2021 Upper Coosa Conservation Summit

October 20, 2021

Program and Abstracts

Please note that due to the rise in COVID-19 cases, **the Coosa Summit has been moved to a virtual format** with a reduced program. We hope to host an in-person gathering during the Spring of 2022. A Zoom link will be provided the day prior to the virtual event. You must register in order to receive the link. All times are EDT.

Schedule

9:00 Welcome, announcements, logistics
9:10 Talks

- Nathan Johnson, "Examining Species Boundaries in the Freshwater Mussel Genus Medionidus."
- Sara Gottlieb, "Prioritizing and Removing Aquatic Barriers in the Holly Creek Watershed."
- Rebecca Bearden, "An Updated Distribution of the Trispot Darter."
- Janet Gentz, "Differences in Water Chemistry Between Hatchery and Riverine Conditions Impact Nutrient Absorption by Juvenile Lake Sturgeon."
- Bernie Kuhajda, "Monitoring the Status of Two Bridled Darter species and Assessing Threats to the Federally Threatened Blue Shiner."

10:30 Break
10:45 Talks

- Phillip Bumpers, "Long-term Patterns in Riverweed (*Podostemum ceratophyllum*) Coverage in the Etowah and Conasauga Rivers"
- Andrew Nagy, "Harnessing Social Media to Inform Upper Coosa Conservation."
- Charlie Mix and Matt Reed, "Preserving the Cradle of Southern Appalachia: A Tri-State, Collaborative Landscape Conservation Blueprint."
- Alex Lamle, "Using the Southeast Conservation Blueprint as a tool for Prioritization."
- Will Esters, "An Introduction to the Park Creek Collaborative Education and Restoration Project."

12:00 Concluding remarks.

Abstracts

Examining Species Boundaries in the Freshwater Mussel Genus *Medionidus*

Nathan A. Johnson[1*] and Caitlin E. Beaver, Wetland and Aquatic Research Center, U.S. Geological Survey
Anakela Escobar, Wildlife Resources Division, Georgia Department of Natural Resources
Paul Johnson, Alabama Aquatic Biodiversity Center, Alabama Department of Conservation and Natural Resources
James D. Williams, Florida Museum, University of Florida

Objectively delimiting species boundaries remains an important challenge in systematics and becomes urgent when potential misidentifications and unresolved taxonomy complicate conservation and recovery efforts. Of the six species currently recognized in the freshwater mussel genus Medionidus, five are federally listed and one, Medionidus conradicus, is under review. Medionidus occurs in the Cumberland, Tennessee, and Eastern Gulf Coast drainages and all species are allopatric with the exception of two species in the Mobile River Basin. These two species are morphologically similar and difficult to positively identify. Medionidus parvulus (federally endangered) has been reported from above the fall line in the Black Warrior, Cahaba, and Coosa rivers drainages but is considered extant only in the Coosa River drainage. Records of M. acutissimus (federally threatened) are scattered throughout the Mobile River basin but remaining populations appear to be isolated in the upper Coosa and Tombigbee drainages. Populations in the Escambia, Yellow, Choctawhatchee basins have not been collected since 1933 and are tentatively assigned to M. acutissimus. Our goal is to assess species boundaries between M. acutissimus and M. parvulus using morphology, molecular phylogenetics, and geographic distributions. Our preliminary DNA sequence data suggests two distinct species of Medionidus occur in the Upper Coosa drainage. Findings and future directions will be discussed, along with potential implications for conservation and recovery of these federally listed species.

This presentation will not be recorded.

Prioritizing and Removing Aquatic Barriers in the Holly Creek Watershed

Sara Gottlieb and Katie Owens, The Nature Conservancy in Georgia

Barriers to aquatic organism passage (AOP) are one of the most serious threats to the long-term viability of the unique freshwater biota of the Coosa Watershed. Culverts at stream crossings are ubiquitous throughout the watershed, with many forming partial/seasonal barriers and others entirely impeding AOP throughout the year. Species such as trispot darter, whose historic range has severely diminished in recent decades, depend on the ability to migrate upstream to suitable habitats in small and ephemeral streams for spawning. In 2019, The Nature Conservancy and our partners undertook a complete survey of all the approximately 200 stream crossings in the Holly Creek watershed to prioritize a subset for replacement with more appropriate designs. The survey identified 37 stream crossings rating as moderate to severe barriers. With funding from the National Fish and Wildlife Foundation and Georgia Power, we have completed the replacement of one stream crossing, with two more underway in 2021-2022. Learning from the process of conducting a survey of stream barriers at this scale and then working to address those prioritized for restoring AOP at scale in Holly Creek will inform our work and that of our partners throughout the Coosa watershed.

An Updated Distribution of the Trispot Darter

Rebecca Bearden, Geological Survey of Alabama

An updated distribution of the Trispot Darter (Etheostoma trisella) in Alabama and Georgia was determined from sampling efforts driven by analysis of environmental DNA (eDNA), geospatial data, and previous collection locations. Water sampling for the eDNA analysis took place from January to March of 2019 at 256 sites in both states, with 64 samples showing positive detections of eDNA for the Trispot Darter. These sites were then used to inform fish sampling conducted from December 2019 to January 2020. In Alabama, geospatial data were then analyzed in December 2020 and January-March of 2021 to determine preferred spawning habitat based on the presence of geospatially derived connected wetlands and decreased slopes. This data was then used to direct additional fish sampling in January-March 2021. In Georgia, eDNA results and previous collections of the Trispot Darter in nonbreeding habitat were used to inform sampling in suitable spawning habitat in January-March 2021. Eight new spawning sites for the Trispot Darter were recorded, two in Alabama in the Big Canoe Creek watershed, and six in Georgia in the Coahulla Creek, Holly Creek, and Lower Coosawattee River watersheds. One collection in Alabama was found in conjunction with a positive eDNA detection; the other was the result of sampling based on geospatial analysis. In Georgia, three collections of Trispot Darter were upstream of a positive eDNA detection; and all six collections made were at sites directly connected to waterbodies with Trispot Darter records in nonbreeding habitat.

Differences in Water Chemistry Between Hatchery and Riverine Conditions Impact Nutrient Absorption by Juvenile Lake Sturgeon

Janet Genz, Trevor Hindman, and Chazz Edwards, University of West Georgia

Extirpated populations of lake sturgeon (Acipenser fulvescens) are being reintroduced in the Coosa River basin using conservation aquaculture. The differences in environmental factors between the hatchery and the river are predicted to influence growth and survival of stocked juveniles. Furthermore, naturally recruited fish are hypothesized to differ physiologically from hatchery-reared fish due to differences in their developmental environments. Changes to absorption and nutrient allocation in young-of-year lake sturgeon at stocking may have impacts on their regulatory physiology and impact the survival of fingerlings. In this study, growth and nutritional status were compared in juvenile lake sturgeon exposed to either hatchery or riverine conditions. Young-of-year lake sturgeon were provided by the USFWS Warm Springs National Fish Hatchery and exposed for 3 weeks to dechlorinated tap water or Coosa River water. Anatomical measurements, tissue samples, and digesta were collected at 0, 1, 10, and 21 days. Specific growth rate, condition factor, hepatosomatic index, and survival were quantified. The body indexes of sampled fish paired with the FCR and proximate composition of the collected intestinal contents provide a complete picture of the diet utilization of stocking-size lake sturgeon. No differences were observed in growth, condition, SGR, HSI, or intestinal anatomy over the 21-day exposure period. However, treatment differences indicated a more efficient FCR in river water-exposed fish at 10 and 21 days post- transfer. Additionally, the proximate composition of intestinal contents indicated significant changes in nutrient absorption. Our results indicate that following transfer to Coosa River water, lake sturgeon experienced similar growth but displayed more efficient nutrient use than fish held in laboratory conditions. These results can be utilized to improve procedures to successfully rear and release this protected species into their natural habitat which is imperative to reestablishing the Coosa River lake sturgeon population.

Monitoring the Status of two Bridled Darter Species and Assessing Threats to the Federally Threatened Blue Shiner

Bernie Kuhajda and Shawna M. Fix, Tennessee Aquarium Conservation Institute

Fifteen species of fishes are endemic to the Coosa River drainage, with eight of these federally listed and several others under review for listing. We propose to address conservation challenges of three imperiled species known from this drainage, the Bridled Darter (Percina kusha), the Etowah Bridled Darter (P. freemanorum), and the Blue Shiner (Cyprinella caerulea). To monitor abundance and genetic health of the two Bridled Darter species, snorkeling and eDNA surveys and DNA analysis from tissues will be utilized in the Conasauga, Coosawatee, and Etowah Rivers. In Weogufka Creek, where Blue Shiners are in low abundance, threat assessments will include determining potential sediment inputs using GIS, fish passage assessments, and comparison of habitats to healthy populations in Choccolocco Creek (both middle Coosa River, Alabama). In the Coosawatee River where Blue Shiners may be extirpated, reintroduction potential will be assessed using seining and eDNA surveys and comparison of habitat availability to healthy populations in the Conasauga River. Management of existing populations of the two Bridled Darter species and recovery of extirpated populations is not possible without an understanding of the levels of genetic variability within and the genetic differences between populations within each species. If Blue Shiners are extirpated and appropriate habitat is available at historical sites, a reintroduction program could be implemented. All of these data are crucial for USFWS, Georgia DNR and Alabama DCNR to develop effective management for these imperiled species.

Long-term Patterns in Riverweed (*Podostemum ceratophyllum*) Coverage in the Etowah and Conasauga Rivers

Phillip Bumpers, Seth Wenger, Odum School of Ecology, University of Georgia
Mary Freeman, Eastern Ecological Center, U.S. Geological Survey, Athens GA 30605
Byron Freeman, Odum School of Ecology and Georgia Museum of Natural History, University of Georgia, Athens, GA, USA

Riverweed (*Podostemum ceratophyllum)* is an aquatic macrophyte common to shoal habitat in many rivers in Georgia and the eastern USA. It has been associated with increased invertebrate productivity and is thought to provide important habitat for several fish species in the upper Coosa River, including the Amber Darter and Coosa Madtom. Recently, declines in occupancy and abundance of several shoal-dwelling fishes have been documented in the Etowah and Conasauga Rivers. Our objective here was to assess the temporal pattern of riverweed to further assess ecological change in the Upper Coosa watershed. Using a long-term dataset from 1996-2019, we determined if riverweed coverage (as the proportion of samples with riverweed present) has changed over time in the Etowah and Conasauga Rivers, and whether patterns in discharge (e.g., the number of low or high flow days) or local-scale habitat conditions were related to changes in riverweed coverage. Overall, riverweed coverage in shoals was considerably higher in the Etowah River compared to the Conasauga River (mean ~ 64% vs. 15% samples) We found that riverweed declined in the early 2000s, followed by increased coverage in the mid-2000s and recently has declined again, exhibiting a multi-year trend. Initial analyses suggest that both hydrology and local-scale habitat partially explain patterns in riverweed coverage, which local-scale habitat explaining the most variability in coverage. On-going analyses will test the effects of extreme flow events, lagged flow, and multi-year hydrologic conditions (e.g. 2 consecutive drought years) on riverweed coverage.

Harnessing Social Media to Inform Upper Coosa Conservation

Andrew Nagy, University of Georgia, Odum School of Ecology, River Basin Center

Using crowdsourcing tactics to collect observations of flora and fauna for use in scientific research has become increasingly popular with the rise of apps such as iNaturalist. However, many posts made on social media websites such as Facebook and Twitter are never incorporated into biological datasets despite containing useful information. The Conasauga River, in particular the Snorkel Hole, has become a popular destination for native Fish enthusiasts to snorkel and take photographs. Searching "Conasauga River" on social media platforms often yields hundreds of posts.

Here, I will discuss how I have gathered information related to spawning phenology and behavior of fishes in the Upper Coosa River watershed from social media, specifically The North American Native Fishes Association (NANFA) Facebook Group. I have combined these data with information from literature and my own life history study to produce a dataset of reproductive traits of these fishes. Although my study has focused on spawning related data, these posts may also prove useful to those who wish to record observations of specific taxa for conservation reasons. However, there are challenges associated with gathering data from social media posts. Often times, desirable information such as the temperature the water or even the day is missing. I hope to encourage discussion about what we can do to harness the growing interest in freshwater snorkeling in the Conasauga River. Creating an online database for native fish enthusiasts to submit information about their observations could greatly improve our understanding of the fishes in the Upper Coosa.

Lightening talk

Preserving the Cradle of Southern Appalachia: A Tri-State, Collaborative Landscape Conservation Blueprint

Charlie Mix, University of Tennessee at Chattanooga
Matt Reed, Thrive Regional Partnership

The Natural Treasures Alliance (NTA) was formed in response to growing conservation concerns in the tri-state area of Alabama, Georgia, and Tennessee surrounding Chattanooga. A collective of conservation, outdoor recreation and land management groups, the NTA is dedicated to long-term landscape preservation across the tri-state greater Chattanooga region, which is referred to as "the Cradle of Southern Appalachia" by the group. Along with research partners at UTC's Interdisciplinary Geospatial Technology Lab, the NTA created the Cradle of Southern Appalachia conservation priority model to identify areas that, if protected, would promote biodiversity and enhance natural resilience to climate change, as well as provide communities with public open spaces to preserve connection with the outdoors. The model identifies areas of high-quality habitat that enhance the natural resilience of the region, and outlines a collaborative strategy to protect them and our quality of life for future generations. The NTA is coordinated by Thrive Regional Partnership, a non-profit organization that facilitates multidisciplinary public and private organizations around issues related to conservation, economic development, and transportation.

Charlie Mix is the Director of UTC's GIS lab, and Matt Reed serves as the Natural Treasures Program Director for Thrive.

Using the Southeast Conservation Blueprint as a Tool for Prioritization

Alex Lamle, U.S. Fish and Wildlife Service

The Southeast Conservation Blueprint is a living, spatial plan that identifies important areas for conservation and restoration across the Southeast and Caribbean and is the primary product of the Southeast Conservation Adaptation Strategy (SECAS). The Blueprint stitches together smaller subregional plans into one consistent map, incorporating the best available information about key species, ecosystems, and future threats. More than 1,700 people from 500 different organizations have actively participated in its development so far, making it a truly collaborative plan. Unlike many spatial plans, the Blueprint is updated annually and undergoes a community review process each year. Additionally, the Southeast Conservation Blueprint has dedicated User Support staff to work directly with planners and practitioners to support grant proposals, planning efforts, and to help tell a story about how their work fits into a larger regional vision. The Blueprint is not intended to be used in isolation of other datasets. Instead, it provides a regional perspective that, in combination with local data and knowledge, can help inform decisions about where to focus conservation action in the face of future change.Nearlya quarter of the Coosa Basin is classified as High Conservation Value in the Southeast Blueprint, while 19% is in Medium Conservation Valuemeaning that almost half of thebasin is prioritizedin the Blueprint.

An Introduction to the Park Creek Collaborative Education and Restoration Project.

Will Esters, Principal, Park Creek Elementary School, Dalton, GA
Stephen Bontekoe, Director, Limestone Valley Conservation and Development Council, Trenton, GA
Joseph Kirsch, Partners for Fish and Wildlife Program Biologist, U.S. Fish and Wildlife Service, Rome, GA

This presentation will briefly walk through the cooperative approach, community engagement, and long-term objectives for the Park Creek Elementary Collaborative Education, Restoration, and Preservation Project in Dalton, Georgia. The Project was initiated in January 2021 through conversations among the Limestone Valley Conservation and Development Council, Dalton Public Schools, U.S. Fish and Wildlife Service and community members, and was focused on improving habitat for the threatened trispot darter (*Etheostoma trisella*). That initial conversation has evolved into a multifaceted terrestrial and aquatic restoration and preservation effort that encompasses a robust alliance of conservation minded professionals and community stakeholders representing over ten private, city, county, state, and federal organizations. Currently, a total of five acres of riparian habitat and 0.3 acres of wetland habitat will be restored or enhanced during the winter of 2022 to abate non-point source pollution within Mill Creek, which is designated as critical habitat for the trispot darter. In addition, up to 2 acres will be restored using native prairie seedlings to improve habitat for at-risk native pollinators (e.g., monarch butterfly [*Danaus plexippus*]) and plants (e.g., royal catchfly [*Silene regia*]), bolster the effectiveness of the restored riparian buffer, and support an ongoing agricultural Milpa food plot project that was started during 2020 at the school to help feed and educate students, their families and the surrounding community. To ensure the restoration work has an educational nexus, restoration practitioners are working closely with educators at the Tennessee Aquarium, Dalton State College, State Botanical Garden and Park Creek Elementary School who are working collaboratively on related educational curriculum and designing educational hiking trails and outdoor classrooms within the restoration areas. In the end, the Project will function as an ambassador and education site, and this talk will set the stage for more good news in the year to come.

Additional project partners will be highlighted in the talk.

Lightening talk