Professor at the University of Connecticut where he is also the Director of the Wildlife and Fisheries Conservation Center. In addition to the academic hats he wears, Jason is the President of the Northeastern Division. He can be reached at jason.vokoun@uconn.edu or by phone at 860-486-0141.



Special Announcement!

**Celebrating 50 years of the
Southern New England Chapter
of the
American Fisheries Society**

First Joint Meeting between SNEC and NED



February 26 – 28, 2017

Hilton Mystic

Mystic, CT

This year marks the 50th year of the Southern New England Chapter (SNEC) of the American Fisheries Society. Please join us in celebrating with the first joint meeting between SNEC and the Northeastern Division (NED). This event will include a day of workshops, two days of presentations including a keynote address and student awards, the NED and SNEC Annual Business Meetings, and of course a birthday party at Mystic Aquarium! The theme of the meeting is ***SNEC at 50: Past, Present, and Future of our Fisheries.***

Abstract Deadline is December 16th, 2016.

We are accepting both oral and poster presentations.

Please submit your abstracts electronically at <http://tinyurl.com/SNEC-abstract>

For more information on the meeting please visit our website:

<http://sneec.fisheries.org/meetings/sneec-50th-anniversary-meeting>

CHAPTER AND SUBUNIT UPDATES

Southern New England Chapter

Sean M. Lucey

The Southern New England Chapter (SNEC) of the American Fisheries Society held their Summer Science Meeting on June 16th. The meeting was held at the picturesque Save the Bay Center located on the campus of Johnson and Wales in Providence, Rhode Island. Over seventy people gathered to hear a range of talks including presentations on Salmon tracking using satellite pop-up tags, blue-crab foraging impacts on Winter Flounder in New England waters, development of a spawning stock biomass estimate for Atlantic Mackerel, and the effects of culverts on the genetic structure of Brook Trout. The afternoon was highlighted by a keynote presentation by Dr. Peter Auster from the University of Connecticut. Dr. Auster spoke on the challenges in fisheries management that arise from the complex nature of marine habitats and the scales on which ecological processes act compared to the scale at which they are sampled. Of the ten presentations, five were performed by students vying for the Saul B. Saila Best Student Presentation award. Lucas Nathan from the University of Connecticut won with his presentation entitled "Evaluating the effects of culverts on fine scale genetic structuring of Brook Trout".

In addition to the presentations, the chapter also held their annual business meeting. The business meeting was highlighted by the presentation of the SNEC professional awards. Dr. David Taylor was presented with the Distinguished Service Award for his service to the chapter's Board of Directors specifically his role as the Program Chair and organizing the chapter's Rhode Island meetings. William Duffy was presented with the Irwin Alperin Membership Service Award for organizing several workshops and an extended stay on the executive committee. The Commercial Fisheries Research Foundation (CFRF) was recognized with the Outstanding Organization Award for their dedicated work with fishermen and fisheries science. The chapter also presented Special Recognition Awards to Dr. Richard McBride and Dr. Cate O'Keefe for their efforts in the Communicating



Bill Duffy (R) receives the Irwin Alperin Outstanding Member Award from Past-President Heidi Fitzpatrick.



Meghna Marjadi (R) receives the Saul B. Saila Best Student Presentation Award from Education Committee member Tracy Maynard.

Science Workshop held in March. In addition to the professional awards, Mathew Devine and Meghna Marjadi received the Grace Klein-MacPhee Best Student Poster Award and Saul B. Saila Best Student Presentation Award respectively for their presentations at the Winter Science Meeting.

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Lucas Nathan also received the SNEC Student Travel Award to help offset the cost of attending the National AFS meeting in Kansas City.

The two big developments from the business meeting were the acceptance of proposed by-law changes that allowed for the inclusion of a new University of Massachusetts Amherst Student Sub-Unit and the announcement of a two day 50th Anniversary SNEC meeting next year. The UMass sub-unit is the second student group to join SNEC, the other being the University of Connecticut. The 50th Anniversary meeting will be held in Mystic, CT, February 27-28, 2017, in conjunction with the Northeast Division of AFS. Further details will be disseminated via the SNEC website as they become available.



Dr. Peter Auster, University of Connecticut, delivers the keynote presentation at the SNEC Summer Science Meeting.

The business meeting concluded with the installation of the new executive committee. Glenn Chamberlain ascended to past-president as Steve Dwyer assumes the role of president. The gavel was passed by former past-president Heidi Fitzpatrick whose term on the executive committee is now over. Dr. Eric Schultz moved from Secretary/Treasurer to President-elect and announced the election of the new secretary/treasurer, Dr. Sara Turner.

SNEC would like to thank all those who attended the meeting and look forward to seeing everyone at the 50th Anniversary meeting in February.

Sean Lucey is the acting Deputy Division Chief for the NEFSC's Resource Evaluation and Assessment Division. He can be reached at sean.lucey@noaa.gov.

UMaine Subunit

Alejandro Molina Moctezuma

It's been a busy first half of the year for the University of Maine Student subunit. During the spring and summer semesters, members have taken part of several science outreach activities, organized our second annual Spawning Run, and organized workshops for the University of Maine community. Our members also traveled to Kansas City to present their research at the national AFS meeting. Finally, we are excited to announce that the University of Maine Student subunit won the "Best Subunit Award" during the national meeting in Kansas City.

This year, we participated in two events as part of World Fish Migration Day. The second annual University of Maine AFS Spawning Run 5K took place at the end of April. Over 100 runners and walkers registered for the event, which took place on the University of Maine campus and bike path. The event consisted of the race, as well as a raffle with items donated by local businesses, and a contest for "Best Fish Costume" for the runners.



The runners from UMaine's School of Forest "Reswordfish" won the best costume contest at our annual Spawning Run 5K.

Through the Spawning Run we were able to raise more than \$1000, which has been dedicated to the subunit's new Outreach and Education Fund to be used to develop outreach materials and partner with local schools to bring fisheries and aquatic science into the classroom. This event has been such a success, that we have decided to make it an annual event. We also volunteered at the Maine Discovery

Museum to educate kids about migratory fish. The kids also made foam fish and watched how they "swam" through a model river with and without dams



Subunit members (L-R) Alejandro Molina Moctezuma, George Maynard, Meg Begley, Aurélie Daroux, and Dan Weaver outside of the Maine Discovery Museum during our World Fish Migration Day outreach event.

During the spring semester, we organized several seminars for members and the broader campus community. We invited Dr. Gayle Zydlewski (UMaine School of Marine Science) to give a workshop on how to effectively portray experiences in resumes and cover letters. Dr. Mike Kinnison (UMaine School of Biology and Ecology) to give a seminar on the "Conservation as the management (or mismanagement) of evolution in an eco-evolutionary world" and Catherine Schmitt (Maine Sea Grant) presented about communicating scientific research to the public.



Subunit members (L-R) Andrew O'Malley, Alejandro Molina Moctezuma, Jonathan Watson, George Maynard, Kevin Job, Meg Begley, Robert Boenish, Betsy Barber, Lisa Izzo, and Daniel Weaver receive the Best Student Subunit Award from outgoing AFS President Ron Ettling.

We were honored to be chosen as the "Best Subunit of the Year" by the national AFS organization, and want to congratulate our outgoing executive board Dan Weaver, Lisa Izzo, Meg Begley, and Catherine Johnston for this award. Our newly elected executive board is Alejandro Molina Moctezuma (PhD student, Wildlife, Fisheries, and Conservation Biology) as president, Elisabeth Maxwell (MS student, Marine Sciences), as vice-president, Heather Brinson (BS student, WFCB) as Secretary, and Betsy Barber (PhD candidate, WFCB) as Treasurer. This new executive board is excited to keep up the great work that characterizes this subunit.



The outgoing and incoming executive boards celebrate our continued winning streak over UMaine's student chapter of The Wildlife Society in our bi-annual bowling competition. (L-R back) Catherine Johnston, Dan Weaver, Betsy Barber, Lisa Izzo, Alejandro Molina Moctezuma. (L-R front) Heather Brinson, Megan Begley, Lis Maxwell.

Alejandro Molina Moctezuma is a PhD Student and the President of the UMaine Student Subunit. He can be reached at alejandro.molina@maine.edu



UNH Subunit

Jenna Rackovan

This past year has been a great start for the UNH student subunit. We have doubled our membership and have had a lot of fun. We ended our first year with a fish printing/shirt making event, where students brought fish from their research to use to make the fish prints. Everyone had a blast, and we were even able to get a couple new faces out to join us. The summer was very exciting, as Jenna Rackovan (President) attended the Atlantic International Chapter meeting, where the subunit was officially voted into the chapter. We were also happy to elect our new vice president, Meghan Owings.



Subunit members participate in the end of semester fish printing.

This year we are continuing with our seminar series, where we bring in professionals from the fisheries and aquaculture fields to talk about their research/work. We are very excited for some of our upcoming speakers, who come from a variety of universities and organizations in the surrounding area. This seminar series provides for an excellent opportunity for students to create some valuable connections. This semester, the subunit also plans on taking a trip to visit and tour one of the local New Hampshire fish hatcheries. This event will hopefully allow students to become connected with some of the local hatcheries, as well as learn more about what is involved in rearing fish for release. We hope to continue having similar events throughout the year and increasing our membership.

Jenna Rackovan is a Master's Student and the President of the UNH Student Subunit. She can be reached at jlr2008@wildcats.unh.edu

UMass Subunit

Matt Devine

The University of Massachusetts-Amherst is thrilled to have officially formed a student sub-unit. The department of environmental conservation at UMass prepares students well to contribute in the professional arena of fish and wildlife conservation, and we are fortunate to have a group of students dedicated to fisheries research and conservation. There is tremendous opportunity for both undergraduate and graduate students to pursue their interests, and this is driven by a support system of passionate and accomplished faculty, robust coursework, working labs and facilities, and ample lakes, streams, estuaries, and seas within reach to conduct research.

As a sub-unit, our mission is to engage with students, professionals, and the community to further our knowledge about fisheries, contribute to conservation, and grow the fisheries community at UMass and in the region. We will aim to accomplish this by generating public interest and awareness towards regional conservation challenges, promote discussion about the latest research, and venture into the field with the community to collect data, learn about our aquatic ecosystems, and have fun!

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Hiking to our field sampling station at Amethyst Brook Conservation area. Shutesbury Elementary School 5th graders learned about sampling methods, safety, and habitat types.

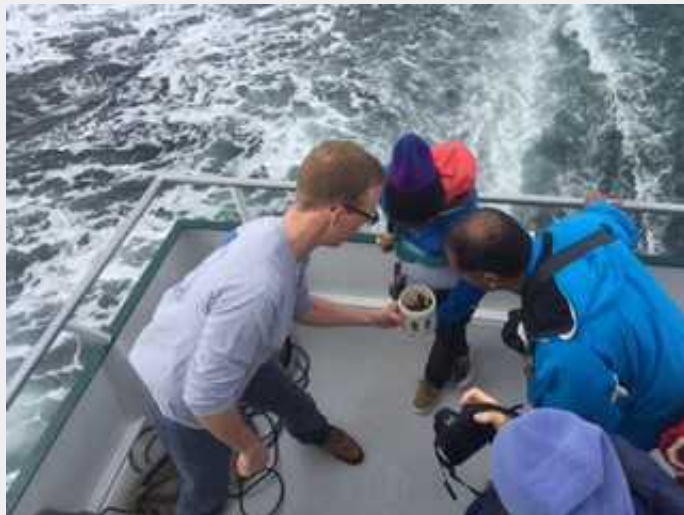
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The UMass sub-unit hit the ground running, beginning in the spring of 2016. After recruiting members and electing officers, we organized our first movie night, screening the award-winning documentary *Damnation*. The sub-unit also held a fisheries trivia night on campus that was well attended by students from a wide range of disciplines across campus.

One of the more memorable events certainly was our “Day in the life of a fisheries scientist”. The UMass sub-unit joined up with the 5th grade class at Shutesbury Elementary School and the U.S. Fish and Wildlife Service to learn about what it’s like to be a fisheries biologist. This full-day event took place in the field, the lab, and the classroom. Students were shown stream electrofishing techniques at a local conservation area, and were given an



Observing humpback whale feeding behavior at Stellwagen Bank National Marine Sanctuary



New England Coastal Wildlife Alliance staff examine a plankton sample containing crab larvae, salps, and plankton.

opportunity to handle and identify real specimens including trout, sculpin, dace, and even lamprey! Students discovered different habitats and investigated why certain species prefer one habitat over another. Back in the lab at UMass, 5th graders jumped into lab coats and gloves and learned how to prepare samples for DNA extraction, use microscopes to identify meristic features, and operate other gear types including gill nets, beach seines, and minnow traps. The day concluded with a wrap-up discussion and brief data analysis, including building graphs to show the number of each species by habitat type, and relating our results back to our original hypotheses. It was amazing to see the enthusiasm and curiosity of these children! The next generation of scientists is upon us!

This fall, sub-unit members took advantage of the

excellent weather and participated in a Connecticut River clean-up day. This provided an opportunity to make an immediate difference with some good old fashion physical work. Members walked, boated, and biked, picking up incredible amounts of trash and debris along the way, benefiting the ecosystem and the wild creatures that inhabit it. Finally, in October, members joined the New England Coastal Wildlife Alliance (NECWA) aboard the *Privateer IV* for a day of whale watching and data collection. The NECWA conducts research projects and educational outreach activities relating to the protection of whales, dolphins, seabirds, seals, basking sharks, ocean sunfish and other unique coastal marine wildlife off New England. We left from Gloucester and toured Stellwagen Bank National Marine Sanctuary, viewing and learning about Humpback and Minke whales, sand lance, ocean sunfish, and various seabirds. The crew performed several plankton tows and bird and whale counts at long-term monitoring stations, adding to a large dataset and growing our knowledge about the occurrence and distribution of these animals. UMass professor and sub-unit faculty advisor Dr. Adrian Jordaan was on-board to speak about trophic interactions in the bank, and changes in phenology that may affect these creatures’ persistence. This was truly a fascinating experience for everyone involved.

We look forward to organizing future events including a kids fishing day, and an interpretive ecological float. I have no doubt our sub-unit will continue to grow and flourish, and our success stems from passionate and involved individuals from UMass and throughout the surrounding community.

Matt Devine is president of the UMass Amherst sub-unit and can be reached at mtdevine@umass.edu

Atlantic International Chapter

John Magee

The AIC held its 42nd Annual Meeting at the Rockywold Deephaven Camps in Holderness, NH, on beautiful Squam Lake. A key element of the meeting was the strong showing of students, including undergraduates, who gave excellent presentations. Clearly, the future of our profession is in good hands. Our new President is Scott Pavey of University of New Brunswick and new Vice President is Trevor Avery of Acadia University. The 2017 meeting will be in September in Nova Scotia. The AIC will continue its tradition of providing student stipends to attend the Annual Meeting.

John Magee is a Fish Habitat Biologist with the New Hampshire Fish and Game Department and the Past President of the AIC. He can be reached at john.magee@wildlife.nh.gov



NEWS AND MEETINGS

Book Review: Introductory Fisheries Analyses with R

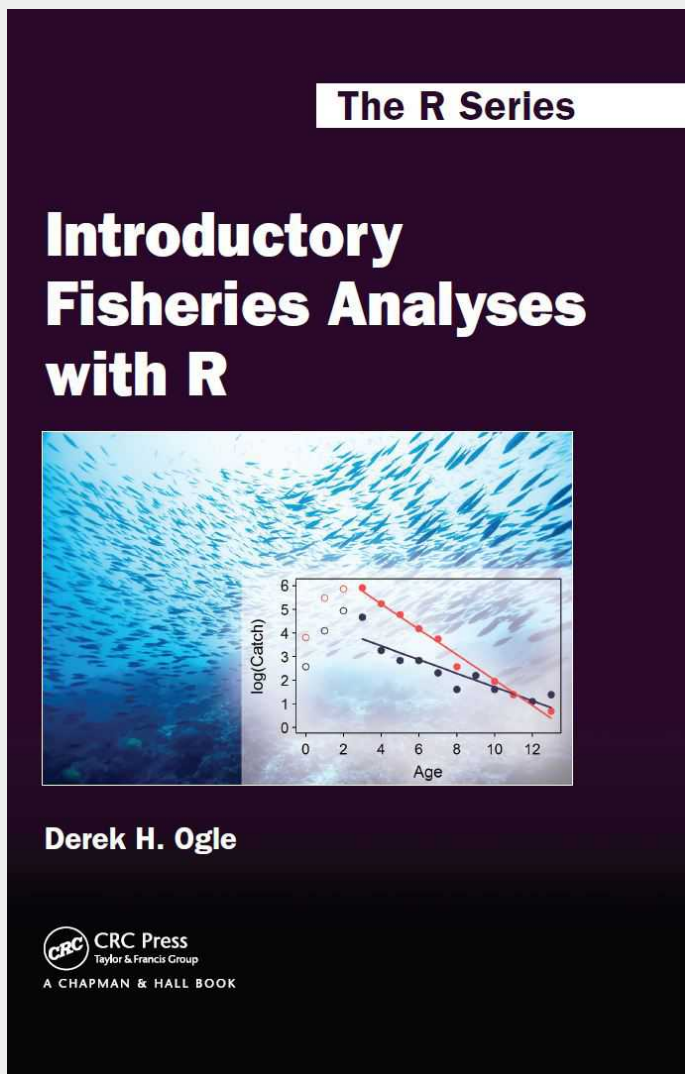
Richard McBride

The R language is very powerful for manipulating all types of data and producing publication-quality graphics. It has a number of 'packages' for analyzing your data and you can create your own packages for special projects. It can be challenging to learn but there are many examples worked out on the internet to learn from (for example, <http://stackoverflow.com/questions/tagged/r>).

This new book by Professor Ogle provides a 'how-to guide for conducting common fisheries-related analyses.' It includes chapters on the basics of fisheries science, such as estimating abundance, growth, recruitment, mortality. Dr Ogle brings together his experience teaching statistics and his interest in population dynamics to create a highly readable and instructive text. There are also specific datasets to use, supplemental materials, exercises, and scripts already written out. This may be the instructional tool to help you learn R finally or to add a quantitative edge to your brand of fishery science.

Introductory Fisheries Analyses with R by Derek H. Ogle of Northland College was published in 2016 by CRC Press. More information about the book can be found at <http://derekogle.com/IFAR/book/>

Richard McBride is a Supervisory Fishery Biologist at NOAA Fisheries.



Maine Hiking Trail Dedicated to Former NOAA Fisheries Atlantic Salmon Team Member

Shelley Dawicki

A long-time member of the NOAA Fisheries Service Atlantic salmon research team will be honored September 10, 2016 with the dedication of the Ed Hastings Memorial Trail at Green Lake National Fish Hatchery (GLNFH) in Ellsworth, Maine.

The trail honors the contributions of Ed Hastings, a longtime member of the NOAA Fisheries Atlantic salmon research team in Maine who was known for his positive and enthusiastic attitude about and tireless efforts for Atlantic salmon recovery. It also connects the public with one of the nation's most imperiled fisheries resources, Gulf of Maine Atlantic salmon.



Ed Hastings enjoyed fishing for striped bass. Photo credit: USFWS/Frederick Trasko

Ed Hastings led a novel salmon tagging program for five years before becoming ill in the spring of 2006 and passing away that fall from cancer. Through strong working relationships and partnerships with staff at the Green Lake National Fish Hatchery and a crew of seasonal workers, he



NOAA volunteers (L-R) Graham Goulette, Justin Stevens, and James Hawkes take a break next to the recently installed memorial bench overlooking Green Lake. Photo credit: USFWS/Frederick Trasko

built the program into one of the largest marking efforts of its type in the world at that time.

Each spring he recruited and trained a dozen fish taggers from the local community, making sure everyone knew the importance of the work and what their accuracy meant to salmon conservation. Many of the taggers, who ranged from college students on break and stay-at-home parents to seasonal forest products workers, had never tagged a fish before, but they soon became a tagging team.

Hastings successfully managed the logistics of tagging 350,000 salmon smolts from multiple hatchery pools in a seamless operation that lasted 6 weeks each spring. "He minimized impacts to fish and increased tag retention each year through attention to detail and effective coaching," said John Kocik of the Atlantic Salmon Ecosystems Research Team at the Maine Field Station in Orono, a longtime colleague.

"His enthusiasm about his work was contagious, and this translated into effective leadership. Each person developed a sense of ownership in the project. New taggers entered the program with various backgrounds and opinions on salmon recovery, but all left understanding the challenges faced by these fish and by those individuals trying to restore Atlantic salmon and their ecosystems."

Ed Hastings' commitment to salmon did not stop at the end of the workday. He volunteered his time generously to the Friends of Green Lake National

Fish Hatchery, Inc., a group active in education about Atlantic salmon and their habitat. He also supported the Fish Friends Program, which supplies salmon eggs to local schools to raise in temperature-controlled egg incubators and fish tanks before releasing to local rivers where the parent hatched and returned to spawn in the spring. It was in this educational role that Ed Hastings made visible the sometimes forgotten plight of salmon at sea and the role of NOAA in understanding marine ecology and improving salmon marine survival.

Over the past few summers, dozens of volunteers from the US Fish and Wildlife Service, National Marine Fisheries Service, Maine Department of Marine Resources, local schools, and the general public have come together to work on the trail. Pete Colman, a local trail expert from Pathmaker Trail Services, created the trail layout, and all the labor for the project was donated by volunteers and organized by staff and The Friends of Green Lake NFH. A grant from NOAA's Preserve America Initiative Internal Funding paid for building materials for bridges for walking trails, kiosks, and production of

high quality interpretive signs to educate the public about the sea-run fish of Maine.

The 1.35-mile long trail begins at the hatchery complex entrance gate and twists its way through the woods towards Green Lake. Interpretive signs are placed along the way. At the culmination, a granite bench invites hikers to rest and admire the view of Green Lake.

"While many who built this trail share a common interest in restoring sea-run fish, the creation and construction of the trail was done to honor the memory of a beloved friend and colleague," Kocik said on behalf of all those who knew and worked with Ed.

The official dedication of the Ed Hastings Memorial Trail on September 10 will permanently honor Ed Hastings's legacy and connect the public with the fish and the landscape he loved. The dedication ceremony will take place at 10 a.m. and will be followed by a day of outdoor activities and a cook-out.

This article was originally published by NOAA's Northeast Fisheries Science Center.



Ocean Tracking Network Receives 2016 Conservation Achievement Award from the American Fisheries Society

Anja Samardzic

The American Fisheries Society (AFS), the world's oldest and largest organization dedicated to strengthening the fisheries profession, advancing fisheries science, and conserving fisheries resources, has awarded the Ocean Tracking Network (OTN) its 2016 Conservation Achievement Award. The award, which is presented by the Fisheries Management Section of AFS, recognizes programs or initiatives by a non-members individual, non-governmental organization or agency (state, provincial, local or federal), that have considerably contributed to fishery conservation or science.

OTN was recognized for its global contributions to understanding the movements and survival of aquatic animals, and how these movements relate to environmental conditions.

The knowledge from the many studies carried out by the investigators supported by the OTN infrastructure is making important contributions to fisheries management and conservation. The nominators, Dr. Susan Lowerre-Barbieri (Florida Fish and Wildlife Research Institute), Dr. William Patterson III (University of South Alabama and Dauphin Island Sea Lab) and Dr. Clay Porch (Southeast Fisheries Science Centre, NMFS) noted that OTN has demonstrated a sustained (and growing) commitment to global science-

based fisheries management using a variety of approaches. OTN and its partners have done significant work with capacity building in developing countries and regions (including the Bahamas, South Africa, Mozambique, Angola, Brazil, and the Arctic) and have made measurable improvements to the management and conservation of valued aquatic species. OTN also has a vibrant communications arm to disseminate research results to stakeholders and the public. They also highlighted the key role OTN is

playing in the establishment of the Integrated Tracking of Aquatic Animals in the Gulf of Mexico (iTag) Network, by increasing both physical infrastructure (receiver arrays) and a platform for data exchange. The work in this area focuses on understanding of key migratory pathways and spawning and foraging grounds of

highly migratory species, as well as movements of straddling stocks.

OTN extends its sincere appreciation to the AFS for the honor of this award, to the nominators who have made this recognition possible, and to the OTN investigators whose work is so very important for the future of healthy fisheries globally.

This article was originally published by the Ocean Tracking Network



OTN Executive Director, Dr. Fred Whoriskey (L) accepting the award at the 2016 AFS Annual Meeting. Photo credit: Rebecca Krogman.

Flatfish Biology Conference

The Flatfish Biology Conference, celebrating its 30th anniversary year, welcomes platform and poster presentations addressing any aspect of flatfish research (e.g., biology, ecology, aquaculture, stock assessment, physiology etc.) from all regions and international locales. The conference, convened by the Northeast Fisheries Science Center, will be held December 6th and 7th, 2016 in Westbrook, CT.

Professional and student flatfish researchers are encouraged to participate.

For more information, please visit our website

<http://nefsc.noaa.gov/nefsc/Milford/flatfishbiologyworkshop.html>

For questions, contact: R. Mercaldo-Allen at renee.mercaldo-allen@noaa.gov, 203-882-6549



Mid-Atlantic Council Approves Amendment to Protect Unmanaged Forage Species

The Mid-Atlantic Fishery Management Council has approved an amendment to protect unmanaged forage species in the Mid-Atlantic. If approved by the Secretary of Commerce, the Unmanaged Forage Omnibus Amendment would prohibit the development of new and expansion of existing directed commercial fisheries on a number of unmanaged forage species in Mid-Atlantic Federal waters. The prohibition would continue until the Council has had an opportunity to assess the available scientific information for these species and consider the potential impacts to existing fisheries, fishing communities, and the marine ecosystem.

Forage fish are small, low trophic level fish that play a central role in the marine food chain. These species facilitate the transfer of energy to higher trophic levels by consuming very small prey and then being eaten by larger, predatory fish and other marine animals.

“Forage species play a vital role in maintaining the productivity and structure of marine ecosystems and are currently at risk of unregulated fisheries development in the absence of adequate science to ensure their ecological sustainability,” said the Council’s Chairman, Rick Robins. “With this action, the Mid-Atlantic Council is taking a proactive approach to conserving unmanaged forage species and the ecosystem services they provide in the Mid-Atlantic region.”

The amendment was not intended to address all unmanaged forage species in the Mid-Atlantic but rather to focus on those species that have high ecological importance and those that have high potential for the development of a large-scale targeted commercial fishery.

The Council received more than 21,000 comments during the public comment period, the majority of which focused on the list of species to be included in the amendment. Although the Council initially considered a list of more than 250 forage species, this was narrowed down to a list of 15 taxa

(i.e. species, families, orders, and other taxonomic groupings) for inclusion.

After considering input from its advisory panel, Ecosystem and Ocean Planning Committee, and members of the public, the Council voted to remove false albacore due to its large size and high trophic level. These 15 taxa include more than 50 forage species, including anchovies, halfbeaks, herrings, sardines, and sand lances. The complete list is included at the bottom of this announcement.

The Council voted to designate these taxa, with the exception of chub mackerel, as ecosystem components (ECs) in all of the Council’s fishery management plans (FMPs). The amendment would establish an incidental possession limit of 1,700 pounds for all EC species combined. For chub mackerel, the Council approved a 40,000-pound incidental possession limit and an annual landings limit of 2.86 million pounds as temporary measures while the Council evaluates potentially adding the species as a stock in the Atlantic Mackerel, Squid, Butterfish FMP.

The Council voted to designate these taxa, with the exception of chub mackerel, as ecosystem components (ECs) in all of the Council’s fishery management plans (FMPs). The amendment would establish an incidental possession limit of 1,700 pounds for all EC species combined. For chub mackerel, the Council approved temporary measures to be implemented while the Council evaluates potentially adding the species as a stock in the Atlantic Mackerel, Squid, Butterfish FMP. These measures would include an annual landings limit of 2.86 million pounds and a 40,000-pound incidental possession limit which would go into effect once this landings limit is met.

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The Council also voted to require use of exempted fishing permits (EFPs) prior to allowing any new fisheries or expansion of existing fisheries for unmanaged forage species and to establish a new policy for Council review of EFP applications. The Council also agreed that, prior to allowing any new fisheries or expansion of existing fisheries, the Council would consider whether the species in question should be managed as a stock in the fishery or if other discretionary management measures should be used.

Additional information, updates, and background materials related to this amendment are available on the Unmanaged Forage Omnibus Amendment page at <http://www.mafmc.org/actions/unmanaged-forage>.

Final List of Forage Taxa Included in Unmanaged Forage Omnibus Amendment*

- Anchovies (family Engraulidae)
- Argentines (family Argentinidae)
- Greeneyes (family Chlorophthalmidae)
- Halfbeaks (family Hemiramphidae)
- Herrings, sardines (family Clupeidae)
- Lanternfish (family Myctophidae)
- Pearlsides (family Sternoptychidae)
- Sand lances (family Ammodytidae)
- Silversides (family Atherinopsidae)
- Cusk eels (order Ophidiiformes)
- Chub mackerel (*Scomber colias*)
- Bullet mackerel/bullet tuna (*Auxis rochei*)
- Frigate mackerel/frigate tuna (*Auxis thazard*)
- Atlantic saury (*Scomberesox saurus*)
- Pelagic molluscs, except sharptail shortfin squid (*Illex oxygonius*)
- Copepods, Krill, Amphipods & other species < 1 inch as adults

*This list is not meant to include species currently managed by the Mid-Atlantic, New England, or South Atlantic Fishery Management Council, or by the Atlantic States Marine Fisheries Commission. The Mid-Atlantic Fishery Management Council has approved an amendment to protect unmanaged forage species in the Mid-Atlantic. If approved by the Secretary of Commerce, the Unmanaged Forage Omnibus Amendment would prohibit the development of new and expansion of existing directed commercial fisheries on a number of unmanaged forage species in Mid-Atlantic Federal waters. The prohibition would continue until the Council has had an opportunity to assess the available scientific information for these species and consider the potential impacts to existing fisheries, fishing communities, and the marine ecosystem.



MID-ATLANTIC | FISHERY
MANAGEMENT
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International Conference on Engineering and Ecohydraulics for Fish Passage



*June 19-21 2017
Corvallis, Oregon*

The 2017 International Conference on Engineering and Ecohydraulics for Fish Passage (Fish Passage 2017) promises to be an important international forum for researchers and practitioners to exchange findings and experiences on fish passage issues.

Fish Passage 2017 will be of interest to researchers, educators, practitioners, funders, and regulators who have an interest in advancements in technical fishways, nature-like fishways, stream restoration and stabilization, dam removal, and the myriad of funding, safety, climate change, and other socio-economic related issues surrounding connectivity projects.

This is a three-day conference with concurrent sessions in engineering, biology, management and monitoring techniques. The conference will also feature plenary talks, professional networking opportunities, and a poster session. Independently offered short courses, workshops and tours will be available immediately before and/or after the conference.

For more information, please see
<http://fishpassage.umass.edu>



Changes in Tautog Management

Eric Schultz

Tautog has historically been managed as a single stock. In 2015, an effort to regionalize stock assessments had faltered. The Tautog Technical Committee had presented to the Management Board regionalized stock assessments comprising a Southern New England region combining Massachusetts and Rhode Island, a middle region with Connecticut, New York, and New Jersey, and a southernmost region with Delaware, Maryland and Virginia. The Management Board regarded as problematic this ‘preferred’ three-region division, and an alternate ‘highly regarded’ scenario combining Connecticut with Massachusetts and Rhode Island instead of with New York and New Jersey. On the one hand, the preferred scenario aggregated Long Island Sound fishes with those in waters off New Jersey despite differences in aspects of the species’ biology such as growth rate and differences in the fishery. On the other hand, the highly regarded alternative scenario awkwardly split Long Island Sound between two regions. Fortunately, a group at the University of Connecticut led by Eric Schultz and Jason Vokoun had just received a research grant from Connecticut Sea Grant, in part to prepare a Long Island Sound-specific assessment. With news of this project, the management board deferred consideration of regional stock assessments until this year. A team consisting of Schultz, Vokoun, graduate student Jacob Kasper, Connecticut fisheries biologist Greg Wojcik, and members of the Tautog Technical Committee, prepared a new set of separate assessments for LIS and the New York Bight (the waters off the south shore of Long Island and off the New Jersey coast). In August 2016, the management board approved this new regional division for management use (see press release at <http://www.asmfc.org/species/tautog>).

The next step for the UConn team is to use the assessment of the LIS stock to evaluate alternative management approaches. They will project from the LIS stock assessment how many fish should be harvested each year over the next five years in order to maintain the stock at a sustainable level. With these projections, they can test for the effect of changes in the legal size, the legal limit of fish allowed per fishing trip, and the fishing season. They are particularly interested in testing the hypothesis that harvest slot limits, specifying not only a minimum legal size but also a maximum size that can be harvested, can promote sustainability by preserving the reproductive potential of highly fecund large old females.

Eric Schultz is a Full Professor in the Department of Ecology and Evolutionary Biology at the University of Connecticut. He can be reached at eric.schultz@uconn.edu



UConn and Sacred Heart University alumnus Joe Cassone, currently a fisheries scientist with HDR Inc. poses with a tautog caught off Point Judith, Rhode Island.

Fish and Plants, Working Together: UNH Launches Aquaculture Farming Project

Lori Wright

Researchers at the University of New Hampshire have launched an integrated aquaculture farming research project that aims to provide a model for integrating land-based aquaculture systems with hydroponic plant production systems that can be used locally to increase food production.

NH Agricultural Experiment Station researcher Todd Guerdat, assistant professor of agricultural engineering, is leading the project at the Kingman Research Farm, an experiment station facility in Madbury.

“Over half of the world’s seafood is produced from aquaculture. Eighty percent of the seafood we eat here in the United States is imported resulting in nearly an annual \$11 billion trade deficit for seafood alone. We need to take control of our food production systems by developing a sustainable U.S.-based aquaculture industry,” Guerdat said.

Specifically, researchers are evaluating nutrients for plants growing in a recirculating aquaponic system that come from the food fed to fish. Using three identical greenhouses, researchers will look at different protein levels in fish feed, and potentially different protein sources, as a way to determine if higher protein diets are more beneficial for plant production or not, or if a different protein source produces different plant-available nutrients in the system.

“In an age where growing, buying, and eating locally improves food security for all, food production systems that are sustainable economically and environmentally are more important than ever. Recirculating aquaponic businesses are already in action here in New



Hampshire and the Northeast. However, there are a great many questions that still remain. How do you match the fish and plant production systems? How big should each be? What are realistic production estimates for business plan development? What is the most efficient design for a recirculating aquaponic system? This research aims to answer all of these questions so anyone – a farmer or individual grower – can take the results and apply them directly to their own application,” Guerdat said.

He explained that integrated farming systems improve energy and resource utilization, and offer an opportunity to monetize otherwise costly treatment processes. Recirculating aquaponic systems are an ideal integrated farming model that produce fish and plants for food locally and sustainably. However, to ensure the sustainable development of an integrated recirculating aquaponic system that produces vegetables and herbs using excess nutrients from finfish production, renewed engineering principles must be applied to develop sound system design guidelines for realistic productivity estimates and economic sustainability.

“As an integrated farming system model, aquaponic systems offer the potential for addressing the need for improved economic and environmental

sustainability in the production of seafood using recirculating aquaculture systems (RAS). Through the integration of hydroponic plant production, aquaponic systems restructure the typical RAS production and effluent stream treatment from an end-of-pipe treatment model to an internalized, integrated production process flow,” Guerdat said. Guerdat has received extensive support and interest from the community for his research project. “We have been overwhelmed with questions, offers for volunteering, and general expressions of support from many, many wonderful people. We are looking forward to bringing the results to on-campus presentations for more folks to see and enjoy,” he said.

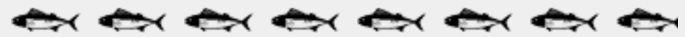
“As a researcher, you are always looking forward. The implications of your research should always provide a foundation for others to grow. Through working collaboratively with biological, economic, social, and environmental researchers, I want to play a role in the development of a U.S.-based agricultural industry that will carry us into the next 100 years sustainably and productively,” he said.

This material is based upon work supported by the NH Agricultural Experiment Station, through joint funding of the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 1010110, and the state of New Hampshire.

Founded in 1887, the NH Agricultural Experiment Station at the UNH College of Life Sciences and Agriculture is UNH’s original research center and an elemental component of New Hampshire’s land-grant university heritage and mission. We steward federal and state funding, including support from the USDA National Institute of Food and Agriculture, to provide unbiased and objective research concerning diverse aspects of sustainable agriculture and foods, aquaculture, forest management, and related wildlife, natural resources and rural community topics. We maintain the Woodman and Kingman agronomy and horticultural farms, the Macfarlane Greenhouses, the Fairchild Dairy Teaching and Research Center, and the

Organic Dairy Research Farm. Additional properties also provide forage, forests and woodlands in direct support to research, teaching, and outreach.

This article was originally published by the University of New Hampshire’s Agriculture Experiment Station.



UMaine Subunit members (L-R) Lisa Izzo, George Maynard, and Alejandro Molina Moctezuma were among the many people who stopped by the Smith-Root booth at the AFS trade show to take advantage of the comic book photo op.

Government of Canada is Funding Collaborative Research to Support Atlantic Salmon Recovery

The Government of Canada is taking action, through collaborative science, to support the recovery of declining Atlantic salmon stocks on Canada's East Coast.

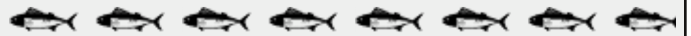
Parliamentary Secretary Serge Cormier, on behalf of the Honourable Dominic LeBlanc, Minister of Fisheries, Oceans and the Canadian Coast Guard, announced that Fisheries and Oceans Canada will be providing more than \$600,000 to Atlantic salmon science and conservation experts to further our understanding of Atlantic salmon and to help us make decisions on potential recovery strategies.

Approximately \$360,000 of this funding will go towards targeted academic and Indigenous research projects to increase our knowledge of Atlantic salmon and the threats affecting their recovery. Approximately \$250,000 will go towards the Atlantic Salmon Federation's monitoring program to better understand Atlantic salmon migration routes, behaviours, and areas of high mortality. The remaining \$50,000 will support the coordination activities of a new joint venture for Atlantic salmon research.

The Atlantic Salmon Research Joint Venture is Canada's first collaborative forum for bringing Atlantic salmon science and conservation communities together. Made up of experts from Fisheries and Oceans Canada,

Indigenous groups, provincial agencies, non-government organizations, academic institutions, and other stakeholders, the Atlantic Salmon Research Joint Venture will promote the sharing of scientific research with the goal of conserving and rebuilding the species. The Joint Venture held its inaugural meeting on September 29 and 30, 2016, in Moncton, New Brunswick.

This article was originally published by the Department of Fisheries and Oceans Canada.



Pennsylvania Fish and Boat Commission Celebrates 150 Year Anniversary

In 1866, a convention held in Harrisburg to investigate pollution, bad conditions existing in mountain lakes and streams, and the stopping of spring shad runs by dams resulted in Governor Andrew G. Curtin signing the law, Act of March 30, 1866 (P.L. 370, No. 336), that named James Worrall as Pennsylvania's first Commissioner of Fisheries. This created what would become the Board of Fishery Commissioners, then the Pennsylvania Fish Commission and now is the Pennsylvania Fish and Boat Commission (PFBC).

While our name has changed during our 150-year history, the agency's commitment through its mission and staff has remained constant and is best exemplified by its philosophy of "Resource First: Protect, Conserve and Enhance." With the understanding that we need to first protect our aquatic resources in order to have great recreational fishing and boating, the PFBC is proud of its past. As we "reel in" the years and reflect back on both the challenges and the accomplishments, we also look forward to a continuation of progress and hope that you'll visit this web page throughout 2016 to take stock of our history.

This article was originally published by the PFBC.



State of Massachusetts and Atlantic Offshore Lobstermen's Association Undertake Joint Study

FOUND A TAGGED JONAH CRAB?

If you find a crab with a green t-bar tag and/or orange knuckle tag marked with "AOLA" please contact: Heidi Henninger at (774) 251-9454 or heidi@offshorelobster.org



Massachusetts's Division of Marine Fisheries, in collaboration with the Atlantic Offshore Lobstermen's Association, is tagging Jonah crabs to investigate migration patterns and growth. Information will be used for Jonah crab stock assessment.

WHAT TO REPORT: date, location, tag #, crab sex, egg status and whether you kept or released the animal. For green tags only, if you have a way to measure carapace width in millimeters, we would appreciate that information as well.

REWARDS: Every tag report will qualify as one raffle entry. Rewards will be drawn July 1, 2017 and July 1, 2018: 1st place - \$500, 2nd place - \$300, 3rd place \$200.

Green tag reports with width measurement will be additionally entered into high value cash raffles drawn July 1, 2017 and 2018: 1st place - \$1,000, 2nd place \$500

If you haul a tagged crab, please release it and contact

(774) 251-9454 or heidi@offshorelobster.org



Dave Boucher, Fisheries Biologist, Awarded Department's Highest Honor Posthumously

David Boucher, fisheries biologist, author and division supervisor, was posthumously awarded the Department of Inland Fisheries and Wildlife Kenneth Anderson Award. IFW Commissioner Chandler Woodcock presented the award to Dave's wife Christa earlier today in Augusta.

"The Anderson Award is presented to a member of the Department who has made exemplary contributions towards the enhancement of the states' fish and wildlife resources," said Chandler Woodcock. "Over a career that spanned 30 years, Dave made a lasting impact on the state's trout and salmon, and numerous individuals."

Dave began his career as a student research assistant for IFW while he was at the University of Maine in the early 1980s. After short stints at IFW's Palermo Fish Hatchery and the Department of Environmental Protection, Dave was hired as an assistant regional fisheries biologist in the Belgrade Lakes Region in 1988, where he worked until he transferred to the Rangeley Lakes region in 1995.

In his 17 years in the Rangeley Lakes region, Dave became well known for protecting and enhancing the area's trout and salmon fisheries. In 2006, he coauthored "Maine Landlocked Salmon: Life History, Ecology and Management." During that time, Dave also directed the fisheries dive team, and was the Department's lead researcher on landlocked salmon.

In 2012, Dave was promoted to Fisheries Management Supervisor in Augusta where he oversaw fisheries management for the seven regions of the state, assisted regional biologists in the field, and helped craft fisheries policy.

"I have long known Dave's work from living and fishing in the western Maine area. His professionalism and commitment made a substantial, enduring effect on the state's fisheries resources, the people he worked with, and the public," said Woodcock. "He is well-deserving of the Department's highest honor, and we are very pleased to be able to recognize Dave for his outstanding work."



IFW Commissioner Chandler Woodcock presents the Anderson Award to Dave Boucher's wife Christa at the agency headquarters in Augusta.

This article was originally published by the Maine Department of Inland Fisheries and Wildlife



A forum for current research

April 21-23, 2017

Radisson Hotel, Cromwell, CT

For more information, please visit https://www.eaglehill.us/NENHC_2017/NENHC2017.shtml

Recent Publications

SEA LAMPREY CARCASSES EXERT LOCAL AND VARIABLE FOOD WEB EFFECTS IN A NUTRIENT-LIMITED ATLANTIC COASTAL STREAM

D.M. Weaver, S.M. Coghlan Jr., and J. Zydlewski

Resource flows from adjacent ecosystems are critical in maintaining structure and function of freshwater food webs. Migrating sea lamprey (*Petromyzon marinus*) deliver a pulsed marine-derived nutrient subsidy to rivers in spring when the metabolic demand of producers and consumers are increasing. However, the spatial and temporal dynamics of these nutrient subsidies are not well characterized. We used sea lamprey carcass additions in a small stream to examine changes in nutrients, primary productivity, and nutrient assimilation among consumers. Algal biomass increased 57%–71% immediately adjacent to carcasses; however, broader spatial changes from multiple-site carcass addition may have

been influenced by canopy cover. We detected assimilation of nutrients (via ^{13}C and ^{15}N) among several macroinvertebrate families including Heptageniidae, Hydropsychidae, and Perlidae. Our research suggests that subsidies may evoke localized patch-scale effects on food webs, and the pathways of assimilation in streams are likely coupled to adjacent terrestrial systems. This research underscores the importance of connectivity in streams, which may influence sea lamprey spawning and elicit varying food web responses from carcass subsidies due to fine-scale habitat variables.

Published in a special issue of the *Canadian Journal of Fisheries and Aquatic Sciences*, 2016. “Cross-ecosystem resource subsidies: from land to water and back again”, a product of a symposium held at the 145th Annual Meeting of the American Fisheries Society, Portland, Oregon, USA, August 2015.

DOI:10.1139/cjfas-2015-0506



A COMPLEX PAST: HISTORICAL AND CONTEMPORARY FISHERIES DEMONSTRATE NONLINEAR DYNAMICS AND A LOSS OF DETERMINISM

E.S. Klein, S.M. Glaser, A. Jordaan, L. Kaufman, A.A. Rosenberg

Nonlinear dynamics have been widely demonstrated in natural systems. In marine fisheries ecosystems, such dynamics have primarily been associated with exploited species, suggesting an anthropogenic stressor may explain their prevalence. However, this earlier work compared co-occurring exploited and unexploited species, as opposed to analyzing the same species before and after significant harvesting pressure. The former does not control for either differences between species or the reality of indirect and long-lasting fishing impacts. Here, nonlinear dynamics were investigated for the same species before and after significant changes in the magnitude of harvesting. We found nonlinear signatures prevalent prior to heavy industrial exploitation, and also found that these dynamics were highly deterministic. This demonstrates that nonlinearity existed in a complex marine system prior to extensive human influence and suggests such behavior may be an innate property of these populations. Results also show a reduction in deterministic dynamics post industrialization, suggesting that fishing can undermine the dynamics and resilience of marine populations and render fisheries model output less predictable for management.

Published in the *Marine Ecology Progress Series*. Vol. 557. 2016.

DOI:10.3354/meps11886

LOSS OF NAIVETY TO ANGLING AT DIFFERENT RATES IN FISHED AND UNFISHED POPULATIONS OF LARGEMOUTH BASS

Jan-Michael Hessenauer, Jason Vokoun, Justin Davis, Robert Jacobs, and Eileen O'Donnell

Recreational fishing represents a coupled human and natural system subject to complex feedback processes. Learned lure avoidance represents one feedback process that may influence a fish population's vulnerability to angling. In the present study, naïve Largemouth Bass *Micropterus salmoides* originating from fished and unfished populations were raised in a pond and subjected to standardized angling. Our objectives were to evaluate the initial angling vulnerability and the rate at which naivety to angling was lost for fished and unfished populations. While no difference in initial angling vulnerability existed among fish from fished and unfished populations of origin, individuals from fished populations learned lure avoidance faster than individuals from unfished populations. Cumulative catch events, a metric that incorporates the number of opportunities individuals had to directly and indirectly experience angling, best predicted declining daily catch rates for both fished and unfished populations, suggesting a social learning component of learned lure avoidance. That individuals originating from fished populations learned lure avoidance more quickly than unfished individuals suggests that angling selected for increased learning ability in fished populations of Largemouth Bass.

Published in Transactions of the American Fisheries Society, Volume 145, Issue 5. 2016.

<http://dx.doi.org/10.1080/00028487.2016.1194894>



GLOBAL VS. LOCAL CAUSES AND HEALTH IMPLICATIONS OF HIGH MERCURY CONCENTRATIONS IN SHARKS FROM THE EAST COAST OF SOUTH AFRICA

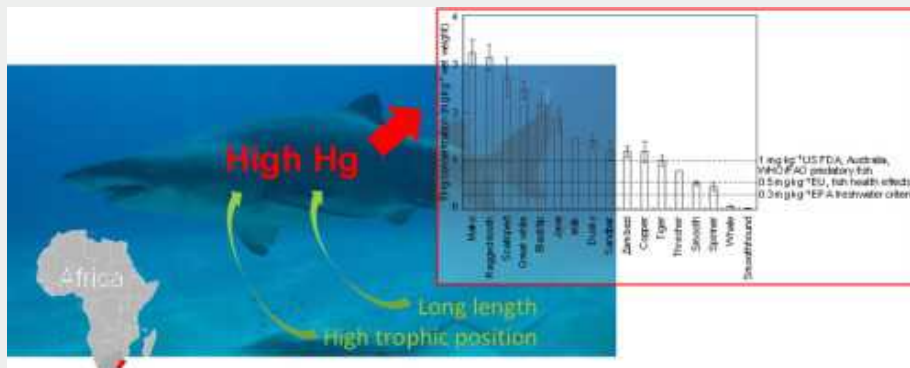
Melissa A. McKinney, Kylie Dean, Nigel E. Hussey, Jeremy Cliff, Sabine P. Wintner, Sheldon F.J. Dudley, M. Philip Zungu, Aaron T. Fisk

Conservation concern regarding the overharvest of global shark populations for meat and fin consumption largely surrounds documented deleterious ecosystem effects, but may be further supported by improved knowledge of possibly high levels in their edible tissues (particularly meat) of the neurotoxin, methylmercury (CH₃Hg). For many regions, however, little data exist on shark tissue Hg concentrations, and reasons for Hg variation within and among species or across regions are poorly understood. We quantified total Hg (THg) in 17 shark species (total n = 283) from the east coast of South Africa, a top Hg emitter globally. Concentrations varied from

means of around 0.1 mg kg⁻¹ dry weight (dw) THg in hardnose smoothhound (*Mustelus mosis*) and whale (*Rhincodon typus*) sharks to means of over 10 mg kg⁻¹ dw in shortfin mako (*Isurus oxyrinchus*), scalloped hammerhead (*Sphyrna lewini*), white (*Carcharodon carcharias*) and ragged-tooth (*Carcharias taurus*) sharks. These sharks had higher THg levels than conspecifics sampled from coastal waters of the North Atlantic and North, mid-, and South Pacific, and although sampling year and shark size may play a confounding role, this result suggests the potential importance of elevated local emissions. Values of THg showed strong, species-specific correlations with length, and nearly half the remaining variation was explained by trophic position (using nitrogen stable isotopes, ¹⁵N), whereas measures of foraging habitat (using carbon stable isotopes, ¹³C) were not significant. Mercury concentrations were above the regulatory guidelines for fish health effects and safe human consumption for 88% and 70% of species, respectively, suggesting on-going cause for concern for shark health, and human consumers of shark meat.

Published in Science of the Total Environment. Volume 541. 2016.

<http://dx.doi.org/10.1016/j.scitotenv.2015.09.074>



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Program

VACANT

Continuing Education

Chris Millard

Division Repres. to AFS Hutton Award Committee

VACANT

Acknowledgments

The Northeast Fish Rapper is produced by volunteers. It would not be possible without contributed content from Northeast Division members. Our next edition will be published in Spring 2017. We are always looking for writers to contribute to our "Fisheries in the News" section. These news briefs can be based on original research, management actions, or articles published in other news outlets and should range from 350-750 words. If you have a particular interest you wish to write about, let us know! If you would like to be included when we send out a list of potential topics for news briefs, send your name and email address to Jocelyn Runnebaum or George Maynard. Additionally, we are always looking for photographs and artwork to include in the Rapper. If you have interesting pictures from field work, fishing trips, or anything else you'd care to share, send it along, no writing necessary. A big thanks goes out to everyone who contributed to this edition of the Fish Rapper. We appreciate all of your effort!



Contributing Organizations:

- Atlantic International Chapter
- Atlantic Offshore Lobstermen's Association
- Fisheries and Oceans Canada
- Massachusetts Division of Marine Fisheries
- Mid-Atlantic Chapter
- Mid-Atlantic Fisheries Management Council
- NOAA Northeast Fisheries Science Center
- Ocean Tracking Network
- Pennsylvania Fish and Boat Commission
- Southern New England Chapter
- University of Connecticut
- University of Maine
- University of Maine Student Subunit
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