Tennessee Chapter of the American Fisheries Society
2026 Annual Meeting

March 17th - 19th, 2026
Cumberland Mountain State Park

2026 TNAFS Meeting Schedule

All activities are at the Cumberland Mountain State Park Homestead Harvest Restaurant in Banquet Room A on all days unless otherwise noted. **All times are in Central Daylight Time (CDT)**.

Tuesday, March 17

7:30 – 5:00 Registration open

Morning Workshops

8:00 – 12:00 Workshop I: Aquatic Connectivity Barrier Blitz (Meet per Shawna's instructions)
8:00 – 12:00 Workshop II: Intermediate Microsoft Excel for Fisheries Professionals (Room B)
8:00 – 12:00 Workshop III: eDNA (Room C)
9:00 – 12:00 Workshop IV: Student Professional Development (Room A)

12:00 – 1:00 Lunch Offsite or in Cabins
*The park restaurant will not be open
*Students in Workshop IV will be served pizza in Room A

Afternoon Workshops

1:00 – 4:30 Workshop I: Aquatic Connectivity Barrier Blitz (Meet per Shawna's instructions)
1:00 – 4:30 Workshop II: Intermediate Microsoft Excel for Fisheries Professionals (Room B)
1:00 – 4:30 Workshop III: eDNA (Room C)
1:00 – 4:30 Workshop IV: Student Professional Development (Room A)

6:00 – TBD Informal Social: Invasive Carp Fish Fry outside of Cabin 27 (BYOB)

Wednesday, March 18

7:30 – 5:00	Registration open
7:30 – 12:30	Presentation Practice Room available. Please sign up for a 30 minute slot on the sheet taped to the door (Room B)
8:00 – 12:00	Workshop V: Fish Identification (Room C)
10:00 – 12:00	Workshop VI: Hidden Rivers Showing and Q&A with Conservation Fisheries and the Tennessee Aquarium Conservation Institute (Room A)
12:00 – 1:20	Lunch Offsite or in Cabins *The park restaurant will not be open
1:20 – 1:30	Welcome and Announcements - Shawna Fix
1:30 – 2:30	Session I: Student Symposium
2:30 –3:00	Break (coffee available)
3:00 – 3:30	Session II: Student Symposium Continued
3:30 – 4:30	Business Meeting
4:30 – 5:30	Poster Session: Viewing and Judging
5:30 – 8:00	Banquet, Awards and Auction (Upstairs adjacent to the restaurant)

Thursday, March 19

7:30 – 8:45	Breakfast
8:55 – 9:00	Good Morning Welcome & Announcements -Shannon Murphy-Harty
9:00 - 10:30	Session III: Contributed Presentations
10:30 – 11:00	Break (Coffee available, reminder to check out!)
11:00 – 12:00	Session IV: Contributed Presentations Continued
12:00 - 12:30	Session V: Lightning Talks
12:30 - 12:35	Closing Remarks, Meeting Adjourned - Shannon Murphy-Harty

2026 TNAFS Session Schedule - March 18 *All times in Central Daylight Time; Banquet Room A		
1:20	**Welcome & General Information — Shawna Fix**	
SESSION I: STUDENT SYMPOSIUM *moderator: Brian Alford*		
1:30	1	Oh Romeo! Where for art thou Chucky Madtom (*Notorus crypticus*)? Environmental DNA (eDNA) can keep hope alive for species on the brink of extinction! **- Robert T. R. Paine**
1:45	2	Genetic Isolation and Hidden Lineages in a Narrow-Range Endemic Fish: Conservation Genomics of the Imperiled Striated Darter (*Etheostoma striatulum*) - **Adam Bajo-Walker**
2:00	3	Preliminary Assessment of Hybridization in the Federally Threatened Slender Chub (*Erimystax cahni*) - **Ty M. Briggs**
2:15	4	Statewide Evaluation of Alabama Bass Genetic Introgression in Tennessee - **Tom Miles**
BREAK		
SESSION II: STUDENT SYMPOSIUM CONTINUED *moderator: Brian Alford*		
3:00	5	Evaluation of Striped Bass (*Morone saxatilis*) Seasonal Movements and Predation on Stocked Trout in the Lower Caney Fork River - **Dalton Bonds**
3:15	6	Fish Assemblage Response to Connectivity and Habitat Restoration in a Tributary of the Lower Hatchie River - **Alexandra Scott**
3:30	7	Broadscale Movement and Habitat Use of Walleye (Sander vitreus) in Watts Bar Reservoir, Tennessee - **Brittnany Graham**
3:45 - 4:30		BUSINESS MEETING
4:30 - 5:30		POSTER VIEWING & JUDGING
5:30 - 8:00		BANQUET, AWARDS, AND AUCTION (Upstairs from Banquet Room A)

2026 TNAFS Session Schedule - March 19 *All times in Central Daylight Time; Banquet Room A		
8:55	**Good Morning Welcome & Announcements — Shannon Murphy-Harty**	
SESSION III: CONTRIBUTED PRESENTATIONS *moderator: Brittnany Graham*		
9:00	8	The Race to Save the Laurel Dace: From a 5K to a Marathon - **Bernie Kuhajda**
9:15	9	Molecular Surveillance of Invasive Carp Reproduction in Tennessee Reservoirs - **Robert T. R. Paine**
9:30	10	Population Monitoring Efforts of Bigheaded Carp in the Tennessee and Cumberland Rivers - **Jennifer Caudle**
9:45	11	Environmental DNA Surveillance of the Pale Lilliput (*Toxolasma cylindrellus*) throughout its historic range in Tennessee **- Robert T. R. Paine**
10:00	12	Discovery of the Salamander Mussel *(Simpsonaias ambigua*) and Spectaclecase (*Cumberlandia monodonta*) in the Buffalo River, Tennessee - **Gerald Dinkins**
10:15	13	Assessing Management Alternatives to Enhance Lake Sturgeon Spawning Habitat **- Ryan Wigner**
BREAK		
SESSION IV: CONTRIBUTED PRESENTATIONS cont. *moderator: Adam Bajo-Walker*		
11:00	14	Cicadas in the stream: evaluating the foraging ecology and life history variation of fishes during a rare but massive resource pulse to stream ecosystems - **Rich H. Walker**
11:15	15	Propagation for Tennessee Dace Restoration in the Cherokee National Forest **- Curt Brewer**
11:30	16	Don’t forget about the macrophytes, especially hornleaf riverweed (*Podostemum ceratophyllum*) - **James Wood**
11:45	17	Recovery of the Dead Pigeon River in North Carolina and Tennessee: a Collaborative Effort to Bring a Riverine Ecosystem Back to Life - **J. Brian Alford**
BREAK		

SESSION V: LIGHTNING TALKS. *moderator: Ashley Padgett*		
12:00	18	Freshwater Biodiversity of the Barrens and Upper Caney Fork Regions of Tennessee: A Special Issue of Southeastern Naturalist - **Grady Wells**
12:05	19	Hurricane Helene and its effects on the freshwater mussel community in a shoal at Solomon Island, Nolichucky River, Tennessee - **Gerald Dinkins**
12:10	20	An Update on Aquatic Connectivity for the Slackwater Darter - **Shawna Fix**
12:15	21	Reconnecting Citico Creek: Preliminary Assessment of Fish Movement Following Dam Removal - **Kailee Schulz**
12:20	22	Tennessee Muskellunge: There and Back Again **- Justin Spaulding**
12:25	23	Water Policy Priorities for the Tennessee Wildlife Federation in 2026 - **J. Brian Alford**
CLOSING REMARKS & MEETING ADJOURNED — Shannon Murphy-Harty		

Map of Cumberland Mountain State Park

Cabin Drive is circled in yellow; the conference venue is circled in orange

The Fish Fry will be hosted outside of Cabin 27 notated with a yellow arrow

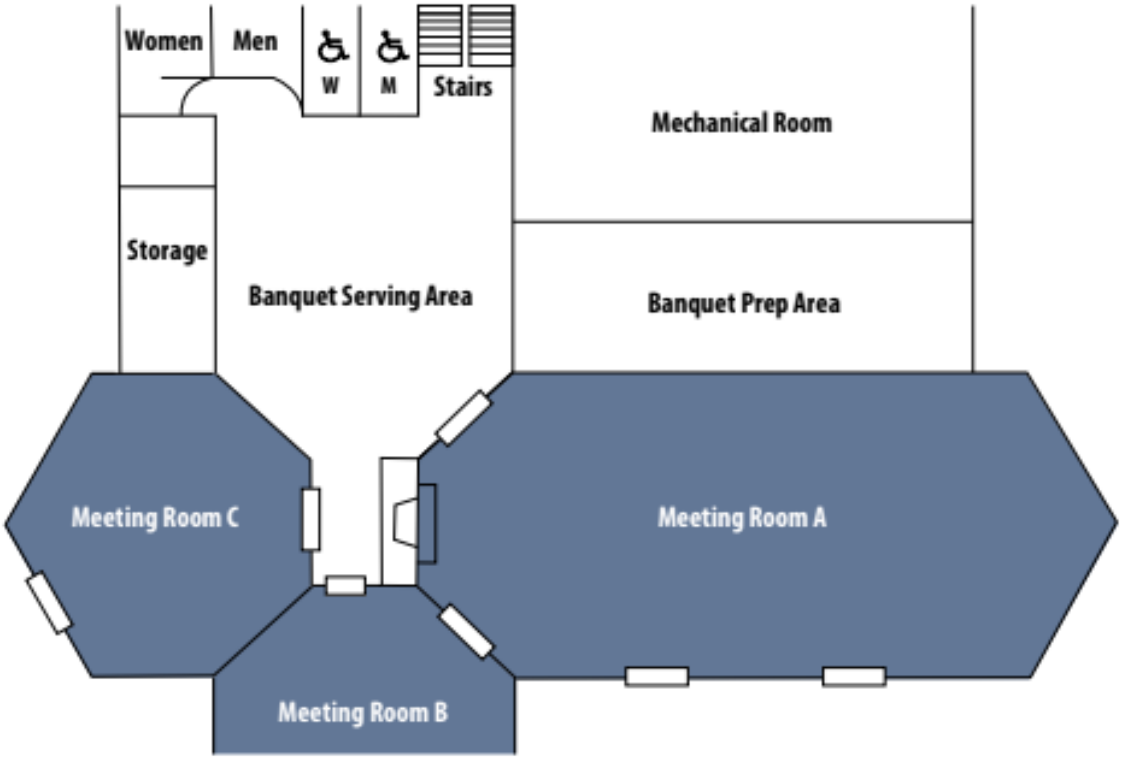
Cumberland Mountain State Park Recreation

Cumberland Mountain State Park | Photo Credit: TNStateParks.com

While we hold our annual meeting at one of Tennessee's beautiful state parks we encourage our members to take advantage of their surroundings!

The park features 5 hiking trails that are between 0.5 miles and 2.5 miles long (Byrd Creek Trail, Byrd Lake Trail, Cumberland Plateau Nature Trail, Pioneer Loop Trail, and Pioneer Short Loop Trail) and some trails feature excellent birding opportunities. Attendees can fish at Byrd Lake, golf at Bear Trace at Cumberland Mountain course, and there are 4 miles of dedicated mountain biking trails.

Conference Venue Floor Plan



General Meeting Information

All meeting activities will be held at the Homestead Harvest Restaurant in Banquet Room A unless otherwise noted in the program.

Informal Social Tuesday night! There will be an informal fish fry social on Tuesday night outside Cabin 27 starting at 6:30 PM CDT.

Silent auction: There will be items available to bid on set up around Banquet Room A and will be moved upstairs during the Wednesday evening dinner banquet. Bidding will end at 7:30 pm on Wednesday, March 18th during the banquet. Payment is due by the end of the meeting. Please find a member of the Executive Committee (Shawna, Shannon, Sally, Aaron) to make payment and receive your item. This auction helps fund all of TNAFS activities, student awards, and more, so your contribution is much appreciated!

Meal Information

For meals on your own, we recommend bringing food to keep and eat in your cabin. You may also reference the local restaurant guide below. Most restaurants are a 10-15 minute drive from our conference venue. Please note that several restaurants in town are only open Thursday through Saturday.

Breakfast will be provided only on the morning of Thursday, March 19th from 7:30am-8:45am before the Contributed Presentations. Breakfast includes biscuits (ham, bacon and sausage),, and assorted pastries, as well as, coffee, and tea. Tuesday and Wednesday breakfast is on your own.

Lunch every day is on your own.

The informal social is an invasive carp fish fry that will take place at Cabin 27 in the park beginning at 6:00pm on Tuesday, March 17th. Fish, sides and non-alcoholic beverages will be provided. Otherwise BYOB.

The banquet will be a buffet fajita bar with a vegetarian option on Wednesday, March 18th and will be located in the upstairs portion of the Homestead Harvest Restaurant venue.

Each registrant will receive 2 drink tickets. Choice of drinks are as follows: Beer (Budweiser, Bud Light, Coors Light, Miller Light, and Michelob Ultra) and house wine (Chardonnay, Cabernet, Merlot, Pinot Grigio and Noir, Riesling, and White Zinfandel).

Local Restaurant Guide

Stagecoach Place Cafe

4355 US-127 #4355, Crossville, TN 38572

Italian restaurant specializing in pizza, Italian cuisine, and fresh pastries

https://www.stagecoachplacecafe.com/

AJ's Diner
549 S Main St, Crossville, TN 38555
American diner
https://www.facebook.com/profile.php?id=100076411863419

Latana Lucy's BBQ
334 US-70, Crossville, TN 38555
Traditional BBQ; Veteran owned

Christy's Pub Grub
69 S Main St, Crossville, TN 38555
Burgers, wings, sandwiches, etc.; LGBTQ friendly
https://www.facebook.com/christyspubgrub/

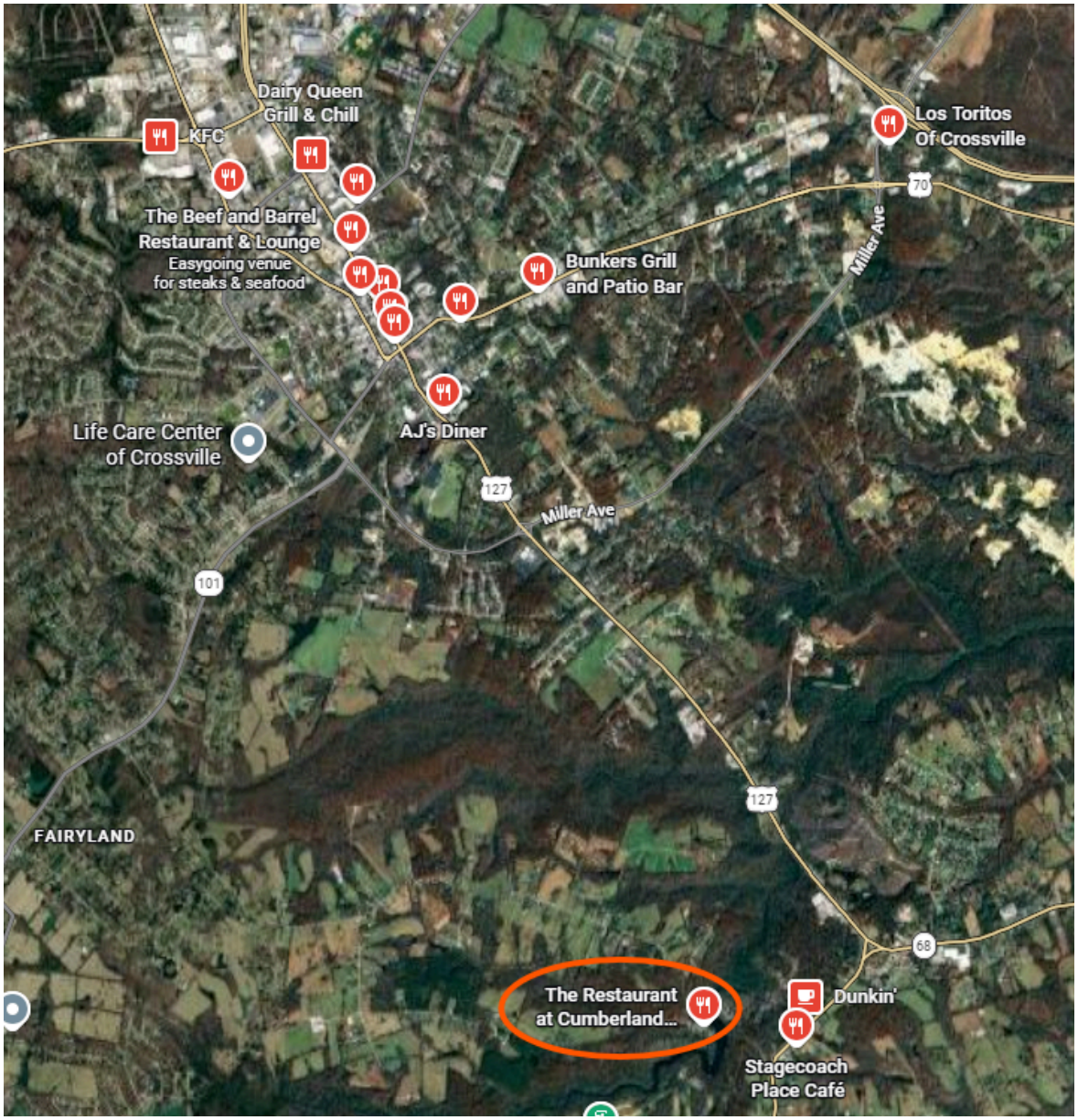
The Country Kitchen on Main
330 N Main St, Crossville, TN 38555
Burgers, sandwiches, and salads

Family Ties Restaurant
904 Webb Ave, Crossville, TN 38555
Breakfast and sandwiches

Kali's Kitchen
178 Woodmere Mall, Crossville, TN 38555
American diner
https://www.facebook.com/kaliskitchen

Raise the Roost
36 Crossroads Dr, Crossville, TN 38555
Chicken and biscuits; Open 24 hours
https://raisetheroostchicken.com/?utm_source=G&utm_medium=local&utm_campaign=google-local

El Parian
2565 Genesis Rd, Crossville, TN 38571
Mexican cuisine
https://www.elpariantn.com/


Dairy Queen
Grill & Chill
KFC
Los Toritos
Of Crossville
70
The Beef and Barrel
Restaurant & Lounge
Easygoing venue
for steaks & seafood
Bunkers Grill
and Patio Bar
Miller Ave
Life Care Center
of Crossville
A.J's Diner
127
Miller Ave
101
127
FAIRYLAND
68
The Restaurant
at Cumberland...
Dunkin'
Stagecoach
Place Café

Continuing Education Workshops

Tuesday

Workshop I: Aquatic Connectivity Barrier Blitz

Instructor: Shawna Fix

Join Southeast Aquatic Resources Partnership in conducting a barrier blitz around Cumberland Mountain State Park and the surrounding Crossville area. This event will be limited to those who have already been trained in or assisted with SARP's stream-crossing survey. If you have not been trained, but are interested in participating, please reach out to Shawna, shawna@southeastaquatics.net. We might be able to take a few folks who have not been trained out to tag along. Registrants will be split up into teams of 3 or 4 and given a list of culverts to assess with your team. **Registration for this workshop will close at the early registration deadline of Feb 20th**. The blitz will be dependent on weather. If there has been heavy rain in the area just before or on the day of the workshop, it will likely be cancelled.

Workshop II: Intermediate Microsoft Excel for Fisheries Professionals (Two Parts)

Instructor: Jack Van Deventer

Morning Session

The challenge for fisheries biologists is to produce sophisticated stats, analytics, charts, and reports with limited time and resources. The good news: in the last 10 years, Microsoft has greatly expanded the power and capabilities of Excel, while making the functionality easier than ever. The goal: You want to set up your analytics to be quick and repeatable, so that each year (rather than re-inventing the wheel each time), you simply refresh your reports, and your work is essentially done. This workshop shows you how. We'll focus on solving common issues in fisheries analytics: data setup, flagging anomalies, merging data (multiple sites, multiple years), filtering data (slice-and-dice to get exactly what you want), and building interactive reports. We'll also look at building high-quality, publication-ready charts. Notes: This workshop will be about 75% "how to" and best practices, and 25% hands-on. The workshop assumes you know the basics of Excel: formulas, cell references, etc.

Afternoon Session (Morning Session Required for Attendance)

This workshop puts you behind the wheel. You will gain expertise in building fisheries solutions in Excel. Which applications? First, we'll build fisheries data sets from scratch, expanding functionality with calculations and lookups, and doing interactive "just in time" reporting. Second, we'll show charting tricks for histograms and scatter plots. Third, we'll build solutions for analyzing stream temperature data. Fourth, we'll build an interactive reporting dashboard. Fifth, as time permits, we'll showcase Excel tools for report generation and mass

communications. All these techniques save you huge amounts of time. You'll be surprised how easy these features are to use. Notes: This workshop will be about 25% "how to" and 75% hands-on.

Workshop III: eDNA (Two Parts)

Instructor: Robert Paine

This workshop offers a crash course on environmental DNA surveillance. Anyone with any level of experience is welcome, but the focus will be on those with little to no experience. Please email Robert Paine (rtpaine@tntech.edu) with any specific questions.

Morning Session

This session of the course will provide an overview of collecting different kinds of eDNA samples in the field, including different collection methods, tools, and protocols to reduce contamination. Participants will not be required to enter the water, but protective gear (i.e.,waders, waterproof gloves) is recommended for participants wanting the full immersive experience.

Afternoon Session

This session will offer a lecture style overview of environmental DNA surveillance. Topics will cover introduction topics to eDNA, eDNA workflow and design, sampling in the environment, negative controls, laboratory methods, and data interpretation. The lecture will cover topics related to single species detection and multi-species detection.

Workshop IV: Student Professional Development

Instructor: Amanda Rosenberger

This FREE course will allow students to meet with professionals to learn about different aspects of fisheries employment in the state of Tennessee. Various state, federal and non-profit organizations will be present to answer any questions and help give guidance on how to obtain future employment. Please sign up for this course in the Square store if you plan on attending so that we can get an accurate head count, and plan to bring a draft resume/CV if you wish to receive feedback from the instructors.

Wednesday

Workshop V: Basic Fish ID
Instructors: Conner E. Ballard & Justin Spaudling

This course will focus on both the ecology and identification of freshwater fishes found in and around Crossville Tennessee.

Workshop VI: Hidden Rivers Viewing & Discussion
Instructors: Bo Baxter & Bernie Kuhajda

Ten years in the making, Hidden Rivers is a feature film by Freshwaters Illustrated that explores the rivers and streams of the Southern Appalachian region, North America's most biologically rich waters. The film follows the work of conservation biologists and explorers throughout the region, featuring the work of both Conservation Fisheries and the Tennessee Aquarium, and reveals both the beauty and vulnerability of these ecosystems. Discussion of conservation work being done in the state of Tennessee led by biologists from Conservation Fisheries and the Tennessee Aquarium to follow the showing.

Meeting Abstracts
*indicates the presenting author

Poster Session

1. A Preliminary Quantification of Aggregations of Madtoms and Darters in Beans Creek, an Elk River Tributary

Bryce Martin* (The University of the South), W. Grady Wells (The University of the South)

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Aggregation behavior is poorly understood but has been noted in several madtom studies. Within *Noturus*, detection rates and increased fish densities have been observed during fall—winter months. This behavior likely provides benefits such as mate selection and increased efficiency of finding suitable refugia. However, aggregation also creates a temporal bottleneck where individuals are condensed within a smaller area. In this study, we observed and quantified aggregation behavior in a population of Slender Madtoms (*Noturus exilis*) in Beans Creek (an Elk River tributary) in southern Tennessee from October 2024—October 2025. Additionally, we note aggregation behavior in three comparative species: Redline Darter (*Nothonotus rufilineatus*), Fantail Darter (*Etheostoma flabellare*), and Tennessee Snubnose Darter (*Etheostoma simoterum*). We observed higher mean madtom counts during fall—winter months, as well as a transition into pool habitat. We also observed higher darter counts for the three mentioned species during spring—summer. Understanding aggregation behavior in more sensitive species, such as madtoms, may help inform future conservation efforts and species management plans.

2. Dam vs. anglers: Effects of hydropower and water quality on catch rate on a tailwater fishery

Avery Kyser* (Tennessee Technological University Department of Biology), Justin Spaulding (Tennessee Wildlife Resources Agency)

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As with many tailwaters in the United States, trout have been stocked in the Caney Fork River below the Center Hill Dam near Nashville, TN for decades. Creel surveys of angler use and catch rates on the Caney Fork River have guided fisheries management during that time, allowing the Tennessee Wildlife Resources Agency (TWRA) to manage for user interest. Water quality and dam discharge vary within a day and throughout the season depending on rainfall and energy needs. Presently, there is uncertainty on how the water quality and energy generation effects the catch rate of stocked species like trout. Here, we present the effects dissolved oxygen and temperature, in the center hill dam tailwaters along with generation schedule and wading conditions, on the angler success rate in the tailwater fishery. This data analysis may lead to better tailwater fisheries management, creating more opportunities for angler use and success not only on the Caney Fork River but also on other tailwaters of the Central Tennessee region.

3. Using Barrier Assessments to Evaluate the Susceptibility of a Barrens Topminnow (Fundulus julisia) Population to Western Mosquitofish (Gambusia affinis) Invasion

Alia Gaddis* (Tennessee Tech University), Kirsten Humphries (Tennessee Tech University), Kit Wheeler (Tennessee Tech University)

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The Barrens Topminnow (BTM; *Fundulus julisia*) is a federally endangered species in critical decline. In the fall of 2022, a new BTM population was discovered in a small tributary to the Middle Collins River. Significantly, this population appears to be relatively isolated from Western Mosquitofish (WMF; *Gambusia affinis*), a species known to have significant negative impacts on BTM populations. However, effective management of the new BTM population is dependent upon a more comprehensive understanding of its vulnerability to WMF invasion. Therefore, we conducted assessments of road-stream crossings between the new BTM population and the closest WMF population to evaluate barrier permeability and thus susceptibility of the BTM population to WMF movement. Based on our sampling, the closest WMF population is located approximately 45 river kilometers downstream of the new BTM population. To assess barrier permeability, we used the Southeast Aquatic Resources Partnership (SARP) barrier assessment protocols and incorporated additional water velocity measurements for comparisons with WMF swimming speed. We surveyed roughly 70 barriers in the Middle Collins River watershed and collected velocity information at nearly half of them. The collected data will allow us to identify any barriers that appear to be most critical to the long-term protection of the new BTM population. Identifying the critical barriers will then help facilitate conservation strategies for this critically endangered species.

4. Natural History Observations for an Undescribed Species of Faxonius in the Barrens Region of Tennessee

Ellianna Masters* (School of Environmental Studies, Tennessee Tech University), Hayden Mattingly (School of Environmental Studies, Tennessee Tech University), John Johansen (Department of Biology, Austin Peay State University), Thomas Boersig (Missouri Department of Conservation), and Matthew Padgett (Department of Biology, Tennessee Tech University).

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Crayfishes are important components of freshwater ecosystems. On a global scale, crayfish biodiversity is especially high in the Southeastern United States, including Tennessee. The undescribed “Sculpin Crayfish” is a member of the genus *Faxonius* known only from Cannon and Coffee counties in the Barrens Plateau region of Tennessee. The objectives of this study were to collect preliminary life history information and estimate the abundance of sculpin crayfish populations in two headwater streams. Quadrat sampling and mark-recapture surveys in McMahan Creek and Liberty Creek were conducted to measure population density, size structure, and reproductive traits. Sculpin crayfish were more abundant in McMahan Creek than in Liberty Creek. Pool habitats had the highest densities of Sculpin Crayfish. Individual Sculpin Crayfish ranged from 10–28 mm carapace length (CL). There was a male-to-female sex ratio of approximately 2:1. Sexual maturity was observed at 12-13 mm CL and reproduction occurred within the first year of life. Mean clutch size was around 17 eggs in smaller females and 30 eggs in larger females. Age classes were difficult to distinguish from length-frequency histograms. These preliminary findings provide the first quantitative population and life history data for *Faxonius sp*. Additional research is needed for a more comprehensive understanding of its distributional range, abundance, and conservation status.

5. Relationships between Spotfin Chub (*Erimonax monachus*) counts and habitat characteristics in the Emory River Watershed

Nathaniel Mathews* (Tennessee Technological University), Avery Davis (Tennessee Technological University), & Kit Wheeler (Tennessee Technological University)

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Effective conservation and management of stream fishes requires a thorough understanding of habitat use. Such an understanding helps identify the full range of resources needed throughout a species' life cycle. For critically imperiled fishes, it is especially imperative to understand species-habitat relationships so that conservation actions can target protection of habitat features most strongly linked with species presence. Here, we use data collected from snorkel surveys to describe relationships between standardized counts of Spotfin Chub (*Erimonax monachus*), a federally threatened minnow native to the Tennessee River system, and particular habitat features in the Emory River Watershed. More specifically, we assessed individual correlations between counts at nine sites and measurements of large substrates (boulder and bedrock), velocity (average and maximum), and depth (average and maximum). Our analysis revealed that the counts of spotfin chub were only weakly related to our measured habitat features. The strongest trend was a negative relationship with maximum depth ($r=-0.23$). While associations with large substrate, avg. depth, and both average and maximum velocity had almost no correlation ($|r|=<0.15$). These results are inconsistent with previous studies of microhabitat use by Spotfin Chub in the Emory River, suggesting that habitat associations may vary spatially or seasonally. Or those factors beyond depth and substrate, such as water quality or competition, influence distribution within the watershed. Work such as ours that identifies species-habitat relationships will improve predictions of suitable habitat, support targeted conservation actions, and provide a more accurate representation of the current population status in the Emory River.

6. Length-weight relationships of *Semotilus atromaculatus* (Creek Chub) in two headwater streams on the Southern Cumberland Plateau

Mary Elizabeth Jackson* (The University of the South, Sewanee, TN), Katie Ellis (The University of the South, Sewanee, TN), Bryce Martin (The University of the South, Sewanee, TN), William G. Wells (The University of the South, Sewanee, TN)

jacksme0@sewanee.edu

Length-weight relationship (W = aLb) analysis is used by ecologists and managers to estimate biomass in fish populations. Our study compares length-weight relationships of *Semotilus atromaculatus* (Creek Chub) populations in two headwater streams on the Domain of the University of the South, Sewanee, Tennessee. Multiple 50-m reaches in each stream were sampled using the single-pass backpack electrofishing method. Lengths (mm) and weights (g) were measured and recorded for Creek Chub captured. There were differences in length and weight in both streams. The average length of Creek Chub in the Mud Creek tributary population was 73.1 mm TL during post-spawning sampling (June 2025) and 59.89 mm TL during pre-spawning sampling (February 2026); the average length of Creek Chub in the Barnes Branch population was 108.1 mm TL during post-spawning (June 2025). A two-sample t-test was conducted for post-spawning lengths (June 2025) ($p < 0.001$). The average weight of Creek Chub in the Mud Creek tributary population was 5.1 g during post-spawning sampling (June 2025) and 2.0 g during pre-spawning sampling (February 2026); the average weight of Creek Chub in the Barnes Branch population was 15.9 g during post-spawning (June 2025). Due to abnormal distribution, a Wilcoxon rank-sums test was conducted for post-spawning weights (June 2025) ($p < 0.001$). We calculated length-weight relationships for Creek Chub during June 2025 in each stream. The slope (b) of the regression line in the Mud Creek tributary population was 2.89. The Barnes Branch population had a slope (b) of 2.65. Competition and predation from Centrarchids (Sunfishes) present in Barnes Branch may explain hypoallometric growth in the Creek Chub population there.

Session I: Student Symposium

1. Oh Romeo! Where for art thou Chucky Madtom (*Notorus crypticus*)? Environmental DNA (eDNA) can keep hope alive for species on the brink of extinction!

Hannah N. Swain-Menzel (The Tennessee Nature Conservancy), Robert T. R. Paine* (Tennessee Tech Cooperative Fishery Research Unit), Amanda E. Rosenberger (U.S. Geological Survey, Tennessee Tech Cooperative Fishery Research Unit), and Auburn Velasquez (Tennessee Tech Cooperative Fishery Research Unit)

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The Southeastern United States is a global hotspot for temperate aquatic diversity, home to many small, endemic species. Many of these threatened and endangered species have restricted distributions and are data deficient regarding contemporary ranges. Moreover, for species that have not been detected over long periods of time (e.g., years or decades), premature abandonment, termed a “Romeo error”, contribute to or fail to prevent its demise. Environmental DNA (eDNA) surveillance methods can provide rapid and efficient methods to look for these cryptic species. We report the first evidence of the persistence of the Chucky Madtom (*Noturus crypticus*) in Little Chucky Creek, Tennessee, which has been absent from conventional surveys since 2004, and in Dunn Creek, Tennessee, where it was last collected in 1940. This highlights the utility of eDNA for detecting cryptic, rare fish species that may persist at extremely low population densities when conventional surveys fail, as well as its effectiveness as a contemporary tool to guide targeted conventional sampling efforts; however, it is not intended to replace the ‘in hand’ detection of the species.

2. Genetic Isolation and Hidden Lineages in a Narrow-Range Endemic Fish: Conservation Genomics of the Imperiled Striated Darter *(Etheostoma striatulum)*

Adam Bajo-Walker* (Tennessee Technological University), Carla R. Hurt (Tennessee Technological University), Kit Wheeler (Tennessee Technological University)

alwalker48@tntech.edu

Effective conservation of imperiled freshwater fishes depends on understanding historical connectivity, contemporary gene flow, and the demographic histories of populations. This is especially critical for narrowly distributed darters, where physical and environmental barriers can strongly influence population structure. The Striated Darter *(Etheostoma striatulum)* is a state-endangered species and is currently under review for federal listing. This species is endemic to a handful of tributaries of the upper Duck River basin, Tennessee, and has experienced documented population declines. To assess population structure and genetic diversity, we combined mitochondrial (concatenated COI and cytb) and SNP data across 110 individuals and 131 individuals, respectively, from twelve sites across eight tributaries.

Genomic analyses identified three evolutionarily significant units (ESUs): 1) the Rutherford Creek population (RUT), 2) the West Fork Bigby Creek population (WFBC), and 3) a multi-tributary ESU comprising North Flat Creek (NFLT), Wilson Creek (WIL), North Fork Creek (NFC), Hurricane Creek (HUR), South Flat Creek (SFLT), and Wartrace Creek (WAR) populations. Effective population size estimates, low rates of genetic diversity, and patterns of distinct tributary separation, indicate heightened vulnerability. Furthermore, patterns of gene flow were minimal among tributaries, contrary to previous assumptions of mainstem-mediated connectivity.

These results reveal previously undocumented diversity, including the discovery of the RUT lineage, which is not a previously unknown *E. striatulum* population but instead, represents a distinct “Barcheek Darter” taxon closely related to Slabrock Darter *(Etheostoma smithi*), occurring within the currently recognized range of *E. striatulum* . Additionally, within the “shared” ESU, tributaries harbor independent genetic pools and function as distinct management units. Conservation efforts should therefore prioritize the protection of individual tributaries, especially RUT and WFBC, and focus on maintaining water availability, reducing drought impacts, and safeguarding watershed integrity for *E. striatulum*, the RUT lineage, and other co-occurring imperiled species.

3. Preliminary Assessment of Hybridization in the Federally Threatened Slender Chub (*Erimystax cahni*)

Ty M. Briggs* (Tennessee Tech Cooperative Fishery Research Unit), Robert T. R. Paine (Tennessee Tech Cooperative Fishery Research Unit), Brook A. Grubb (Computational Biology Institute, Dept of Biostatistics and Bioinformatics, Milken Institute of Public Health, The George Washing University), and Amanda E. Rosenberger (U.S. Geological Survey, Tennessee Tech Cooperative Fishery Research Unit)

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While conducting biological monitoring to identify a living specimen and associated habitat is important, other parameters must also be examined to identify the persistence of a species, such as hybridization. Hybridization between animal species can have positive and negative effects to species populations, including the disappearance of one or more of the parent taxa. A small, benthic minnow historically known from the Powell, Clinch, and lower Holston rivers, the Slender Chub (*Erimystax cahni*) was rare when first discovered in 1941, but has since become extirpated from its known habitat, with the last individual recorded in the late 1980s. Recently, environmental DNA (eDNA) surveillance has provided evidence that contemporary Slender Chub genetics still exist, either in a pure or hybrid form. Many suspect individuals have been captured and identified as either pure Slender Chubs or hybrid individuals, only to later be confirmed as aberrant sister taxa. However, none of these individuals have been genetically tested. We barcoded 42 individuals captured in the Clinch and Powell rivers. Individuals were visually identified to species in the field, and then identified genetically using the 12S and COI mitochondrial genes. We used genes trees to identify agreeance between species identification and phylogenetic relatedness. No Slender Chub mitochondrial DNA was detected in any of the 42 sampled individuals. Visual and genetic identification had a 59.5% agreement, where disagreement was always with individuals visually identified as Blotched Chub (*E. insignis*), but were genetically identified as Streamline Chub (*E. dissimilis*). While the 12S gene tree has less bootstrap support, both the 12S and COI gene trees were in agreement with taxonomic assignment.

4. Statewide Evaluation of Alabama Bass Genetic Introgression in Tennessee

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Black bass *Micropterus spp*. are the most targeted gamefish in the state of Tennessee. Alabama Bass Micropterus henshalli have been introduced within Tennessee and are believed to be negatively impacting populations of native black bass as reported in other southeast states. Concern in Tennessee centers on native Smallmouth Bass M. dolomieu fisheries and genetic integrity. Alabama Bass and Smallmouth Bass readily hybridize, and, in surrounding states, reservoir Smallmouth Bass populations have been reduced or even extirpated following the introduction of Alabama Bass. Since 2017, the Tennessee Wildlife Resources Agency has collected fin clips from about 3,000 non-largemouth black bass from 34 waterbodies across the state of Tennessee. Using a panel of species-specific single nucleotide polymerases, we assessed percentages of genetic contribution by species to an individual, thus allowing us to identify pure fish and hybrids and the genetic contribution to hybrids. To help inform and guide management actions relating to black bass introgression in Tennessee, we calculated mean ancestry proportions by reservoir to characterize population-level genetic composition and performed principal component analysis to assess and visualize patterns of Smallmouth Bass and Alabama Bass admixture at the reservoir and watershed level. Mean ancestry proportion contributed by Alabama Bass varied from <1% to 34%, and was highest at Watts Bar Reservoir. Principle component analysis using two variables explained 99.7% of the variance and represented the Alabama–Smallmouth ancestry axis. At the watershed scale, Tennessee River reservoirs had higher PC1 scores (more Alabama Bass ancestry), while Cumberland River reservoirs clustered toward lower PC1 scores (more Smallmouth Bass ancestry), and no individuals had PC1 scores >0 in the Cumberland River reservoirs, signifying that pure Smallmouth are still dominant there. A Tennessee statewide evaluation will assist regulation agencies by providing baseline data for continued monitoring and identifying specific areas for management decisions.

Session II: Student Symposium

5. Evaluation of Striped Bass (*Morone saxatilis*) Seasonal Movements and Predation on Stocked Trout in the Lower Caney Fork River

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Coldwater dam releases create unique downstream habitats that support a variety of stocked and naturally reproducing sportfishes. Rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), and brook trout (*Salvelinus fontinalis*) are stocked into one such system, the lower Caney Fork River by the Tennessee Wildlife Resources Agency (TWRA). Landlocked striped bass (*Morone saxatilis*) enter the lower Caney Fork River through the Cumberland River system, and both species support recreational fisheries. Previous studies have documented landlocked striped bass in similar systems in the southeastern United States feeding on stocked trout, and sampling efforts conducted by TWRA have confirmed striped bass predation on stocked trout in the lower Caney Fork. However, the seasonal movements and extent of striped bass predation of trout in the lower Caney Fork River are unknown. The objectives of this project are to 1) quantify seasonal movements of striped bass in the lower Caney Fork River, 2) identify and quantify striped bass stomach contents, and 3) investigate the relationship between trout in striped bass stomach contents and stocking timing and location. Seasonal movements will be captured by passive and active acoustic telemetry throughout the lower Caney Fork River and Cumberland River from Old Hickory Dam to Cordell Hull Dam. Striped bass will be collected by boat electrofishing after trout stocking events. Stomach contents collected from gastric lavage will be analyzed visually and genetically using DNA metabarcoding. Acoustic telemetry and dietary sampling efforts will occur in tandem to examine the relationship between striped bass feeding habits and the TWRA trout stocking regime. Results from this study will assist future trout stocking management decisions and striped bass management.

6. Fish Assemblage Response to Connectivity and Habitat Restoration in a Tributary of the Lower Hatchie River

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Globally, many freshwater streams have been severely altered by human activity, resulting in degraded habitats and disrupted connectivity. Thus, restoration projects that focus on reconnecting stream reaches and reinvigorating in-stream and riparian habitat are becoming more numerous. However, many of these projects focus on connectivity for large species of economic importance, such as salmonids, but ignore smaller and more diverse fish communities. This is especially relevant in the Lower Mississippi water resource region where most streams have been channelized or otherwise altered since the 19th century. In this region, the use of grade control structures is common practice for stopping active head cutting and sedimentation issues; however, these structures can often act as barriers to small-bodied fishes. In Cub Creek, a headwater stream of the Hatchie River in West Tennessee, we are evaluating the efficacy of an innovative grade control design for facilitating fish movement between stream reaches and assessing habitat use versus availability in 9 restored reaches. Between December 2024 and February 2026, we tagged 575 fish from 12 species with passive-integrated transponder (PIT) tags. In May 2025, we installed four radio frequency identification (RFID) compatible antennas at each grade control fish passage to detect PIT tagged fish and capture bidirectional movement. These antennas will collect data until July of 2026. Additionally, between January and March 2026, we collected point-of-detection habitat data (from relocated PIT tagged fish) and conducted habitat availability surveys.

7. Broadscale Movement and Habitat Use of Walleye (*Sander vitreus*) in Watts Bar Reservoir, Tennessee

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The Tennessee River is the largest tributary to the Ohio River and contains multiple reservoirs formed by nine mainstem dams located along the river. Watts Bar Reservoir, the second largest reservoir in Tennessee, is a popular recreation area for anglers targeting a variety of species. In 2011, the Tennessee Wildlife Resources Agency began stocking Walleye (*Sander vitreus*) into Watts Bar Reservoir. Walleye are native to the Tennessee River, but their numbers had been reduced following dam construction in the 1940s. While the stocking program has been successful at enhancing the Walleye fishery in Watts Bar, studies on habitat use and movements of Walleye in southeastern reservoirs has been limited compared to their northern counterparts. Furthermore, it's unknown what areas of the reservoir are used as potential thermal refuge for Walleye, a coolwater species, during the thermally stressful summer months. The objective of this study is to document the movement patterns and habitat use of Walleye, particularly during spawning, post-spawning, and summer months. 150 Walleye from Watts Bar Reservoir and its two main tributaries (the Clinch and Emory rivers) were acoustically tagged and tracked using an array of 27 receivers. Initial receiver downloads in early September 2025 show during late July/August, 36% of tags were last detected in the Clinch River, and 36% of tags were last detected roughly 22 river kilometers downstream of Fort Loudon Dam on the Tennessee River mainstem. Temperature data from receivers suggests the Clinch River may serve as thermal refuge during the summer, as temperatures didn't exceed the Walleye optimal temperature window of 18-22 C. This study will assist managers in collecting baseline information on Walleye movements and habitat use in the system and provide information on spawning site fidelity patterns that could be used to refine stocking practices in Watts Bar and other Tennessee reservoirs.

Session III: Contributed Presentations

8. The Race to Save the Laurel Dace: From a 5K to a Marathon

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The Laurel Dace, *Chrosomus saylori*, is a federally endangered minnow known from only a few headwater streams along Walden Ridge on the Cumberland Plateau in eastern Tennessee. The Tennessee Aquarium has been the lead on Laurel Dace research for 13 years, including status surveys, microhabitat assessment, life history studies. and development of propagation protocols. Unfortunately, Laurel Dace have continued to decline from heavy siltation and degraded water quality attributed to poor agricultural practices, competition and predation from invasive centrarchids, high levels of Yellow Grub trematode infection, and drying streams during drought. In 2022, the Tennessee Aquarium partnered with the Natural Resources Conservation Service on Ridges to Rivers, a Regional Conservation Partnership Program to address water quality concerns on Walden Ridge and the Sequatchie Valley by assisting farmers with implementing best-management practices on their land. This project is investing $21.8 million in conservation funding to the region over five years. However, in 2024 an exceptional drought across Walden Ridge led to the emergency rescue of 300 Laurel Dace from the only two streams where they were thought to still occur. These individuals safely overwintered at several facilities, and most of these fish were released in March 2025 back to the wild. Meanwhile, the Tennessee Aquarium formed an advisory group and embarked upon actions necessary for managing a critically endangered species, including establishing an ark population, assessing genetic and disease risk, and strengthening local outreach. Strong community engagement led to the inaugural Laurel Dace Day festival and 5K in nearby Spring City, which adopted the Laurel Dace as their official town fish. Early results demonstrate the program's potential to engage communities and drive meaningful on-the-ground conservation efforts to save this species from extinction. More good news, summer 2025 surveys rediscovered Laurel Dace in upper Moccasin Creek after not being collected since 2013.

9. Molecular Surveillance of Invasive Carp Reproduction in Tennessee Reservoirs

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Resource agencies invest considerable effort and costs into monitoring and controlling invasive carps (*Hypophthalmichthys spp.*). These monitoring and control efforts are widely applied to Tennessee rivers where invasive carps have expanded their distribution, including the Tennessee and Cumberland rivers, tributaries to the Ohio River. Although much of the life history and biology of invasive carps are well documented, information and data concerning their reproductive ecology is lacking in Tennessee. While juvenile individuals have been captured in both reservoirs, larval carp have not been known, nor have specific spawning conditions or areas been identified. Beyond monitoring and detection, taxonomic identification of larval fishes is time consuming and difficult. The goal of this project was to develop a protocol that can expedite the detection of larval carp in Tennessee reservoirs with improved accuracy over conventional identification and to establish a baseline for spawning conditions that can be used to develop predictive modelling of carp reproduction. Larval tows and light traps were used to sample for presence of larvae and eggs from late spring through the summer at Kentucky and Barkley reservoirs. Quantitative PCR was used to identify the presence of silver carp larval in bulk samples. Further, statistical analyses were conducted to identify factors (e.g., collection method, collection timing, and site location) that contributed to molecular detection of carp larvae and eggs. The presence of carp larvae and eggs were detected in several locations of both reservoirs. Evidence of successful spawning of silver carp in Tennessee reservoirs was observed, however there has been no indication of recruitment to the existing population. Results from this study will be used to assist agencies with developing more efficient monitoring approaches for larval carps as well as a need for rapid response to limit potential further population expansion.

10. Population Monitoring Efforts of Bigheaded Carp in the Tennessee and Cumberland Rivers

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Silver Carp (*Hypopthalmichthys molitrix*) and Bighead Carp (*H. nobilis*), collectively called bigheaded carp, are found throughout the Tennessee and Cumberland river systems. Young-of-year bigheaded carp were detected in 2015, prompting an intensive monitoring effort. Bigheaded carp invasion is concerning for native fish due to potential dietary overlap and habitat displacement and are a danger for recreational lake activities. Long term monitoring programs are useful tools to understand how bigheaded carp distribution and population demographics are changing over time. Monitoring efforts have been conducted seasonally each year since 2017 using overnight experimental gill nets and an electrified dozer trawl. Experimental overnight gillnets target adults and are set in Barkley, Kentucky, Cheatham, and Pickwick reservoirs. Timed dozer trawling transects target juvenile bigheaded carp in Kentucky and Barkley reservoirs. Mean length of bigheaded carps appear to be increasing over time across all reservoirs. Frequency histograms show no new age classes entering the population, coupled with no young-of-year, recruitment has not been detected. The shortest fish collected in 2025 was 662mm TL. In summary, bigheaded carp appear to be growing larger and more rotund with no evidence of recruitment in 2025. Monitoring should be continued to detect future bigheaded carp expansion and recruitment within Tennessee waterways.

11. Environmental DNA Surveillance of the Pale Lilliput (*Toxolasma cylindrellus*) throughout its historic range in Tennessee

Robert T. R. Paine* (Tennessee Tech Cooperative Fishery Research Unit), Kristin I. Womble (McClung Museum of Natural History and Culture, University of Tennessee-Knoxville), and Amanda E. Rosenberger (U.S. Geological Survey, Tennessee Tech University Cooperative Fishery Research Unit)

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Rapid monitoring and surveillance are critical to the conservation of imperiled, aquatic species in the southeastern United States to help identify the contemporary distribution and status. This is especially true for species that are disproportionately imperiled like freshwater mussels. The Pale Lilliput (*Toxolasma cylindrellus*) is a tiny, federally endangered mussel that currently exist in a small fraction of its known historic range. We developed a novel environmental DNA (eDNA) assay protocol to survey for this rare mussel throughout the watersheds in its contemporary and historic range. We conducted extensive surveillance that included 30 sites, guided by species distribution models, across five different watersheds. Analyses and results are still pending, but may assist resource managers with a new, efficient surveillance tool and identifying new populations.

12. Discovery of the Salamander Mussel *(Simpsonaias ambigua*) and Spectaclecase (*Cumberlandia monodonta*) in the Buffalo River, Tennessee

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Simpsonaias ambigua (Salamander Mussel) occurs in medium creeks to large rivers and is restricted to waterbodies that support a population of its only known host, the Common Mudpuppy (*Necturus maculosus*). Prior to this study, the only record of the Salamander Mussel in the Tennessee River drainage was from the Duck River. *Cumberlandia monodonta* (Spectaclecase) is a federally endangered species and in Tennessee was last collected alive in the Duck River in the early 2000's and in the lower Tennessee River in 1998. In 2025, while diving in a deep pool of the lower Buffalo River, Humphreys County, TN, we discovered a robust population of the Salamander Mussel and one live Spectaclecase.

13. Assessing Management Alternatives to Enhance Lake Sturgeon Spawning Habitat

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Lake Sturgeon, once nearly extirpated from Tennessee due to commercial harvest and habitat alteration, has been the focus of an extensive reintroduction effort by the Tennessee Wildlife Resources Agency (TWRA) since the early 2000s. Over the past four spawning seasons (2022–2025), TWRA has documented Lake Sturgeon aggregations below Center Hill Dam. Lake Sturgeon spawning is benefited by higher, continuous flows occurring during the spring time, which is hydrologically wet. During this time period, releases from Center Hill Dam are normally elevated due to spring rains, creating opportunities to support spawning through strategically optimized releases.

Through the Sustainable Rivers Program, the USACE Nashville District has been working to identify optimal release scenarios to benefit Lake Sturgeon spawning below Center Hill Dam using hydraulic modeling. A two-dimensional HEC-RAS model was developed to establish baseline hydraulic conditions downstream of Center Hill Dam. This modeling effort improved understanding of velocities, flow distribution, inundation extent, and water depths within known spawning areas. This modeling allowed USACE to evaluate numerous operational scenarios to identify the ideal conditions for critical spawning habitat. Operational scenarios were evaluated to determine the number of turbines needed to achieve optimal flow conditions and each turbine was tested to identify which unit produces the most desirable velocities in critical habitat.

Future work by the USACE Nashville District will include additional modeling to evaluate the feasibility of achieving optimal spawning flows under historical hydrologic conditions, while ensuring all authorized project purposes continue to be met.

Session IV: Contributed Presentations

14. Cicadas in the stream: evaluating the foraging ecology and life history variation of fishes during a rare but massive resource pulse to stream ecosystems

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Aquatic and terrestrial food webs are tightly linked through cross-ecosystem exchanges of allochthonous resources. While many subsidies occur annually, rare resource pulses can have disproportionate ecological influences. Periodical cicadas (*Magicicada spp*.) represent one of the largest natural resource pulses in North America, emerging every 13 or 17 years depending on species and delivering substantial biomass and nutrients to forests and streams. Optimal foraging theory predicts that high-density, high-value resources like cicadas should attract consumers, yet their effects on stream fishes remain poorly studied. Cicadas' large body size may impose morphological constraints, but fishes' varying sensory modalities (visual, olfactory, auditory) and behaviors may determine their ability to exploit them. We examined how cicada pulses influence stream fish foraging by: (1) quantifying cicada drift density and biomass using drift nets (26 × 45 cm), (2) assessing cicada occurrence in fish diets, and (3) evaluating relationships among foraging strategy, life history, and gape size. During the 2024 emergence of Broods XIX and XIII and the 2025 emergence of Brood XIV, we sampled drift in 88 streams across Arkansas, Missouri, Illinois, Iowa, Tennessee, Kentucky, and Ohio, and collected fishes from 39 sites. Target species included Green Sunfish (*Lepomis cyanellus*), Longear Sunfish (Lepomis megalotis), Bluegill (*Lepomis macrochirus*), Creek Chub (*Semotilus atromaculatus*), Bullhead Catfish (*Ameiurus spp.*), Madtoms (*Noturus spp.*), Sculpins (*Cottus spp*.), and Topminnows (*Fundulus spp.*). By linking drift dynamics with consumer morphology and behavior, we assess how cicada consumption varies among surface, pelagic, and benthic foragers. Our findings will demonstrate how infrequent, large-scale resource pulses shape fish feeding ecology, trophic interactions, and energy flow in stream ecosystems, advancing understanding of consumer–resource dynamics under rare but ecologically significant phenomenon.

15. Propagation for Tennessee Dace Restoration in the Cherokee National Forest

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Tennessee dace have been extirpated from multiple tributaries across their native range, prompting a collaborative restoration effort between Conservation Fisheries (CF) and the U.S. Forest Service beginning in 2022. While the USFS has focused on restoring degraded stream conditions—redesigning culverts, restoring hydrologic connectivity, and adding large woody debris to reestablish natural habitat complexity—CF has been responsible for restoring historic populations through captive propagation. After several years of propagation, CF has developed and refined species-specific propagation protocols that enable reliable, high-volume rearing of Tennessee dace within a limited footprint. These protocols continue to evolve annually to address biological and logistical challenges and increase production. However, due to the species' high fecundity and the finite number of tanks and systems that can be allocated to a single species, CF has reached a practical ceiling in production capacity. This presentation will summarize recent habitat restoration efforts, describe current propagation methods and outcomes, and highlight the space-based limitations CF faces for all species.

16. Don’t forget about the macrophytes, especially hornleaf riverweed (*Podostemum ceratophyllum*)

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Macrophytes (aquatic plants) are important components of aquatic ecosystems but are often overlooked by freshwater ecologists. This is especially true in lotic systems where macrophytes can look similar and be difficult to identify. The macrophyte Podostemum ceratophyllum, aka hornleaf riverweed, can look like algae, but it is actually a flowering plant. It grows submerged, attached to stable substrates in swift water habitats and waterfalls throughout the Appalachian region. The plant provides valuable habitat for aquatic insects and fishes, but these relationships need additional attention, especially by fisheries biologists. This presentation will discuss the basic ecology of Podostemum, how it supports macroinvertebrate communities and stream fishes, and is being used to help establish environmental flows in eastern rivers.

17. Recovery of the Dead Pigeon River in North Carolina and Tennessee: a Collaborative Effort to Bring a Riverine Ecosystem Back to Life

J. Brian Alford* (Tennessee Wildlife Federation), J. Larry Wilson (University of Tennessee Institute of Agriculture), Joyce Coombs (University of Tennessee Institute of Agriculture), Justin Wolbert (Tennessee Valley Authority)

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The Pigeon River Recovery Project (PRRP) formed in 2001 as a partnership of over 20 volunteer institutions that translocated fish, snails, and mussels back to the river, after a paper and pulp mill was forced to improve its toxic effluent in the mid 1990s. For 90 years, the river was referred to by locals as the "Dead Pigeon River", because the entire length downstream of the mill in Canton, NC to Newport, TN was a toxic soup the color of coffee that roiled with industrial pollutants like dioxin, furan, and chloroform. The PRRP monitored dispersal and recruitment of repatriated species from 2002 to 2021.To date, multiple snail species have recolonized, although mussels have not. Most of the 95 native fish species have re-established either by translocation of wild sources or hatchery-reared stocking. Benthic macroinvertebrates recovered from ratings of poor condition to good or fair, based on annual index of biotic integrity scores from 1987 to 2021. Lessons learned from this 20-year, ecosystem-level recovery effort as follows: (1) patience is a virtue, because some species take a long time (>10 years) to show evidence of natural recruitment, (2) regulations meant to restore biological integrity work, since without the federal NDPES system under the U.S. Clean Water Act, no biological recovery of any kind would have been possible, (3) an informed public is crucial for ecosystem recovery to be accepted by local residents and persist in the long term, and (4) be flexible enough to adapt ecosystem recovery plans to a changing environment, so that evaluations of repatriation success can be level-set based on drought or flooding events. The mill shut down in June 2023, and fish species never before seen in the area surrounding the mill have returned. However, impacts from Hurricane Helene in September 2024 could have negated some returns.