AFS Estuaries Section News

Fall 2018

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President's Message

Happy 25th & Social Media Blitz

Happy 25th to the Estuaries Section! My how things have changed in those 25 years. My hope is we can continue the forward momentum and continue to provide travel awards to students, for many years to come. Our 25th year as a section was filled with lots of events- we sponsored a symposium in Atlantic City ("Life in the Big City: Understanding Urbanization Impacts on Estuarine Fishes and Shellfish"), we gave out two student travel awards (PhD student Amanda Croteau from UF and MS Student Steven Lombardo from NCSU), supported the AFS Puerto Rico Fund, and threw a successful 3rd Monsters event, "Monsters of Climate Science".

At AFS in Atlantic City, the AFS Science Communication Section made an amazing offer. They offered to help any section out with social media in any form (wowza!). Currently, the Estuaries Section maintains a Facebook page, a Twitter account (@Estuaries_AFS), and a LinkedIn account. Our LinkedIn account has 112 followers and has been going strong for over four years. The Facebook page has 66 likes and our twitter account has gained 69 followers since it started in December 2016 (Happy 2nd birthday to our twitter feed). While these numbers are encouraging, we know we can do better, and to continue to attract the next generation of scientists and researchers to our section we must do better with our communication and outreach. So, the executive board has some secret plans in the works, some involving

Continued on Page 2

Continued from Page 1

participation from our members! So please stay tuned. Until then, please enjoy this interview with our President-Elect, Catherine Johnston.

Meet Our Section's President-Elect Catherine Johnston!

LW: Why did you join the Estuaries Section

CJ: I joined the Estuaries Section of AFS when I was a graduate student at the University of Maine. My research was on sturgeon in the Penobscot River estuary, so the section seemed to be a really good fit for my research at the time. Plus, anadromous fish and their habitats have always been most interesting to me, so the section fit well with my passion.

LW: What are you currently working on?

CJ: I work as a supervisory fish biologist for the US Fish and Wildlife Service in Lodi, California. I work on a program monitoring endangered Delta Smelt and other native fishes in the San Francisco Estuary. I do a mix of things daily - managing the database for the monitoring program, writing and reporting, performing field work, and supervising field technicians.

LW: What do you hope to do with the Section when you are president?

CJ: One thing I hope to work towards with the Section is increasing membership and involvement of students and early career members. As an early career researcher myself, I have found the Estuaries Section to be incredibly helpful in introducing me to other members of AFS who share my interests. It has helped me become more connected and involved, which I am very grateful for so I want to encourage others to do the same. I also will look forward to helping the Section organize special activities at the Annual AFS meetings.

Catherine in Sequoia National Forest fishing for California Golden Trout

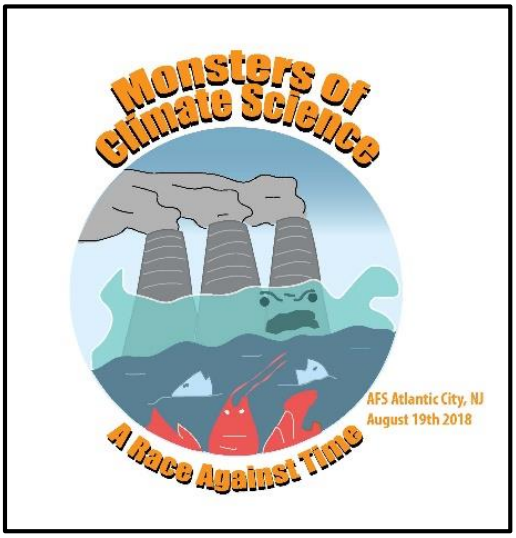
LW: What is your favorite Estuary you have visited or worked on?

CJ: My favorite estuary is the Kennebec Estuary in Maine. As a college student, I was introduced to fisheries research when I worked in that system performing summer research on anadromous fish in Merrymeeting Bay. I fell in love with field work and realized how fun it was to go to work when it was on a boat handling fish on a beautiful bay!

Lynn Waterhouse
Estuaries Section President

Monsters of Climate Science Wrap-up

The AFS Estuaries Section and Marine Fisheries Section sponsored a third fund-raising workshop at the 2018 AFS Annual Meeting in Atlantic City. The workshop, entitled Monsters of Climate Science: A Race against Time, brought together six leading scientists to discuss the implications of climate change for fisheries ecosystems and fishing communities.



Doug Beard, U.S. Geological Survey (USGS) Assistant Director for Land Resources, kicked off the workshop with a talk on climate adaptation that concluded with the audience dancing with Baby Groot from Guardians of the Galaxy. NOAA Fisheries' Vince Saba, taking the podium to the power chords of Rush's "Tom Sawyer," discussed the state of climate change science. The Gulf of Maine Research Institute's Lisa Kerr, looking sharp in her Monsters of Climate Science custom t-shirt, described fisheries management strategies in a changing climate. Abigail Lynch of the USGS, introduced by REM's ironically bouncy "It's the End of the World as We Know It (and I Feel Fine)," addressed ecological drivers that interact with climate change studies. After rocking out to the Bangles' "Hazy Shade of Winter," Michelle Staudinger of the U.S. Department of Interior provided a short lecture on climate-induced shifts in phenology. Princeton's Talia Young, replete in an elaborate squid hat, concluded the workshop with a presentation on fishing community responses to climate change.

Continued on Page 4

"Monsters of Climate Science"

Monsters of Climate Science Wrap-up

Continued from Page 3

The workshop was well-attended and included some interesting discussion questions at the end. The Estuaries and Marine Fisheries Sections are happy to report that the workshop raised nearly $1,200 (to be split between the sections) for student travel awards to future AFS annual meetings. Thanks to all the great presenters and organizers for making this workshop a big success!

“Monsters of Climate Science” and some of the workshop organizers.

Feature Article

Evidence for Temperature-dependent Shifts in Spawning Times of Anadromous Alewife and Blueback Herring

Steven Lombardo, 2018 MS Estuaries Section Travel Award Winner

Advisor: Jeffrey Buckel
North Carolina State University
The Center for Marine Sciences and Technology
Department of Applied Ecology

Steven Lombardo being present the Estuaries Section Travel Award by President-elect Catherine Johnston.

Driving through northeast North Carolina can sometimes feel like you've stepped back in time, to the early 20th century, a slower time. Along the meandering country roads you'll find vast expanses of longleaf pine forest, a smattering of sleepy towns, and conclude that farming is the way most people here make their living. Continue exploring the region and you'll likely find yourself along the banks of North America's second largest estuary, the Albemarle Sound. The Albemarle Sound is at the heart of North Carolina's "fertile crescent". It's ten large tributaries (Roanoke, Cashie, Chowan, Yeopim, Perquimans, Little, Pasquotank, North, Scuppernong, and Alligator) and the shunting of the ocean from the Outer Banks make this estuary uniquely fresh. The waters are brown, or black as you move up towards the headwaters, laden with tannins leached from the peat soils; a perfect habitat for cypress and tupelo trees. Their knees reaching up out of the water like woody stalagmites you'd find in a cave. As the water laps up against the shore and curls through the bevy of Cyprus knees, the simplicity and calmness of the landscape, especially in the crisp air before the bonanza that is spring, would lead you to believe that everything here moves slow. But unbeknownst to the casual shoreline observer, a marathon is going on below the surface…

The Albemarle Sound's close proximity to the ocean – Oregon Inlet is only tens of kilometers away – provides the perfect conditions for anadromous fish populations. Anglers and piscivorous foodies may be familiar with large Striped

Continued on Page 6

Continued from Page 5

Bass *Morone saxatilis* that migrate from, the oceans to these tributaries to spawn, but historically small, silver forage fishes collectively called river herring, were the predominant anadromous fishes; so abundant that locals would posit that they could walk across the rivers on their backs. Alewife *Alosa pseudoharengus* and Blueback Herring *Alosa aestivalis* are commonly referred to as river herring due to being nearly indistinguishable when examined visually and due to their similar spatiotemporal distributions. Thus, Alewife and Blueback Herring are managed together as one fishery.

River herring once supported one of the largest fisheries in North America, spanning their North Atlantic distribution from Nova Scotia to Florida. In North Carolina, landings averaged more than 12 million pounds between 1880 and 1970. That equates to 24 million fish harvested per year over that time period, and a total of 2.2 billion fish. However, in the late 1970s the fishery collapsed in North Carolina and across the North American Atlantic Coast. The North Carolina Division of Marine Fisheries (NCDMF), many other Atlantic States Marine Fisheries Commission (ASMFC) member states, and researchers have spent the past four decades investigating causes to this collapse. Collectively, they have determined that the collapse has been caused by a combination of commercial fishing pressure on the spawning grounds, habitat inaccessibility due to dams, and degraded habitat due to poor water quality. In 2007 North Carolina introduced a harvest moratorium on river herring. In spite of this, the fisheries independent monitoring has suggested that the population has not recovered. As part of my master's thesis work in Dr. Jeff Buckel's lab at NC State University's Center for Marine Sciences and Technology (CMAST), I was tasked with further exploring the decline and apparent inability to recover in the Albemarle Sound river herring population.

In order to examine the population issue I worked with the NCDMF and their river herring spawning habitat survey team, which has been monitoring river herring habitat use in the Albemarle Sound since 1973. My main objective was to use their

Gillnet set near culvert to collect river herring (top) and river herring samples (bottom).

Continued on Page 7

Continued from Page 6

long-term dataset to identify fluctuations in spawning habitat use and availability, and to determine what environmental conditions influence these changes. Serendipitously, while familiarizing myself with the dataset and working on constructing a habitat use probability model, I came across an interesting pattern in the presence of these fishes over time. As anadromous fishes, river herring enter the river systems to spawn and leave upon completion. When looking at the timing of ingress and egress on a year-to-year scale, the changes in timing showed variability, but in some years sampling was too scarce to make conclusions. However, when the data was aggregated by decade a clear pattern emerged: river herring in the last decade were arriving to the spawning grounds earlier and leaving much earlier when compared to their migration timing in the 1970s and 1980s. The changes in ingress and egress timing were not equal, and as a result the amount of time spent on the spawning grounds was reduced. Alewife are spending 11 days less on the spawning grounds when compared to the 1970s, and Blueback Herring are spending 18 less days on the spawning grounds compared to the 1980s. Changes in river herring spawning migration timing appears to be driven by changes in vernal warming. Streams in this region are warming at 49% faster rate in April and May when compared to the 1970s and 1980s, likely contributing to the larger change in egress timing. Using warming trends to predict ingress and egress corroborated the phenological shifts observed.

The original project goal and work examining whether river herring habitat use was influenced by anthropogenic modification of the riparian zone and instream habitats showed that river herring habitat use was not being impacted by agriculture/silviculture and urbanization in this region. Also, at current abundances, culverts were not preventing migration to and from spawning habitat. Despite access to quality spawning habitat, and both habitat and fisheries management efforts, the substantial changes in time spent on the spawning grounds may be preventing the Albemarle Sound river herring population from recovering. Further work examining the relationship between time spent on the spawning grounds and recruitment will help to determine whether time spent on the spawning grounds truly is the bottleneck preventing stock recovery.

The above work will be submitted for journal publication in winter 2018. Thesis copies, entitled Phenological Characterization and Effects of Environmental Attributes on River Herring Spawning Migrations within the Albemarle Sound Watershed, can be found at https://repository.lib.ncsu.edu/handle/1840.20/35428.

Steven Lombardo with river herring collected during habitat use survey.

Estuaries Section sponsors urbanization impacts session at AFS Annual Meeting 2018

Nine speakers representing seven estuaries contributed to the symposium **"Life in the Big City: Understanding Urbanization Impacts on Estuarine Fishes and Shellfish"**, which was sponsored by the Estuaries and Fish Habitat Sections. We heard from researchers studying estuaries on the eastern, western, and southern coasts of the US as well as a researcher studying Brown Trout in a Norwegian estuary. A broad range of urbanization pressures were discussed by our speakers including dams, shoreline armoring, impervious cover, water extraction, and construction. Some talks provided valuable information on what's been learned by monitoring fish communities in urbanized estuaries. Other talks looked ahead at ways to promote improved estuarine health, including dam removals, citizen science monitoring programs, and increased data resolution to better understand how to conserve resources in these complex and valuable systems.

A number of recurring themes emerged throughout the afternoon of talks, including the critical importance of collecting data on fish and shellfish in highly impacted estuaries, where many competing priorities can make the conservation of natural resources particularly difficult. Both the long history of human impacts and the intensity of impacts are driving the effects observed on natural resources in these urbanized estuaries. Below are summaries, written by either our speakers or the organizers, of the talks included in the session:

Jan Grimsrud Davidsen, NTNU University Museum, presented "Under Pressure - the Importance of Estuaries for Brown Trout"

Estuaries are important transition zones for sea trout and need to be protected from industrial development, channelization and other kinds of deterioration of the habitat. For successful compensatory measures or habitat restoration, detailed knowledge about sea trout habitat use and behavior is crucial.

Continued on Page 9

Symposium organizers and some of the speakers.

Estuaries Section sponsors urbanization impacts session at AFS Annual Meeting 2018

Continued from Page 8

Jessica L. Valenti, Rutgers University, presented "Influence of Shoreline Armoring on Deep-Subtidal Marsh Creek Fish Communities"

The species composition of deep, subtidal fish assemblages from natural and armored creeks were similar; however species that relied on marsh habitat were absent or had decreased abundances in the armored creeks. It appears the influence of shoreline armoring extends to deeper water fish assemblages although the effects may not be as pronounced as the effects on intertidal and shallow subtidal assemblages which rely more heavily on marsh shoreline for habitat, food sources, and reproduction. Small patches of marsh in an area surrounded by armoring have been shown to support diverse fish communities indicating the importance of marsh habitat for estuarine fishes.

Margaret McGinty, Maryland Department of Natural Resources, presented "Fish Habitat Management in Changing Chesapeake Bay Watersheds: Developing Sound Science to Guide Policy"

Studies of spawning and nursery habitat for several tidal fish species in the Chesapeake Bay have shown that increased development in a watershed is correlated with declining habitat quality and attendant declines in presence of eggs, larvae, juveniles and adult life stages of key iconic species. Without directed research to identify underlying mechanisms that limit habitat, our best management strategy is promote conservation of rural landscapes where habitat is still supporting successful recruitment.

Kayla M. Smith, SUNY College of Environmental Science and Forestry, presented "Towards Co-Learning in River Restoration: Public Perceptions of Dam Removal in the Hudson River Estuary"

Dams have a long history of impacting the Hudson River Estuary and disrupt the ecosystem in a variety of ways. Kayla discussed the diverse impacts of dams (environmental, economic, and safety-related) and described work to engage the public in discussions of dam removal. This work will contribute to a stakeholder-generated decision making tool for considering dam removal. *Written by Catherine Johnston*

Continued on Page 10

Estuaries Section sponsors urbanization impacts session at AFS Annual Meeting 2018

Continued from Page 9

Sara Turner, MA Division of Marine Fisheries, presented "Improving Fish Passage and Aquatic Connectivity: Undoing 200 Years of Anthropogenic Impacts in a Coastal Massachusetts Watershed"

Dam removals on the Mill River in Taunton, MA offer a view into the potential for restoring a long-impacted estuary. For the first time in 200 years, diadromous fish were able to pass upstream from Narragansett Bay in spring 2018. Monitoring has been underway to document the response, offering insight into how river restoration can impact multiple migratory species. *Written by Catherine Johnston*

Levi Lewis, UC Davis presented "California's Endangered Estuarine Osmerids: Life History Diversity Within a Highly-Modified and Ever-Changing Environment"

Delta Smelt (*Hypomesus transpacificus*) and Longfin Smelt (*Spirinchus thaleichthys*) are two of the most endangered and socio-politically important estuarine fishes in the San Francisco Bay Estuary, CA. Major conservation interventions and changes in water management are likely necessary to save these species; however, identifying effective strategies requires a comprehensive understanding of their unique life history strategies and environmental needs. We used in situ Sr isotope laser ablation otolith chemistry to reassess the life histories of these two fishes, with results challenging existing life-cycle models and suggesting that conservation efforts may need to focus more on restoring ecological dynamics that favor the full spectrum of the diverse life-history strategies utilized by each species.

Eivy Monroy, Narragansett Bay Estuary Program, presented "Challenges and Changes Due to Historical and Current Urbanization Trends in Narragansett Bay Watershed"

In the Narragansett Bay watershed, urbanization impacts such as widespread impervious cover and low dissolved oxygen challenge shellfishing area management. Climate change is another impending threat that will compound the challenges of resource management in the system. Eivy discussed these challenges, and the types of data being synthesized to better understand and address these issues. *Written by Catherine Johnston*

Continued on Page 11

Estuaries Section sponsors urbanization impacts session at AFS Annual Meeting 2018

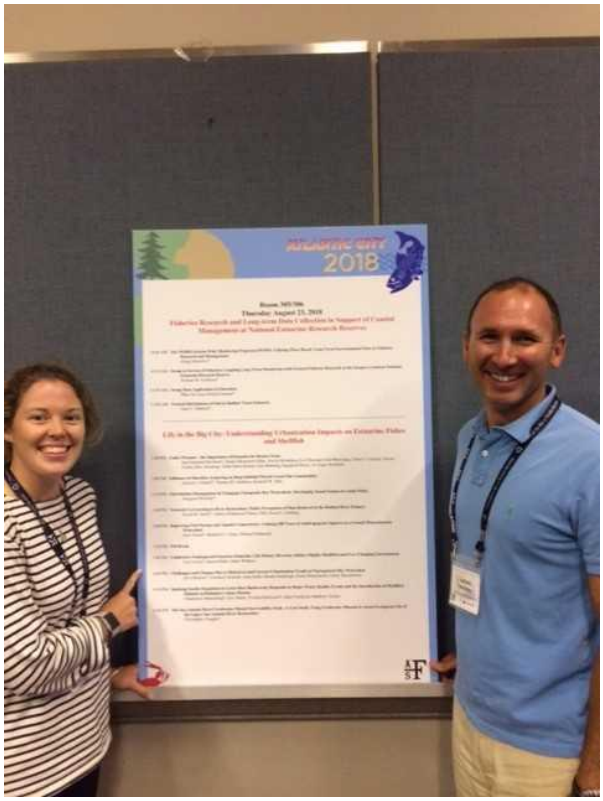
Continued from Page 10

Charmaine Dahlenburg, National Aquarium, presented “Studying Sessile Organisms to Learn How Biodiversity Responds to Major Water Quality Events and the Introduction of Modified Habitats in Baltimore's Inner Harbor”

Charmaine presented on a project led by The National Aquarium to construct a Model Urban Waterfront in Baltimore’s inner harbor. The inner harbor sits in a highly urbanized area, and little baseline information existed on the biota found there. With the Model Urban Waterfront, researchers and citizen scientists can collect baseline biodiversity data, learn about poor water quality impacts on the community, and educate the public. *Written by Catherine Johnston*

Christopher Vaughn, San Antonio River Authority, presented “The San Antonio River Freshwater Mussel Survivability Study: A Case Study Using Freshwater Mussels to Assess Ecological Lift of the Upper San Antonio River Restoration”

Christopher presented on restoration activities and monitoring on the Upper San Antonio River, where habitat degradation and poor water quality have detrimentally impacted freshwater mussels. Following the restoration of Mission Reach, monitoring of captive mussels in Mission Reach and the Lower San Antonio River is being conducted to compare survivability and growth to determine the feasibility of reintroduction of mussels into the system. *Written by Catherine Johnston*



Symposium organisms: Catherine Johnston (Estuaries Section President-elect) and Jim Vasslides (Estuaries Section Secretary)

Estuaries Section Treasurer's Report

respectfully submitted on 11/25/2018 by
Dr. Konstantine J. Rountos (Treasurer)

Date	Balance	Credit	Debit	Note
08/19/18	4,520.64			Treasurer's Report (2018 ES Business Meeting)
08/23/18	4,720.64	200.00		AIFRB check to support 2018 "Monsters" event
08/28/18	4,318.43		402.21	Check#123 (Food and Bev. for 2018 Business meeting w/ MFS)
08/28/18	4,213.43		105.00	Check#125 (Reimbursement for L. Benaka for Monsters t-shirts for 2018 AFS meeting)
09/14/18	4,414.53	201.10		Check from MFS for 50% of 2018 Business meeting Food & Bev. Costs
09/24/18	3,614.53		800.00	+Check#124 (Reimbursement for J. Vasslides for 2018 Student travel award checks)
11/25/18	3,614.53			Current balance

+ 2018 Student Travel Award winners were given personal checks from J. Vasslides at the 2018 AFS meeting. This is because checks #121 and 122 (made out to CROTEAU and LOMBARDO) that were originally sent to J. Vasslides to bring to the AFS meeting were lost. Checks # 121 and 122 have been VOIDED.

*Pending check issued - Check#126 for Invoice 8852 (AFS Award Certificates CROTEAU, LOMBARDO) = $20.00

Check us out online!

Website: http://estuaries.fisheries.org Twitter: @Estuaries_AFS

Facebook: http://www.facebook.com/EstuariesSectionAFS

LinkedIn: https://www.linkedin.com/groups/7443198