

# **PENNSYLVANIA CHAPTER**

#### **AMERICAN FISHERIES SOCIETY**

JULY 2019 SUMMER NEWSLETTER



pa.fisheries.org

## Summer Social and Business Meeting: July 27, 2019 Juniata College Raystown Field Station on Raystown Lake

Join us for our annual summer social at the Raystown Field Station on Saturday July 27. Come early and spend the day with other chapter members. Fun for the whole family by the lake.

#### Schedule:

Lunch at noon — burgers and hotdogs. Please bring a side dish or dessert

Business meeting at 3 PM — introduction of new officers

Evening activities 4 PM to ? — hiking, fishing, biking, sight seeing, swimming, kayaking, and canoeing, and *fish sampling* along the shoreline of Raystown Lake. This is a free event!

Please RSVP by July 25 to pachapterafs@gmail.com or on this form: https://forms.gle/kVr6KbL5p3mbjeRz9







#### PA Chapter Officers 2018 / 2019

**Contact us!** We love to hear from members. Please send us your thoughts, ideas, and suggestions for meetings, activities, or anything related to our fisheries and aquatic resources!

pachapsterafs@gmail.com

Chapter President David Argent



President elect Greg Moyer





Past President



Aaron Henning

Excomm Henning Geo







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# Recap: 2019 PA Chapter AFS Annual Technical Meeting The Nexus—Bridging Land and Water



The 2019 annual technical conference was held jointly this year with the Pennsylvania Chapter of The Wildlife Society in State College at the Ramada Inn on Feb 21-23. Attendance was incredibly high and packed the conference center. On Friday, we were fortunate to have AFS executive director Doug Austen speak about the importance of AFS membership. Dustin Shull a Water Program Specialist with PA DEP and Cindy Dundy, secretary of DCNR spoke in the plenaries. After a day of concurrent technical presentations, 28 poster presentations filled the Directors Hall and spilled into to lobby of Ramada Inn. Best student paper and poster awards went to *wildlife* students: Grace Lewis (Juniata College) for her poster on "Impact of Environmental Factors, Predators, and Patch Size on the Distri-

bution of Allegheny Woodrats", and N. Scott Parkhill (Penn State U) for his paper on "Using multi-scalar habitat modelling of wood thrush in central Pennsylvania to inform novel forest management." Ben Kline from Penn State received the Cooper Award. Congratulations to all students who won awards. Saturday workshops

included using R for Statistics, macroinvertebrate identification, monitoring fish and wildlife individuals and disease,



winter botany, Geographic Information Systems, and a geological tour of the area. Due to road conditions, the geology tour had to be canceled, but hopefully will be offered in a future meeting. Thanks to all attendees and participants, and especially the workshop leaders, for making this an extremely valuable networking experience and one of the largest attended conferences in recent times. The full conference program with abstracts and biographies of plenary speakers can be found here: <a href="https://wildlife.org/pennsylvania-chapter/abstracts-programs-past-chapter-meetings/">https://wildlife.org/pennsylvania-chapter/abstracts-programs-past-chapter-meetings/</a>



## **Contest: ichthyology fun**

I recently saw these 2 pieces of art (constructed of tin) on the wall in a local hotel in Huntingdon, PA. While I love everything fishy, and these works are impressive, my eye caught obvious anatomical and taxonomic mishaps and over generalizations. I am often plagued with the need to study and point out these "slip-ups" anytime I see fish art on clothing, socks, and so forth (anyone with me here?). So, first who can provide an ID on the suspected species below? And, how many fish follies can you fish nerds find? Email your response to: <u>merovich@juniata.edu</u>. Best essay response wins a trip to see them on display!





### **Research and Project Updates**

#### California University of Pennsylvania—submitted by David Argent

#### Genetic analysis of Brook Trout populations in Laurel Highlands

As part of their ongoing assessment of Brook Trout (*Salvelinus fontinalis*) populations along Laurel Hill, Drs. Argent and Kimmel collaborated with US Fish and Wildlife Service personnel (Drs. Beer and Bartron) to evaluate genetic variation from selected populations. Brook Trout are typically restricted to high-quality headwater streams and often exist in isolation. In this study, we characterized the patterns of genetic partitioning and diversity among Brook Trout populations in the Laurel Hill with respect to landscape features and potential barriers to migration. In total, 354 wild Brook Trout samples were collected from 10 streams. Samples were analyzed using 12 microsatellite loci. Results indicated a wide range of genetic diversity (allelic richness AR = 3.404-7.124; expected heterozygosity He = 0.432-0.727) and effective population sizes (Ne = 13.5-1.106.6). However, some sites contained small, low-diversity populations of Brook Trout. Three populations were located upstream of reservoirs; however, our results did not show significant differences in the genetic diversity metrics between upstream and downstream populations despite the physical barrier. Although



isolation by distance could be a factor, the patterns of genetic differentiation revealed minimal contemporary gene flow between watersheds and among most streams. Overall, our results highlight the need for continued population monitoring and habitat restoration for Brook Trout populations in southwestern Pennsylvania.

Dowell, S., M. Bartron, D.G. Argent, and W.G. Kimmel. 2019. Genetic analysis of Brook Trout populations in Laurel Highlands. Transactions of the American Fisheries Society. 148(3):620-635.

Eastern Brook Trout captured in Neals Run.

Impacts of Point-Source Net Alkaline Mine Drainage (NAMD) on Stream Macroinvertebrate Communities

Many streams in Pennsylvania are orange and most people think they are acidic - yet on further inspection

it is found they support biological communities of fish and macroinvertebrates. Acid Mine Drainage is characterized as an acidic mixture of toxic heavy metals in solution, while NAMD is circumneutral in pH with metals forming oxidized precipitates. The ecological impacts of AMD have been well documented but NAMD-impacted streams have received considerably less attention. We selected 10 low-order tributaries of the Ohio and Youghiogheny rivers in southwestern Pennsylvania impacted by pointsource inputs of NAMD for assessment of water quality and benthic macroinvertebrate communities. Levels of pH, total iron (Fe), and sulfate (SO<sub>4</sub>) were significantly elevated in the impacted stream reaches when compared with upstream reference sites while total alkalinity and specific conductance were equivocal. Macroinvertebrate abundance declined by 92% in the



Katie Gallmeyer sampling Guffey Run.

impacted stream reaches, but community structure in terms of taxonomic composition and species richness was similar. Total iron, total sulfate, and specific conductance were significantly linked to macroinvertebrate community impairment. The presence of resident macroinvertebrate communities in the unimpacted reaches suggests that remediation would result in a rapid recolonization and establishment of viable downstream ecosystems.

> Kimmel, W.G., and D.G. Argent. **In review**. Impacts of Point-Source Net Alkaline Mine Drainage (NAMD) on Stream Macroinvertebrate Communities. International Journal of Environmental Monitoring and Analysis.

#### Juniata College — submitted by Nicholas Smith

Invasive Rusty Crayfish ecology and trout stream habitat restoration in the upper Juniata River watershed

Throughout the summer of 2019, I will be working on multiple studies of a local watershed. Mainly, I will be studying the impact of an invasive species, the Rusty crayfish (*Orconectes rusticus*) in the upper Juniata River watershed. To quantify the impact, I will be collecting, identifying, measuring, and analyzing data on crayfish collected from a multi-



tude of sites. Once the data are collected, I will then review the distribution of crayfish species throughout the watershed and search for reasons certain species are found in specific areas. In addition, I will also be comparing the diets of Rusty crayfish and searching for similarities in the diets of those crayfish and young-of-the-year smallmouth bass (*Micropterus dolomieu*) found in the



same waters. I will identify the contents of both species diets and conclude whether Rusty crayfish are competing and creating a limited food supply for growing smallmouth bass. Finally, I will be continuing analyzing the impact of a stream restoration on a headwater stream. A small tributary within the Little Juniata watershed, Kelso Run, was restored in the Summer of 2018 with the plan of improving trout habitat by adding more cover and deeper pools within the stream. To understand whether the restoration was successful, I will be collecting water quality, macroinvertebrate,

habitat, and fish data from the stream and comparing to data from before the restoration along with a data collection 4 from after the restoration.

## Update on Didymo

Recently, Matt Shank, who works for the Susquehanna River Basin Commission, published a article on the distribution of Didymo, sometimes referred to as Rock Snot, in Pine Creek. Didymo is an invasive type of diatom (an algae) that severely threatens benthic habitat and food sources for fishes by entirely covering the stream bottom. Check out the pictures from Matt and read the abstract of the publication below. Thanks Matt for submitting this important information. Excellent work!

Shank, M. K. 2019. Physicochemical controls on spatiotemporal distribution and benthic mat severity of *Didymosphenia geminate* in Pine Creek, an unregulated watershed in northern Pennsylvania. Northeastern Naturalist 26:420-445.

**Abstract** - *Didymosphenia geminata* (Didymo) is a benthic freshwater diatom that has been globally expanding its range and extracellular stalk production in freshwater ecosystems. Didymo has been observed in reaches downstream of



hypolimnetic reservoir releases in the northeastern US since 2007. This study focused on a newly observed (2013) Didymo occurrence in Pine Creek, a highly forested and unregulated watershed in northcentral Pennsylvania. Study objectives included comparing contemporary distribution with historical data to provide insight on historical occurrence, quantifying physicochemical controls on Didymo distribution and benthic mat severity, and examining historical changes in water chemistry that might affect habitat suitability. At present, Didymo cellular distribution is limited to upper reaches of Pine Creek where median soluble reactive phosphorus (SRP) is 2.7  $\mu$ g/L; median SRP was 4.8  $\mu$ g/L at sites where Didymo was absent. At the epicenter of distribution in Pine Creek where SRP was consistently <2  $\mu$ g/L, increased streamflow flashiness and water temperature were associated with decreased benthic mat severity. My results suggest SRP thresholds for Didymo proliferation may vary

depending on whether streams are regulated by reservoirs with hypolimnetic releases. Mann–Kendall trends tests of a ~20-y water chemistry dataset show that orthophosphate and sulfate concentrations decreased while pH increased within Pine Creek, which may have implications for Didymo habitat suitability. Further research is warranted to determine whether improving water quality following the industrial era may facilitate Didymo colonization.





#### NEWS

2019 Participants are:

Lewisburg Area High School

Valley View High School

Milton Area School District

East Pennsboro High School

Bradford County Conservation District Mifflin County Junior High School

Abington Heights School District

Loyalsock Township School District

# Eels in the Classroom – Susquehanna River Basin Commission includes students in hands-on restoration program

As the temperature slowly begins to warm, millions of juvenile American eels, known as elvers will continue to migrate upstream into freshwater systems along the Atlantic seaboard. The Susquehanna River will be no different except that these eels will make it deep into Pennsylvania & New York, a feat unheard of just 10 years ago. Our watershed was once formerly rich with eels but as dams were constructed across the river eels disappeared, unable to access the freshwater needed to complete their life cycle.

Aaron Henning, The Susquehanna River Basin Commission's representative on the basin's interagency migratory fish restoration cooperative has championed the return of the American eel by working closely with The Pennsylvania Fish and Boat Commission, The Pennsylvania Department of Environmental Protection, and the US Fish & Wildlife Service. And through his involvement in the re-licensing of hydroelectric projects one-million American eels have been recovered and stocked upstream of Conowingo Dam. The potential ecological benefits of migratory fish restoration have been known for years, but only now are their value beginning to be realized.

Eels serve as an intermediate host species for some freshwater mussels, another imperiled group of animals. In streams where they now co-exist, mussels are now successfully reproducing thanks in part to the return of the eel.

"We're bringing back a species that's been absent for multiple generations. People are going to be curious and have questions. The goal is to have the next generation develop a greater appreciation and understanding of natural resources than the one that came before it." ~ Aaron Henning

This is where 'Eels in the Classroom' comes in. Through an internal funding award received directly from SRBC, seven Pennsylvania School Districts and the Bradford County Conservation District will each receive 15 juvenile eels to raise in their classrooms in 2019. Eels will be collected from 'elver ramps' located on Octoraro Creek and the Susquehanna River at Conowingo Dam and given to the young educators, our future hydrologists, biologists, scientists!

While raising eels in their classrooms, students will learn about water quality, ecology and migratory fishes. At the end of the program the eels will ultimately be returned to the Susquehanna to complete their life cycle.



Elvers, juvenile eels, in collection tank at Conowingo Dam. Photo by Aaron Henning, SRBC.

If your school district has an interest in participating in the future please contact Aaron Henning at ahenning@srbc.net

Elver ramp located on Octoraro Creek. Photo by Aaron Henning, SRBC.

## News continued: Pennsylvania Water Quality Update

#### By Tim Wertz and Josh Lookenbill

The water quality of streams and rivers across the commonwealth is a concern shared by a variety of stakeholders, from private citizens to political representatives, across industry and academia. These concerns are usually from various perspectives from human health to aquatic life or even recreation and boating opportunities. Many of the legal responsibilities for monitoring and reporting water quality within the commonwealth fall on the shoulders of the Pennsylvania Department of Environmental Protection (DEP). The DEP reports water quality through an Integrated Report that satisfies the requirements of Sections 303(d) and 305(b) of the Federal Clean Water Act.

The Integrated Report is a one stop shop for all things related to water quality and represents the culmination of decades of hard work by dedicated individuals across many state, interstate, federal, academic, and private organizations. Historically, the Integrated Report has been a bulky, paper file that was difficult to read and understand, without first graduating from law school. However, as technology evolves, so has the DEP when it comes to communicating water quality with the Integrated Report. In 2019 the DEP released the newest, fully digital, and interactive version of the <u>Integrated Report</u>. This new reporting tool can be accessed online by everyone and includes narrative concerning individual streams or even summaries of state-wide water quality data, with insight into pollution sources and causes. This new user-friendly, transparent report is just one example of recent innovations that DEP has applied to water quality.

Not only has the DEP stepped up the reporting game, they have also stepped up the data collection game. Through collaboration with numerous state, interstate, federal, academic and private organizations, new biological and chemical data collection methods have been developed and implemented, to aid in assessing water quality. For chemical data, a <u>continuous instream monitoring protocol</u> utilizing the deployment of water quality sondes allows for some water quality parameters to be collected at a much finer scale than historically possible, at 60, 30 or even 15 minute intervals. Having the ability to measure water quality at such a fine scale has led to the development of an assessment protocol using these new, continuous data.

New biological methods have also been developed for collecting <u>benthic macroinvertebrates in semi-wadeable streams</u> and <u>rivers</u>. This new collection protocol is directed towards larger waterbodies that were historically underrepresented, providing insight into the health of Pennsylvania's larger river systems. This protocol was developed as part of the <u>Sus-quehanna River Study</u>, a large-scale collaborative effort to understand the potential role of water quality on observed de-



clines in Smallmouth Bass (SMB) populations, which started around 2005. This collaborative study identified the most likely causes as generally being pathogens and/or parasite related. Collaborative efforts between DEP and Pennsylvania Fish and Boat Commission (PFBC) have since investigated the role of Largemouth Bass Virus as being a specific pathogen that was found to affect SMB. Studies were also conducted measuring parasite loadings and coinfections, to better understand synergistic effects of multiple stressors. Recent data from the PFBC has shown a recovery of SMB and in July of 2018 the PFBC removed <u>regulations</u> from the middle and lower portions of the Susquehanna River and Lower Juniata River, re-opening the fishery with no-harvest, for spring angling beginning in 2019.

Using the new monitoring protocols and assessments, DEP has listed impaired portions of the Susquehanna and Juniata Rivers in the latest Integrated Report. Specifically, the Juniata River from the confluence of the Raystown Branch to the mouth, and the Susquehanna River from the confluence of the Juniata River to the Route 462 bridge near Columbia, PA are impaired for aquatic life use. Monitoring efforts identified high pH as the cause of impairment, based on large diel swings in pH. This impairment is consistent with the Chesapeake Bay TMDL goal to reduce nutrients and sediment in the basin. To restore the Susquehanna and Juniata Rivers, DEP and other agencies are providing funds to local governments, nonprofits, and watershed organizations to ensure restoration efforts are underway at local watershed scales. 7

## News continued: Agro-chemicals and smallmouth bass in the Juniata River system

On a related note, Benjamin Martin, under the direction of Juniata College Assistant Professor Christopher Grant, recently had their research published on the threats to smallmouth bass in the Juniata River basin. Specifically, the research looked at the association of agro-chemicals, in particular atrazine, with physiological end-point signals such as vitellogenin (an egg protein precursor) in male bass and body shape. The link to the paper is <u>here</u> and the abstract is below.

Ben was an undergraduate student working with Dr. Grant when most this work took place for his senior thesis, including submitting the article. The research was supported by a grant from the US Fish and Wildlife Service. Ben is currently a PhD student at UW-Madison studying predator-prey interactions of invasive zooplankton the spiny water flea and natives fishes. Ben is also being considered for the US Geological Survey Pathways program--an award that would increase his graduate stipend for collaborating with the USGS while in graduate school, and help place him in a research PI position with the USGS upon completion of his degree. Great job Ben and Chris!



#### Potential threats to smallmouth bass (*Micropterus dolomieu*) in the Juniata River Basin, Pennsylvania, USA

The Susquehanna River basin is one of the largest and most diverse watersheds in the northeastern United States, however, its historically renowned Micropterus dolomieu (smallmouth bass-SMB) fishery has been in decline since the mid-2000s. Agricultural herbicide runoff has been identified as a major risk for Susquehanna basin SMB populations given their effects as endocrine disrupting compounds (EDCs). During the summers of 2016 and 2017, we assessed potential threats to SMB populations in 11 tributaries to the Juniata River, the second largest tributary to the Susquehanna River. Passive water samplers were installed for 38-39 days in ecologically important tributaries to quantify six common herbicides, and SMB were collected from nine sites in 2016 and 2017 to assess their health and morphology. Our passive water samplers showed markedly higher EDC concentrations than has previously been documented in the Juniata basin, with atrazine occurring at all sites and in the highest concentrations (11.09-91.02 ng/L). SMB blood samples revealed complete prevalence (100%) of vitellogenin, an egg protein precursor, in male fishes further confirming previous rates male vitellogenisis. Additionally, SMB hepatosomatic index (HSI) was statistically higher in female SMB than in male SMB (P < 0.001), and higher than many previous regional SMB studies further highlighting a contaminant-based stressor. Finally, a geometric morphometric analysis of SMB body shape indicated morphologies to be significantly site-based. Morphological differences were in line with the ram-suction feeding continuum, further revealing potential vulnerability in SMB sub-populations where EDCs may alter food web dynamics and prey availability. Overall, our study of the Juniata River Basin highlights high EDC concentrations alongside high rates of male vitellogenisis and elevated HSI, and proposes novel theory for morphological vulnerability in SMB sub-populations.

> Benjamin E. Martin & Christopher J. Grant (2019) Potential threats to small mouth bass (Micropterus dolomieu) in the Juniata River Basin, Pennsyl vania, USA, Journal of Freshwater Ecology, 34:1, 591-602, DOI: 10.1080/02705060.2019.1642244



## Update from the California University of Pennsylvania Sub-Unit of AFS

The Cal U sub-unit recently took a trip to the Pymatuning Fish Hatchery in Linesville, PA. They spent the day with folks learning about all kinds of things. They learned about the walleye program, and they assisted PFBC personnel with the capture, sorting, and spawning of collected fishes.





Alexis Blake (Eric Felix, photo bombing) holding a captured Bowfin and Eric Freeman emptying a trap net.





Dan McConville and Jackie Stevenson spawning walleye. Jennifer Greenleaf stirring eggs.

# Cal U activities continued...

In early April, Cal U AFS members assisted with the Open House at Pymatuning. Members helped to clean fish and make Gyotaku tee-shirts.



Jackie Stevenson and Julie Leiendecker making fish tee-shirts (Gyotaku).





Nick Nelson ('16) and Brian Ensign (PFBC Personnel) cleaning Crappie for the big fish fry at Pymatuning.

### **2019 AFS Parent Society Meeting with TWS**



Join us for the first ever joint meeting of the Parent Societies in Reno, NV Sep 29– Oct 3. This is bound to be the largest conference of fisheries and wildlife professionals and may only be surpassed in legend by next year's 150th Annual Meeting of AFS in Columbus OH (plan for that too, it is closer!). The Reno conference is packed with all kinds of workshops ranging from statistical and

GIS techniques to building leadership skills, electrofishing methods, and eDNA. See the link here for all the detail: <u>https://afstws2019.org/</u>

### Until next time... happy summer everyone!

