

Summer 2017

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# AFS Estuaries Section News

## President's Corner

This is my final column as the Estuaries Section President. It's been a real pleasure to serve, particularly getting to know more of you and especially working with the rest of our Executive Committee: Past-President Abigail Archer,

President-elect Lynn Waterhouse, Secretary Geoff Smith, Treasurer Konstantine Rountos, and our very own guru, ex-officio Lee Benaka. And welcome to our incoming President-elect, Catherine Johnston, and Secretary-elect, Jim Vasslides.



I want to give a shout-out to Lee: he has been awarded AFS's Distinguished Service Award, which he'll receive at the AFS annual business meeting in Tampa (Wednesday, 8/23). Lee's being recognized for all his fine work for the Estuaries Section. Well done, Lee, and well deserved!  
We'll be sending out a

"Conference Special Edition" newsletter in early August; it will contain important info for you about the special fundraising event and symposia we are sponsoring, as well as details on the business meeting. Stay tuned.

I want to round out my column with a few more thoughts about terrestrial-aquatic linkages; you may have noticed this is one of my recurring themes. I've got a small plot in a community garden, and perhaps some of you may work the soil as well. It's a scruffy garden, with a mix of intentional, accidental, and volunteered members. It forms a community that teaches me every year how plants interact with each other and how my actions, whether weeding, feeding, or pruning, affect it. I've found over time that the scruffiness seems to promote resilience to pests and diseases, as long as I keep an eye on it. We get what we want in the way of produce, and some goes toward the other

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*(cont'd from page 1)*

creatures in the system.

We've had a lot of rain here in the Northeast this summer, even while the Southwest bakes and burns. How do the estuaries in these regions respond to these varied inputs? Here the waters are bearing much of the land-wash downstream to marshes, bays, and out to sea. In drier areas, ocean water pushes up. All of this affects productivity, habitat space, and consequently the fish communities. In many systems, water and sediments are held back by dams and water works; many of us in the Estuaries Section concern ourselves with these, as impediments to connectivity.



My garden is linked to waters not only through the hydrological cycle, but also through the fish carcasses that I feed it. Mostly these are the remains left behind of graduate student research: Hudson River eels, Delaware River sea lampreys, river herring from up and down the coastal estuaries. This is a far, esoteric cry from the industrial fish-based fertilizers in wide use, but serves to remind me that we of the land link in so many ways to our coastal waters. Indeed, it mimics the age-old occupation of fisher-farmers, who used the fertility of estuaries and rivers directly – the shad, sturgeon, salmon – and fed so much to their land (think menhaden, for example).

Are we, in some ways, the latter-day equivalent of the fisher-farmers? Something to think about, as you head off to do your research and management...

Have a great summer, and I hope to see many of you in Tampa!

*Karin Limburg  
Estuaries Section President*

## Announcing the 2017-2019 Estuaries Section Executive Committee



**President  
Lynn  
Waterhouse**



**President-Elect  
Catherine Johnston**



**Secretary Jim Vasslides**



**Treasurer  
Konstantine  
Rountos**



**Past-President  
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**Newsletter Editor  
Geoffrey Smith**



**Webmaster  
Abigail Archer**

## FEATURE ARTICLE

## Relating variation in the population dynamics of Gulf Menhaden to environmental processes

By **Grant Adams**

**2016 Estuaries Section Student Travel Award Winner**

Forage fish are a multitaxonomic group of small, planktivorous species such as anchovies and menhadens and are a link between phytoplankton and upper trophic levels. Globally, forage fish support 20% of the ex-vessel catch value of marine fisheries either directly or through strong trophic linkages. Because of their short-life cycle, forage fish respond quickly to climate-driven shifts in environmental conditions such as temperature, productivity, and currents. However, environmental processes are rarely included in management. In a review of 1,250 stock assessments and harvest control rules, Skern-Mauritzen et al (2015) found only 24 examples or 2% of global fisheries management that included processes such as temperature, currents, upwelling, and predation. Therefore, research should aim to relate the dynamics of forage fish to environmental processes to better inform management as environmental conditions change.

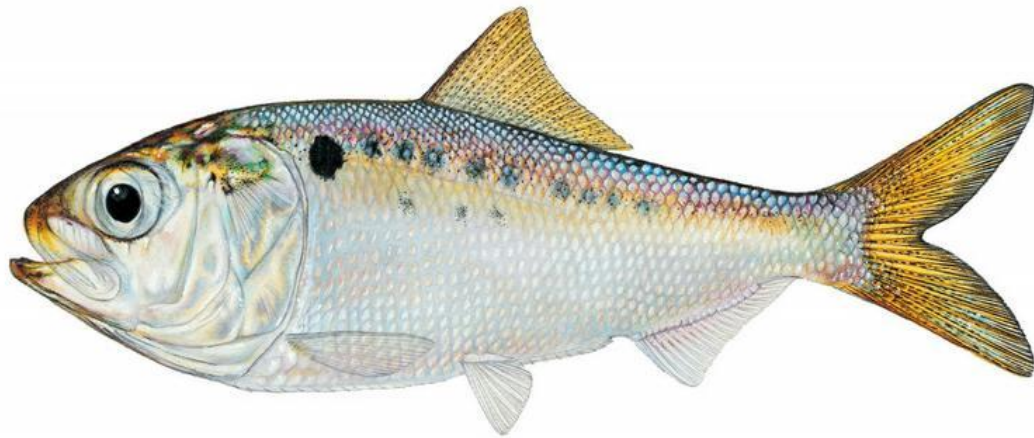


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### Grant Adams article cont'd

The northern Gulf of Mexico (NGOM) is a river-dominated ecosystem that serves as the terminus of the watershed for much of the continental US. Gulf Menhaden, *Brevoortia patronus*, is an abundant forage fish distributed throughout coastal and estuarine waters of the NGOM. In addition to supporting the second largest fishery, by weight, in the United States, Gulf Menhaden is a prey item for commercially and recreationally important fishes, sea birds, and marine mammals, providing a link between primary producers and secondary consumers. Variations in the individual and

population dynamics of Gulf Menhaden can have implications for ecosystem productivity and fisheries in the NGOM.



Gulf Menhaden, *Brevoortia patronus*

A variety of hypotheses have been proposed to explain which environmental processes impact the population dynamics of Gulf Menhaden. Recruitment is negatively correlated with Mississippi River discharge, and previous researchers have suggested that increases in discharge serve to enhance the offshore distribution of larvae and increase predation. Alternatively, increases in river discharge in the NGOM can lead to increased nutrient inputs and enhanced primary and secondary productivity. Gulf Menhaden are obligate filter feeders and processes that enhance primary and secondary productivity in the NGOM may lead to contrasts in individual growth and condition. Similarly, temperature is also associated with variations in the individual growth and survival of fishes. However, an understanding of the impacts of temperature on the dynamics of Gulf Menhaden is limited.

The majority of my research aims to further understand the relationship between individual and population dynamics of Gulf Menhaden and environmental processes. I investigate this by utilizing historical fisheries

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### ***Grant Adams Research, cont'd***

data and a suite of remote sensing, modeled, and in situ environmental data. These data are incorporated into statistical- and process-based models that evaluate variation in the relative condition, distribution, and individual growth of Gulf Menhaden in relation to Mississippi River discharge, chlorophyll *a* concentration, wind vector components, sea surface temperature, and the areal extent of the recurring hypoxic zone.

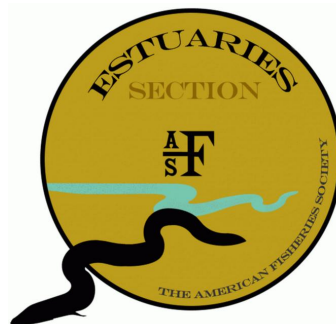
My research indicates that multiple environmental processes are correlated with the individual and population dynamics of Gulf Menhaden. For example, throughout the NGOM, relative condition is positively correlated with Mississippi River discharge. This is likely a consequence of increased nutrient loading, leading to greater feeding opportunities. However, river discharge is also associated with reduced individual growth during year-one, possibly mediated by temperature related growth dynamics because river discharge is significantly cooler than surrounding shelf waters. Alternatively, my work also reveals that river discharge



Mr. Adams accepts the 2016 Student Travel Award from Estuaries Section President Karin Limburg.

serves to enhance the offshore and western distribution of larvae, prolonging inshore transport to estuarine nursery grounds. An enhanced offshore distribution may limit the duration of rapid growth that occurs in estuarine environments. This work highlights the complexity within this ecological system and that environmental impacts often are contingent on the age of an individual. Similarly, the relationship between environmental covariates and Gulf Menhaden can also be non-stationary, varying depending on location. For example, winds influence carbon export pathways out of the Mississippi and Atchafalaya Rivers which is in turn, influenced by local topography. Using regression models that account for such non-stationarity, my work indicates that the relationship between wind vector components and relative condition of Gulf Menhaden reflects wind-driven transport of productive plume waters, likely due to the enhanced feeding opportunities associated with the location of the river plume.

The relationships identified by the observed research are relevant to the management and activity of the Gulf Menhaden fishery. Given correlations between fat content and condition of Menhaden, lower oil yields from the commercial reduction fishery would be expected during years of low river discharge and variations in wind may alter oil yields if fishing activity does not account for spatially-explicit wind dynamics. Conversely, given the altered growth and spatial distribution of pre-recruits in relation to river discharge, biomass of age-1 individuals may be reduced after high discharge years. The next step for fisheries researchers would be to use simulation techniques to evaluate the inclusion of the environmental processes identified by my research on the estimation of biological reference points used to manage the Gulf Menhaden fishery. The incorporation of environmental processes in dynamic population and assessment models can then be used to guide tactical management decisions that account for a changing climate and the ecological role of Gulf Menhaden in the NGOM. ■



## Monsters of Fish Habitat Science Workshop

**JOIN US** for an afternoon of **mayhem**, *mirth*, and majorly informative presentations on different aspects of fish habitat science.



**12:30-3:30pm on Sunday, August 20**

### Speakers

**Tom Bigford**, AFS Policy Co-Director

**Gary Whelan**, Michigan Dept of Natural Resources – Fisheries Division

**Brian Graeb**, Dept of Natural Resource Management at S Dakota State University

**Howard Townsend**, NOAA/NMFS/ST/Ecosystems Cooperative Oxford Lab

**Karin Limburg**, SUNY College of Environmental Science & Forestry

**Linda Walters**, Department of Biological Sciences, University of Central Florida

**James Locascio**, Fisheries Habitat Ecology & Acoustics Research Program Manager,  
Mote Marine Laboratory

This event, organized by the AFS Estuaries, Fish Habitat, and Marine Fisheries Sections, will benefit student travel awards for the AFS Annual Meeting. Register online or at the door: \$40 for non-students and \$20 for students.



AMERICAN FISHERIES SOCIETY  
147TH ANNUAL MEETING  
**TAMPA, FLORIDA**  
AUGUST 20-24, 2017

## ***Estuaries Section Sponsored Symposium: Biology and management of aggregating species in freshwater and marine systems***

### **19 Talks on Monday, August 21**

#### **Organizers:**

Lynn Waterhouse, Ph.D, Candidate,  
University of California, San Diego, Scripps  
Institution of Oceanography  
Selina Heppell, Oregon State University  
Scott Heppell Oregon State University



Source: Grouper Moon

#### Featuring talks on...

- Swirling, Jumping, Burping and Farting: Pre-Spawning Aggregation Behaviors of Bonefish (*Albula vulpes*)
- Coldwater Refugium Use By Migrating Salmon: Pitfall or Panacea
- What Happens in Real Life: Comparing Protected and Unprotected Aggregation Sites in the Florida Keys and Its Implications for Management
- Estimating Fish Abundance at Spawning Aggregations from Courtship Sound Levels
- Spawning Migrations of Atlantic Goliath Grouper
- Spawning Aggregations Act As a Bottleneck Influencing Climate Change Impacts on a Critically Endangered Reef Fish



AMERICAN FISHERIES SOCIETY  
147TH ANNUAL MEETING  
**TAMPA, FLORIDA**  
AUGUST 20-24, 2017

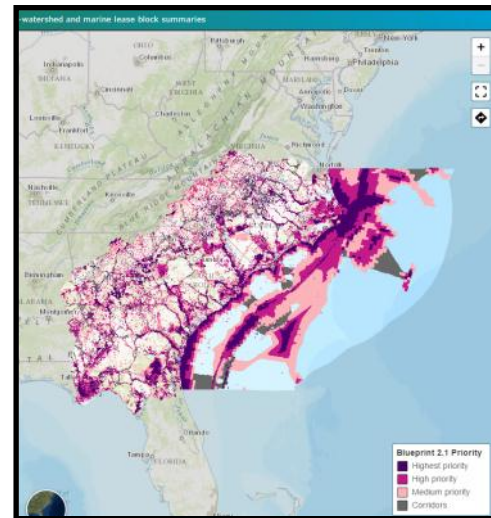
## **Estuaries Section Sponsored Symposium: Landscape Conservation Cooperatives and Fish Habitat Partnerships Facilitate Networks**

### **12 Talks on Monday, August 21**

**Organizer:** Gwen White, Science Coordinator, Eastern Tallgrass Prairie & Big Rivers LCC

#### **Featuring talks on...**

- Protecting and Restoring Environmental Flows and Water Levels in Prairie Rivers and Streams in the Great Plains
- Collaboration Between Fish Habitat Partnerships and Landscape Conservation Cooperatives Facilitates Connections Between Land and Water
- The Southeast Conservation Adaptation Strategy: Building a Connected Network of Landscapes and Seascapes
- Mississippi Basin / Gulf Hypoxia Initiative - Precision Conservation Blueprint
- Social Networking and Scientific Tools Help Fishers & Farmers Connect with Conservation
- Great Plains Native Fish Conservation Network: Empowering Collaborative Stewardship Across a Multi-Jurisdictional Landscape
- Collective Action and Sharing Science-Based Resources to Enhance Conservation of Aquatic Ecosystems



South Atlantic Conservation Blueprint map.

## Estuaries Section Treasurer's Report

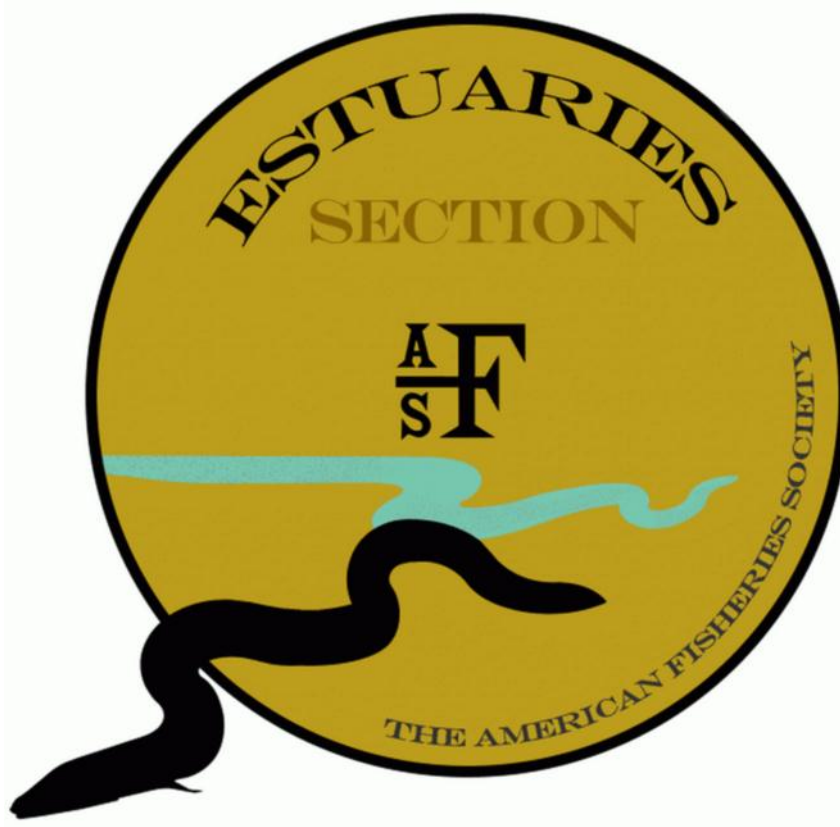
respectfully submitted on 07/18/2017

by

Dr. Konstantine J. Rountos

### Recent transactions:

Date:	Balance	Credit	Debit	Note:
03/27/17	2,663.23			Winter/Spring 2017 Newsletter
07/10/17	3,862.23	1,199.00		Deposit of 2016 Estuaries Section dues
07/18/17	3,862.23			Current balance



**Check us out online!**

Website: <http://estuaries.fisheries.org> • Facebook: <http://www.facebook.com/EstuariesSectionAFS>

LinkedIn: <https://www.linkedin.com/grps/Estuaries-Section-American-Fisheries-Society-7443198/>