American Fisheries Society

2024 Arkansas Chapter Meeting

February 21 – 23, 2024

Holiday Inn Convention Center

Texarkana, Arkansas

Arkansas Chapter of the American Fisheries Society

Executive Committee – 2023-2024

Brie Lusk, President

Dylan Hann, President-Elect

Christy Graham, Past-President

Sean Lusk, Treasurer

Allison Asher, Secretary

Committee Chairs – 2023-2024

Josh Melton, Raffle

Jacob Martin, Activities

Erin Thayer, Environmental Affairs

Chelsea Gilliland, Education Liaison

Tyler Thomsen, Webmaster

Katie Thomsen, Newsletter Editor

THE EXECUTIVE COMMITTEE WOULD LIKE TO THANK OUR SPONSORS AND DONORS!

February 21st, 2024

Hello Chapter Members,

I'm thrilled to welcome you to the 38th Annual Meeting of the Arkansas Chapter of the American Fisheries Society! The Executive Committee is looking forward to visiting with Chapter members as well as learning about the important work that's happening all over the state. As with each annual meeting, we hope this provides our members with opportunities to collaborate and network amongst the people and organizations that have a stake in protecting and improving our aquatic resources.

If you went to the Annual Meeting in 2017, you'll be familiar with the venue and all that Texarkana has to offer. In the past, the Holiday Inn Convention Center was a great place to accommodate our Chapter activities and will no doubt continue to provide a perfect space for learning and collaboration. Our President-elect, Dylan Hann has worked hard to put together a fun and educational program. We'll kick off the meeting with an Intermediate R Workshop led by AGFC Biologist Ryan Gary and AGFC Fisheries District Coordinator Sean Lusk. Our Welcome Social will bring a taste of the local flavor with Cajun food, the Pam Setser Band, and a cornhole (or as some of you may call it, baggo) tournament. We're also proud to continue to offer a student lunch workshop, where we invite a diverse panel of fisheries and aquatic resources professionals to discuss their careers and help students navigate the job market. We anticipate this meeting will provide multiple occasions to network and find ways to work together on the complex topics we face in our educations and professional lives.

We're so glad you are able to join us in Texarkana! I can't say enough about the hard work that our Executive Committee has put in to undertaking this event – we, as members, are fortunate to have these dedicated people moving our Chapter forward. Here's to a great and productive meeting!

Brie Lusk
President, Arkansas Chapter AFS

February 21st, 2024

Dear Conference Attendees,

Welcome to the 38th annual meeting of the Arkansas Chapter of the American Fisheries Society (AFS). We hope you find the program informative and are able to connect with fisheries and aquatic science professionals in Arkansas and surrounding states. This year's meeting has 29 oral presentation submissions and 17 poster presentations. It's important to the Executive Committee that Arkansas AFS remains a platform for students and professionals to collaborate on projects, connect with colleagues, and find solutions to the continuing challenges of our professions. We have been working diligently on the conference schedule to make sure all students and professionals have the opportunity to share their work. The oral presentation time will be 15 minutes and five minutes for questions. We also had the opportunity to add a second workshop for all attendees on Friday morning before the business meeting. Dr. Marlis Douglas will be sharing: Futurecasting Workshop – An adaptive planning framework for a successful future of AFS.

This year's conference theme "Collaborative Conservation" reminds us that in order to do something epic, we need to work together. State agencies, federal agencies, biologists, public users, universities, clubs and all silos in-between need relationships and communication with one another. We owe this to the incredible resources we have in the Natural State. Let's work together for a better aquatic Arkansas!

We hope you enjoy the program!

Thank you,

Dylan Hann
Conference Program Chair
President-Elect, Arkansas Chapter AFS

AMERICAN FISHERIES SOCIETY
MEETING CODE OF CONDUCT

The American Fisheries Society (AFS) is committed to providing a safe, productive, and welcoming environment for all meeting participants, and the Arkansas Chapter is no exception.

Purpose of the Code of Conduct:

AFS meetings are among the most respected scientific meetings of fisheries professionals in the natural resource scientific community. AFS values the diversity of views, expertise, opinions, backgrounds, and experiences reflected among all attendees, and is committed to providing a safe, productive, and welcoming environment for all meeting participants and AFS staff. All participants, including, but not limited to, attendees, speakers, volunteers, exhibitors, staff, service providers, and others, are expected to abide by this Meetings Code of Conduct. This Code of Conduct applies to all AFS meeting-related events, including those sponsored by organizations other than AFS but held in conjunction with AFS events, in public or private facilities.

The full list of acceptable and unacceptable behavior can be found at:
https://fisheries.org/about/governance/afs-meetings-code-of-conduct/

Reporting Unacceptable Behavior:

If you are not in immediate danger but feel that you are the subject of unacceptable behavior, you are encouraged to file a formal complaint to the AFS Ethics and Professional Conduct Committee and/or an AFS officer or the AFS Executive Director which will then be forwarded to the Ethics and Professional Conduct Committee for assessment. **Any member of the Arkansas Chapter's Executive Committee will assist you with reporting unacceptable behavior.**

Consequences of Unacceptable Behavior:

Anyone requested to stop unacceptable behavior is expected to comply immediately. Consequences may include one or more of the following actions:

- Dismissal from the meeting without refund;
- Reporting to your agency;
- Exclusion from future AFS meetings for five years;
- Revoke AFS membership without the opportunity for renewal for five years;
- If the offense is criminal, local law enforcement will be contacted.

Program Overview

American Fisheries Society

38th Annual Meeting of the Arkansas Chapter American Fisheries Society
Holiday Inn Convention Center, Texarkana, Arkansas

All events will be located in the Holiday Inn Convention Center

Wednesday, February 21st

Activity	Time
Intermediate R Workshop	8:30 am – 12:00 pm
Meeting Registration and Presentation Loading	11:00 am – 1:00 pm
Lunch- On Your Own	12:00 pm – 1:00 pm
President's Welcome	1:00 pm – 1:10 pm
Keynote Address	1:10 pm – 1:30 pm
Session I	1:30 pm – 3:10 pm
Break	3:10 pm – 3:30 pm
Session II	3:30 pm – 5:10 pm
Break	5:10 pm – 5:30 pm
Poster Session	5:30 pm – 7:00 pm
Welcome Social with the Pam Setser Band	5:30 pm – 10:30 pm
Cornhole Tournament	7:00 pm – 9:00 pm

Thursday, February 22nd

Activity	Time
Meeting Registration and Presentation Loading	7:00 am – 8:00 am
Session III	8:00 am – 9:40 am
Break	9:40 am – 10:00 am
Session IV	10:00 am – 11:20 am
Student Workshop Lunch	11:20 am – 1:10 pm
Lunch- On Your Own	11:20 am – 1:10 pm
Session V	1:10 pm – 2:50 pm
Break	2:50 pm – 3:10 pm
Session VI	3:10 pm – 4:50 pm
Break	4:50 pm – 5:30 pm
Banquet/Silent Auction	5:30 pm – 10:30 pm

Friday, February 23rd

Activity	Time
Futurecasting Workshop	8:00 am – 9:30 am
Break	9:30 am – 9:45 am
Chapter Business Meeting	9:45 am - 11:20 am
Past President's Luncheon at Naaman's BBQ (Invitation only)	11:30 am - 12:30 pm

Food Truck Menu (available for lunch in the rear parking lot Wednesday and Thursday)

Good Eats Catering Company Menu & Prices

3 PC Fish Basket	$13
8 Wings *lemon pepper, hot, BBQ, spicy BBQ, or ranch *add fries ($16)	$13
Pulled Pork Fries	$13
Pulled Pork Sandwich *add fries ($13)	$10
3 Fish Tacos	$10
3 Street Tacos (Pork)	$9
8 oz. Cheeseburger *Combo: $13 (includes veggies, fries, & drink)	$9
Mozzarella Sticks (5)	$8
Large Frito Pie	$6
Smoked Bologna (on a bun)	$6
Fries *add cheese ($6) *add chili and cheese ($7)	$5
Hot Links (on a bun)	$3 or 2 for $5
Drinks *bottled water or bottled sodas	$2
Jumbo Turkey Legs (when available)	$15

Extra Charges	
Add cheese or cheese	$1
All drums or All flats (wings)	$3 more
Extra piece of Fish	$3 each
Extra wings	$2 each
Extra ranch (cups)	2 for $1

Texarkana, TX (903) 691-0623 goodeatscatering2009@gmail.com

Oral Presentation Schedule

See pages 15 – 28 for complete abstracts in presentation order

Wednesday, February 21st

Time

1:00 PM **President's Welcome** *by* Brie Lusk

1:10 PM **Keynote Address: "Collaborative Conservation"** *by* JJ Gladden

Session I

Moderator: Chelsea Gilliland, Arkansas Game and Fish Commission

Time (Order)	Presentation Name and Author(s) *** =** *Presenter,* † *= Student Presenter*
1:30 PM (1)	**Futurecasting — An Adaptive Planning Framework for a Successful Future of AFS** Marlis Douglas* (University of Arkansas) and Joseph Conroy (Ohio Department of Natural Resources)
1:50 PM (2)	**Teamwork for Stream Work, A Conservation Partnership** Aaron Norton* (Arkansas Game and Fish Commission), Tim Burnley (Arkansas Game and Fish Commission)
2:10 PM (3)	**Assessment of fish movement in relation to barriers in the Upper Illinois Bayou watershed.** Risa McCollough† (Arkansas Tech University), Kyler Hecke (Arkansas Tech University)
2:30 PM (4)	**Cultivating Anglers through Partnerships with Educators: A Statewide Collaboration** James Davidson* (Arkansas Game and Fish Commission) and Hailey Robinson (President Trout Unlimited 514)
2:50 PM (5)	**Anonymous Location Data and its Applications in Fisheries Management** Ryan A. Gary*, Christy Graham, Joe Kaiser and Vic DiCenzo (Arkansas Game and Fish Commission)
3:10PM	**BREAK**

Session II

Moderator: Edward Wild, Arkansas Department of Energy and Environment

Time (Order)	Presentation Name and Author(s) *** =** *Presenter,* † *= Student Presenter*
3:30 PM (6)	**Exploitation and harvest characteristics of the Striped Bass fishery in Arkansas** Eric Gates* (Arkansas Game and Fish Commission), Jon Stein (Arkansas Game and Fish Commission), Jordan Lindaman (Arkansas Game and Fish Commission)
3:50 PM (7)	**Largemouth Bass habitat use, movement, and mortality within Millwood Lake** Katie Thomsen*, Dylan Hann, Sean Lusk, Vic DiCenzo, Jeremy Risley, Elizabeth Chambers (Arkansas Game and Fish Commission)
4:10 PM (8)	**Diversity of Smallmouth Bass in Arkansas** Zachery D Zbinden†, Casey L Brewster, Tyler K Chafin, Michael E Douglas, Marlis R Douglas (University of Arkansas), Jeff Buckingham, Jeremy Risley, Jeff Quinn, and Vic DiCenzo (Arkansas Game and Fish Commission)
4:30 PM (9)	**Comparison of tandem baited hoop net sampling by month and bait type in two lakes in eastern Arkansas** Justin Homan*, Micah Tindall, Chris Middaugh (Arkansas Game and Fish Commission)
4:50 PM (10)	**Optimizing Sampling Protocols: Evaluating how electrofishing settings affect the capture of Flathead Catfish in the field** Jacob Martin * and Tyler Thomsen (Arkansas Game and Fish Commission)
5:10 – 5:30 PM	**Break**
5:30 – 7:00 PM	**Poster Session**
5:30 – 10:30 PM	**Welcome Social with the Pam Setser Band**
7:00 – 9:00 PM	**Cornhole Tournament**

Thursday, March 16th

Session III

Moderator: Katie Morris, Arkansas Game and Fish Commission

Time (Order)	Presentation Name and Author(s) ***** = *Presenter*, † = *Student Presenter*
8:00 AM (11)	**Silver Carp *Hypophthalmichthys molitrix* and lower Mississippi River fish assemblages: Part 1 – Structure** Glen Jackson†, Ryan Mozisek, and Michael Eggleton (University of Arkansas Pine Bluff)
8:20 AM (12)	**Silver Carp *Hypophthalmichthys molitrix* and lower Mississippi River fish assemblages: Part 2 – Function** Ryan Mozisek†, Glen Jackson , and Michael Eggleton (University of Arkansas Pine Bluff)
8:40 AM (13)	**Using stationary radio telemetry to determine survival and movement of Brown Trout following implantation in the Little Red River** Hayden Wall†, Levi Olhausen, Derek Owens, Ben Johnson, Steve Lochmann (University of Arkansas at Pine Bluff), Christy Graham, Joe Kaiser, Ryan Gary, and Kent Coffey (Arkansas Game and Fish Commission)
9:00 AM (14)	**Longitudinal fish assemblage changes past the managed coldwater sport fishery on the Little Red River** Steve Lochmann*, Levi Olhausen, Ben Johnson (University of Arkansas at Pine Bluff), Ryan Gary, and Joe Kaiser (Arkansas Game and Fish Commission)
9:20 AM (15)	**Lake DeGray vegetation re-establishment project – vegetation mapping update** Scott Jones* (University of Arkansas at Pine Bluff)
9:40 AM	**BREAK**

Session IV: Fisheries Management Part 2

Moderator: Spencer Dorsey, Arkansas Game and Fish Commission

Time (Order)	Presentation Name and Author(s) ***** = *Presenter*, † = *Student Presenter*
10:00 AM (16)	**Importance of habitat and water quality on the South Central Plains macroinvertebrate communities across a disturbance gradient.** Ellie Green*****, Edward Wild (Department of Energy and Environment), Molly Wozniak, Ryne Lehman, and Hal Halvorson (University of Central Arkansas)

10:20 AM (17) **Importance of habitat and water quality on the South Central Plains fish communities across a disturbance gradient.**
Edward Wild*, Ellie Green (Arkansas Department of Energy and Environment), Molly Wozniak, Ryne Lehman, and Hal Halvorson (University of Central Arkansas)

10:40 AM (18) **Temporal assessment of fish communities in the headwaters of a South Central Plains ecoregion watershed**
Tara L. Schnelting† and Kyler B. Hecke (Arkansas Tech University)

11:00 AM (19) **Hydrologic variability drives environmental and geospatial relationships in Smallmouth Bass distribution**
Sarah F. Sorensen† (Arkansas Cooperative Fish and Wildlife Research Unit, University of Arkansas), J. Tyler Fox (The Nature Conservancy), Daniel D. Magoulick (U.S. Geological Survey, Arkansas Cooperative Fish and Wildlife Research Unit, University of Arkansas)

11:20 AM **LUNCH – On Your Own**

11:25 AM **Student Workshop**

<u>Session V</u>

Moderator: Jamie Kindschuh, Arkansas Game and Fish Commission

Time (Order)	**Presentation Name and Author(s)** ***** = *Presenter*, † = *Student Presenter*
1:10 PM (20)	**Restoring the Source - A Decade of Assessing and Removing Stream Barriers Through Collaborative Partnerships** Ben Thesing* and Raven Lawson (Central Arkansas Water)
1:30 PM (21)	**Collaborative Approach to Large-Scale Restoration on War Eagle Creek** Sean M. Saunders*, Tim W. Burnley (Arkansas Game and Fish Commission), Becky L. Roark, Daniel L. Hagood (Beaver Watershed Alliance), and Jonathan B. Baxter (Partners for Fish and Wildlife, U.S. Fish and Wildlife Service)
1:50 PM (22)	**Clearing The Way For Some Dam Work: The Great War Eagle Creek Mussel Rodeo** Kendall R. Moles* (Arkansas Game and Fish Commission)
2:10 PM (23)	**Community-level Study of Fish Thermal Tolerance in the Ouachita Mountain Ecoregion** Krista Yari†, Peyton Manry, Matt Gifford, Ginny Adams, and Reid Adams (University of Central Arkansas)

2:30 PM (24) **Thermal Tolerances of Fishes Inhabiting a Thermally Dynamic Urban Stream**
Peyton Manry†, Krista Yari, Cade Richesin, Matt Gifford, Ginny Adams, and Reid Adams (University of Central Arkansas)

2:50 PM **BREAK**

Session VI

Moderator: Ryan Gary, Arkansas Game and Fish Commission

Time (Order)	Presentation Name and Author(s) ***** = *Presenter*, † = *Student Presenter*
3:10 PM (25)	**The importance of spatial scale and host distribution in modelling suitable habitat for a recently federally listed mussel species** Seth Drake†, Tom Nupp, Kyler Hecke (Arkansas Tech University), and Kendall Moles (Arkansas Game and Fish Commission)
3:30 PM (26)	**Reassessing fish state conservation status ranks and entering data into the fish presence database to inform the 2025 revision of the Arkansas wildlife Action Plan** Katie Morris*, Jeff Quinn, Ethan Dodson (Arkansas Game and Fish Commission), and Dustin Lynch (Arkansas Natural Heritage Commission),
3:50 PM (27)	**Evaluating the Effects of Drought on Endangered Yellowcheek Darter (Nothonotus moorei) and Yoke Darter (Nothonotus juliae) Survival, growth, and behavior** Kearstin M. Findley† (University of Arkansas), Daniel D. Magoulick (U.S. Geological Survey, Arkansas Cooperative Fish and Wildlife Research Unit)
4:10 PM (28)	**Occupancy assessment and microhabitat selection of Rocky Shiners in Arkansas** Savannah Wise† and John Jackson (Arkansas Tech University)
4:30 PM (29)	**Status and distribution of Swainia Darters in Arkansas with emphasis on Longdose Darter *Percina nasuta*** Jeffrey W. Quinn*, Katie Morris, and Ethan Dodson (Arkansas Game and Fish Commission)

4:50 PM **BREAK**

5:30 PM **Banquet/Silent Auction**

Friday, March 17th

Session VII

Moderator: Dylan Hann, Arkansas Game and Fish Commission

Time (Order)	**Presentation Name and Author(s)** *** =** *Presenter,* † *= Student Presenter*
8:00 AM	**Futurecasting workshop— An adaptive planning framework for a successful future of AFS** Marlis Douglas* (University of Arkansas) and Joseph Conroy (Ohio Department of Natural Resources)
9:30 AM	**BREAK**
9:45 AM	**Business Meeting**

Poster Session Overview

(See pages 29 – 40 for complete poster abstracts, in order)

Order	Poster Name and Author(s) *** =** *Presenter,* † *= Student Presenter*
P-1	**Exploring New Territory: Freshwater Mussels of Arkansas South-Central Plains Ecoregion** Zach Crain† (Arkansas Tech University), Kyler Hecke (Arkansas Tech University)
P-2	**Land Use Impacts on Fish Communities in the Arkansas Valley Ecoregion: A Preliminary Analysis** Jarrett Tallent† (University of Central Arkansas), Ryne Lehman (University of Central Arkansas), Ginny Adams (University of Central Arkansas), Reid Adams (University of Central Arkansas)
P-3	**Responses of fishes to multiple barrier removals on War Eagle Creek** Claire Binfield† (University of Central Arkansas), Ginny Adams (University of Central Arkansas), Reid Adams (University of Central Arkansas)
P-4	**Coproducing research for preventative aquatic invasive species management in Arkansas** Lindsey A.P. LaBrie† (Arkansas Cooperative Fish & Wildlife Research Unit; University of Arkansas, Fayetteville;), Caleb P. Roberts: (U.S. Geological Survey; Arkansas Cooperative Fish & Wildlife Research Unit; University of Arkansas, Fayetteville)
P-5	**Estimation of a Sportfish Population in an Unmanaged Farm Pond in Arkansas** Karson Hamilton† (Arkansas Tech University) and Kyler Hecke (Arkansas Tech University)
P-6	**Spatial Assessment of Slender Madtom (Noturus exilis) Diets within the Illinois Bayou Watershed** Kade B. Mitchell† (Arkansas Tech University), Kyler B. Hecke (Arkansas Tech University)
P-7	**Microhabitat Use of the Highland Darter (Etheostoma teddyroosevelt) in the Illinois Bayou Watershed of Arkansas** Colton W. Morris† (Arkansas Tech University), Kyler Hecke (Arkansas Tech University)
P-8	**Assessment of aquatic macroinvertebrate assemblages in the Upper Illinois Bayou watershed** Coley Turner† (Arkansas Tech University), Risa McCollough (Arkansas Tech University), Kyler Hecke (Arkansas Tech University)

P-9 **Length-Weight Relationship of Flier (Centrarchus macropterus) in Moro Creek**

Jeffrey Phillips† (Arkansas Tech University), Kyler Hecke (Arkansas Tech University)

P-10 **Distribution and habitat use of the endemic ozark shiner (Paranotropis ozarcanus)**

Alivia Mayes† (University of Central Arkansas), Ginny Adams (University of Central Arkansas), Reid Adams (University of Central Arkansas)

P-11 **Why is the Striped Shiner (Luxilus chrysocephalus) declining in the Ozarks?**

Tavis Taylor† (University of Central Arkansas), Ginny Adams(University of Central Arkansas), Reid Adams (University of Central Arkansas)

P-12 **Mussel Communities of Two Impacted Tributaries in the Arkansas South Central Plains Ecoregion**

Jimmy Hall† (Arkansas Tech University), Seth Drake (Arkansas Tech University), Kyler Hecke (Arkansas Tech University), Kendall Moles (Arkansas Game and Fish Commission), Parker Brannon (Arkansas Tech University), Savannah Wise (Arkansas Tech University), and Tom Nupp (Arkansas Tech University)

P-13 **A Survey of Mussels in Small Tributaries of the Ouachita River Headwaters**

Aaron Huckeba† (Arkansas Tech University), Seth Drake (Arkansas Tech University), Kyler Hecke (Arkansas Tech University), Kendall Moles (Arkansas Game and Fish Commission), Tom Nupp (Arkansas Tech University), Risa McCollough (Arkansas Tech University), Nathan Mansor (Arkansas Tech University)

P-14 **Capture fisheries harvest in the United States: Trends, species diversity, and implications**

Uttam Deb*, Md Asadur Rahaman, Shuva Saha (University of Arkansas at Pine Bluff)

P-15 **DNA barcoding is useful to identify diverse larval fishes collected in drift surveys**

Jesse Filbrun* (Southern Arkansas University)

P-16 **Production and consumption of seafood in Nigeria**

Uttam Deb* (University of Arkansas at Pine Bluff), Caleb I Adewale (University of Arkansas at Pine Bluff)

P-17 **Monthly evaluation of low-frequency electrofishing for catfish on the White River**

Allison S. Copeland*, Justin M. Homan, Micah D. Tindall (Arkansas Game and Fish Commission)

Oral Presentation Abstracts

(1) Futurecasting — An Adaptive Planning Framework for a Successful Future of AFS

Marlis Douglas* (University of Arkansas), Joseph Conroy (Ohio Department of Natural Resources)

AFS fulfills an essential role in advancing fisheries science, training professionals and providing cohesion with the fisheries community. But AFS struggles to remain relevant to its members in a changing world. What services are of value to members and what needs can AFS fulfill to continue to support our community of fisheries professionals? A long-term strategic vision is needed for AFS so we can prioritize programs and sustain those services that will be of value to both members and stakeholders. The AFS Strategic Positioning Committee is engaging AFS members and units at all levels to identify big picture, strategic goals (30+ year moonshots). The Futurecasting framework helps identify such long-term goals. These will guide programs and initiatives across all units, and ensures actions progress towards goals, while also promoting decentralized decisions and adjustments to unforeseen challenges. Futurecasting complements the traditional 5-Year Strategic Plan by emphasizing future targets as drivers, promoting long-term proactive perspectives over short-term reactive efforts, and relying on adaptive planning to optimize decisions and action plans. While the future is uncertain and cannot be predicted, future outcomes can be shaped by guiding actions through adaptive planning. Help us build the AFS you want to be part of over the next 30+ years.

---

(2) Teamwork for Stream Work, A Conservation Partnership

Aaron Norton* (Arkansas Game and Fish Commission), Tim Burnley (Arkansas Game and Fish Commission)

Aaron Norton will discuss the newly formed conservation partnership between the Arkansas Game and Fish Commission, The Arkansas Department of Agriculture, Southeastern Aquatic Resources Partnership, and Weyerhaeuser, a timber company which is the largest private landowner in Arkansas. The project, funded by a 319 grant through Arkansas Department of Agriculture's Natural Resource Division, involves the inventorying and removal of aquatic organism passage barriers in the Lower Little River Watershed utilizing Southeastern Aquatic Resources Partnership's Barrier Prioritization Tool. The partnership has already been initiated and has completed the removal of 3 aquatic organism passage barriers on the Saline River in Southwest Arkansas and has already prioritized 6 more barriers for removal on Weyerhaeuser and county properties in the Lower Little River Watershed. These removals aim to improve aquatic organism habitat and movement as many of the streams and rivers in this watershed contain federally threatened and endangered species. The project also seeks to improve public safety, improve recreational access, reduce erosion, and mitigate the strain on local infrastructure by restoring the stream to its natural hydrologic state.

(3) Assessment of fish movement in relation to barriers in the Upper Illinois Bayou watershed

Risa McCollough† (Arkansas Tech University), Kyler Hecke (Arkansas Tech University)

There has been increased concern about the effects stream barriers have on aquatic organism passage. Artificial barriers, such as road crossings, can hinder the movement of aquatic organisms and affect habitat connectivity. Two creeks were selected in the Upper Illinois Bayou watershed (Dare and Dry Creek) to assess fish movement using mark-recapture through PIT and Visible Implant Elastomer (VIE) tags. Sampling occurred monthly (October 2023-present; omitting January due to inclement weather) at each site. During sampling, species abundance, length and weight of tagged individuals, number of recaptured individuals, and number newly tagged fish were recorded. At Dare Creek, 24 species were tagged; through three sampling efforts, 417 individuals were tagged with 8 individuals recaptured. At Dry Creek, 13 species were tagged with an additional 3 species collected before being released due to size constraints or high handling sensitivity; after three sampling efforts, 186 individuals were tagged with 3 individuals recaptured. While no movement was detected, the recapture rate (recaptured/total tagged) was 0.02 for both sites; however, PIT tags had a higher total recapture rate than VIE tags (0.03 versus 0.02). Our detection may have been limited due to substantial increases in flow between sampling periods. Future sampling may provide data on fish movement and the temporal changes in fish communities at these sites. These data will further aid in our understanding of stream barriers, how they impact fish, and lay a foundation for further research in this watershed.

---

(4) Cultivating Anglers through Partnerships with Educators: A Statewide Collaboration

James Davidson * (Arkansas Game and Fish Commission) and Hailey Robinson (President Trout Unlimited 514)

The decline in angler participation presents a formidable challenge to fisheries and conservation management. This project showcases a successful model for recruiting anglers by forging partnerships with educators across various learning environments. The Arkansas Game and Fish Commission's Fishing Education program and Fishing In the Natural State program have established partnerships with over 250 traditional and non-traditional educators. Together, they engage more than 30,000 students annually through initiatives such as Youth Fish Camps and classroom curriculum. These efforts aim to empower today's youth to embrace angling and conservationism, fostering a new generation of stewards for our natural resources.

---

(5) Anonymous Location Data and its Applications in Fisheries Management

Ryan A. Gary*, Christy Graham, Joe Kaiser and Vic DiCenzo (Arkansas Game and Fish Commission)

The use of anonymous location data (ALD) has become more prevalent with the increase in cell phone availability and accuracy. Historically first applied to forensic investigations and the private and commercial business sectors, ALD is now being used by fish and wildlife management agencies. In order to evaluate the accuracy and application of ALD as a substitute for creel survey methods, fishing effort and residency data from a 2021-22 creel survey of Bull Shoals Tailwater were compared to ALD data secured for the same area. The relationship between daily creel and ALD effort estimates was positively correlated. Seasonal effort estimates were similar in spring and summer between creel and ALD estimates, but were found to be significantly different between summer and winter seasons. Residency also differed between the two methods. During the creel, 84% of Arkansas counties were represented, whereas ALD accounted for 100% of counties. Additionally, interview data indicated 45% of angling parties were residents, while ALD estimated 70% of visitors were residents. Nationwide, creel and ALD data overlapped for 43 states, but there was disparity in 7 states. Based on this data, the use of ALD has the potential to save management agencies resources in evaluating a fishery's use and demographics. However, this data also shows where reasonable conclusions may be drawn based on ALD and where conclusions may be ambiguous.

---

(6) Exploitation and harvest characteristics of the Striped Bass fishery in Arkansas

Eric Gates* (Arkansas Game and Fish Commission), Jon Stein (Arkansas Game and Fish Commission), Jordan Lindaman (Arkansas Game and Fish Commission)

Annual stockings of Striped Bass (M. saxatilis) support a popular recreational fishery in Arkansas. In recent years, biologists have become aware of increasing public concern over perceived declines in catch rates and overall fishery quality. A statewide tag-reward study was initiated in February 2022 to evaluate annual exploitation and harvest characteristics of the Striped Bass fishery. A total of 667 legal-sized Striped Bass were doubled tagged in three large flood control reservoirs and each tagged fish offered a $100 return incentive. A total of 154 tagged Striped Bass have been reported (23% overall return rate) and adjusted annual exploitation ranged between 4—14% among reservoirs. Information derived from this study will be used to guide future management of the Striped Bass fishery in Arkansas.

---

(7) Largemouth Bass habitat use, movement, and mortality within Millwood Lake

Katie Thomsen*, Dylan Hann, Sean Lusk, Vic DiCenzo, Jeremy Risley, Elizabeth Chambers (Arkansas Game and Fish Commission)

Millwood Lake is known for its Largemouth Bass fishing and ranks among the top 5 lakes in Arkansas based on fishing quality indicators gathered from tournament data within the past 5 years. Despite its reputation, results of standardized sampling and angler observations have indicated that the Millwood bass fishery is not reaching its historical potential. Although it is believed that habitat degradation is the likely culprit, assessing habitat utilization has proven very difficult due to the complex network of backwaters and main lake structure. Identifying, protecting and enhancing critical habitat areas are of paramount importance to managing this fishery. Our study aims to inform biologists on Largemouth Bass habitat use, movement, behavior, and mortality within Millwood Lake using a combination of radio telemetry and forward-facing sonar for two years. Our approach will entail capturing fish via electrofishing and tagging them with radio transmitters (ATS model F1170, 4g) and an external T-bar tag. Fish will be tracked bi-weekly for the next two years, or when either battery life fails or a fish is considered expired. Fish locations will be determined with an ATS Model R410 receiver and 3-element yagi antenna. Location of each fish will be recorded using Garmin GPSMAP 1222xsv and 24xd heading sensor. When the transmitter signal is strongest directly below the boat, Garmin Panoptix Livescope will then be deployed to characterize habitat utilization of the fish.

Findings from this study will help inform future management decisions, sampling procedures, and build rapport with anglers.

---

(8) Diversity of Smallmouth Bass in Arkansas

Zachery D Zbinden†, Casey L Brewster, Tyler K Chafin, Michael E Douglas , Marlis R Douglas (University of Arkansas), Jeff Buckingham, Jeremy Risley, Jeff Quinn, and Vic DiCenzo (Arkansas Game and Fish Commission)

The Central Interior Highlands harbor unique Smallmouth Bass (SMB) lineages, and this endemic diversity should be conserved. But a clear definition of species and population boundaries is needed to inform conservation plans and management strategies. Therefore, the University of Arkansas and the Arkansas Game and Fish Commission have embarked on a collaborative project to delineate the distribution of SMB evolutionary lineages, assess the effects of historical stocking on genetic admixture, and assess genetic diversity across populations. This initiative leverages a combined population genomic and morphometric approach to link genetic patterns with specific phenotypes. AGFC partners conducted comprehensive geographic collections of 1,499 SMB genetic samples from 109 sites across Arkansas. For morphometric analysis, 266 voucher specimens were also collected from 52 sites. Analysis of shape differences revealed phenotypic variation within and among basins. A novel type of genetic assay (GT-seq) was developed specifically for SMB in Arkansas to genotype many genetic markers (SNPs) efficiently for each individual. The assay was validated, and preliminary genotype data of a subset of samples (N=426) reveal that SMB in Arkansas is a diverse group with seven distinct lineages ('Southern Smallmouth Bass'). Population structure is consistent with expectations of unique lineages in the White, Little, Ouachita rivers, and Neosho SMB in the Arkansas River. Furthermore, fine-scale population structure reveals additional distinct lineages in the Black, Saline, and Little Red rivers. These findings highlight the diversity of SMB in Arkansas and suggest new opportunities for anglers seeking unique SMB experiences.

---

(9) Comparison of tandem baited hoop net sampling by month and bait type in two lakes in eastern Arkansas

Justin Homan*, Micah Tindall, and Chris Middaugh (Arkansas Game and Fish Commission)

Tandem baited hoop nets (TBHN) are the most efficient gear used to evaluate Channel Catfish populations in reservoirs. However, sampling month and bait used in TBHN has varied among collections in Arkansas and published studies. Understanding how catch rates and size structure might change by season or bait type will help inform standard sampling protocols used by management agencies. We evaluated catch rates, size structure, and turtle bycatch of TBHN in two lakes in eastern Arkansas (Lake Greenlee and Lake Des Arc) using Zote™ soap and cheese bait by month from May to October of 2022. We did not detect a difference in catch rates among months. We did find significantly higher catch rates with cheese bait than with Zote™ soap in both lakes. Mean length of Channel Catfish collected was larger with Zote™ soap than with cheese bait in both lakes and the length distributions of fish collected by bait type were significantly different in both lakes. Mean turtle bycatch by bait type was not significantly different in either lake, though Zote™ soap bycatch was overall lower. Due to differences in CPUE and size structure of Channel Catfish collected by the different bait types, TBHN samples collected with Zote™ soap and cheese bait should not be compared or analyzed together. Also, because we did not detect a difference in monthly CPUE, TBHN sampling can be performed during the entire growing season (May to October) in lakes with a similar climate to ours.

---

(10) Optimizing Sampling Protocols: Evaluating how electrofishing settings affect the capture of Flathead Catfish in the field

Jacob Martin* and Tyler Thomsen (Arkansas Game and Fish Commission)

Understanding how varying duty cycle affects capture efficiency and length distributions of Flathead Catfish can aid fisheries managers in data collection and subsequent management decisions. Two pools of the Ouachita River and a segment of the White River were sampled for this project. River kilometers were randomly selected within each study area for low frequency electrofishing. At each randomly selected river kilometer, two 10-minute long electrofishing runs were conducted using a duty cycle of 10% and a duty cycle of 30%, pulse-width was held constant at 15Hz. Length distributions among the two settings varied significantly in Felsenthal Pool and the White River, but did not differ in Thatcher Pool. Catch per unit effort (CPUE) did not differ significantly among duty cycles for Flathead Catfish overall. However, a zero inflated negative binomial model revealed CPUE of quality sized (≥ 510 mm) Flathead Catfish was 28% higher with a duty cycle of 10 than a duty cycle of 30 (P=0.004). Furthermore, the likelihood of not catching any Flathead Catfish >510 mm during a sampling run is 58% higher when using a duty cycle of 30. These data suggest that a length bias associated with duty cycle for Flathead Catfish may exist and it appears that a duty cycle of 10% is superior at sampling larger Flathead Catfish.

---

(11) Silver Carp *Hypophthalmichthys molitrix* and lower Mississippi River fish assemblages: Part 1 – Structure

Glen Jackson[†], Ryan Mozisek, and Michael Eggleton (University of Arkansas Pine Bluff)

Since the early 2000s, Silver Carp *Hypophthalmichthys molitrix* has established populations throughout the Lower Mississippi River (LMR), inhabiting most main-stem habitats and all significant tributaries. Since 2021, we have been engaged in a comparative analysis of LMR fish assemblages from the 1990s (pre-carp establishment) to those from the 2020s (15-20 years post-carp establishment). Data during both time periods were collected by boat electrofishing at 7-9 locations spanning nearly 900 river kilometers from the Kentucky-Missouri border downstream to the Mississippi-Louisiana border. Fish assemblages were assessed in up to five macrohabitats at each location during both falling-water (July-August) and low-water (September-October) river stages. Overall, sampling collected 49 different fish species, with 43 and 38 species collected during the pre-carp and post-carp periods, respectively. Silver carp alone comprised 22% of the numerical catch, with all of that catch occurring in the 2020s. Non-metric multidimensional scaling indicated significant shifts had occurred in the LMR fish assemblage structure between the pre-carp and post-carp periods. In particular, blue sucker *Cycleptus elongatus*, blue catfish *Ictalurus furcatus*, smallmouth buffalo *Ictiobus bubalus*, longnose gar *Lepisosteus osseus*, and shortnose gar *L. platostomus* were more associated with carps. Conversely, common carp *Cyprinus carpio*, channel catfish *I. punctatus*, and goldeye *Hiodon alosoides* were less associated with carps. Species associations were sometimes habitat specific. These findings represent a first attempt assess responses of a large-river fish assemblage collected over broad spatial and temporal scales to a biotic stressor (invasive carps) now pervasive throughout the Mississippi River basin.

(12) Silver Carp *Hypophthalmichthys molitrix* and lower Mississippi River fish assemblages: Part 2 – Function

Ryan Mozisek†, Glen Jackson , and Michael Eggleton (University of Arkansas Pine Bluff)

Silver Carp *Hypophthalmichthys molitrix* has become one of the most prolific aquatic nuisance species in the lower Mississippi River (LMR) basin during the last two decades. Ongoing research conducted during 2021-2023 has been focused on a comparative analysis of LMR fish assemblages from the 1990s (pre-carp establishment) to those from the 2020s (15-20 years post-carp establishment). To complement this work, fish assemblage data collected during 1995-97 and 2021-23 was reclassified according to several functional attributes, including trophic guilds (e.g., piscivore, insectivore, etc.), reproductive guilds (e.g., broadcast spawner, nest builder, etc.), and environmental tolerances (e.g., tolerant, intermediate, or intolerant) in addition to habitat preferences (e.g. stream size, substrate, and current/velocity). Non-metric multidimensional scaling indicated several significant shifts in LMR fish assemblages with respect to function between the pre-carp and post-carp periods. In the presence of high carp abundances (2021-23), fish assemblages shifted away from omnivory and more towards planktivory (e.g., silver carp) and benthic insectivory (e.g., blue sucker and smallmouth buffalo). In terms of environmental tolerances, fish assemblages shifted towards more tolerant species (mostly silver carp), though the proportion of intolerant species (mostly blue sucker) more than doubled between the pre-carp and post-carp periods. Reproductive guild composition of assemblages was similar between periods, though the percentage of broadcast spawners increased by 18%. Assessment of the fish assemblage functional responses to silver carp establishment in the LMR stands to provide a fuller, more comprehensive understanding of the effects this invasive species may be having in large rivers everywhere.

(13) Using stationary radio telemetry to determine survival and movement of Brown Trout following implantation in the Little Red River

Hayden Wall†, Levi Olhausen, Derek Owens, Ben Johnson, Steve Lochmann (University of Arkansas at Pine Bluff), Christy Graham, Joe Kaiser, Ryan Gary, and Kent Coffey (Arkansas Game and Fish Commission)

Brown Trout Salmo trutta are a popular sportfish in the Greers Ferry Tailwater. Movement estimates depend on methodology (PIT tag recaptures vs gastric implantation). To further study movement, we deployed 11 ATS R4500 stationary receivers approximately every 8 km in the 80 km below the dam. We surgically implanted 150 ATS F1835 transmitters into Brown Trout during early December using Smith-Root electric fish handling gloves for anesthesia. To date, we have retrieved data from five receivers. We estimated survival and movement of Brown Trout approximately two months after implantation. One hundred thirty-six of the one hundred fifty Brown Trout have moved enough to verify survival after at least 96 h after surgery. Of the 136 fish, 45 were only recorded by a single receiver. Five fish were recorded at four different receivers. No fish were recorded at all five receivers from which data has been retrieved. Total movement (km) was determined for the 136 fish. Total movement averaged (SD) 68 (120) km. Movement ranged from less than a kilometer to 1299 km. One hundred fish moved more than 10

km but less than 100 km, while 20 fish moved more than 100 km but less than 1000 km. Although Brown Trout movement is variable, movement can be characterized by common movement patterns.

---

(14) Longitudinal fish assemblage changes past the managed coldwater sport fishery on the Little Red River

Steve Lochmann*, Levi Olhausen, Ben Johnson (University of Arkansas at Pine Bluff), Ryan Gary, and Joe Kaiser (Arkansas Game and Fish Commission)

The AGFC Trout Program manages the Greers Ferry Tailwater trout fishery from the dam 48 km to the Monoghan-Womack Access (MWA). Coldwater habitat capable of supporting trout extends further downstream. The system eventually shifts to a warmwater stream. Understanding the transition will offer management alternatives and provide knowledge of how coldwater species interact with warmwater species in transition zones. Thirty 10-min nighttime electrofishing samples were conducted in December 2023 in a reach 30 km below the MWA. At the MWA, about 67% of the fish collected were coldwater individuals. About 30% of the fish collected there were warmwater individuals. This suggests that the warmwater fishery begins above the MWA. A coolwater sport fishery was not prevalent in this study. At the MWA, the coolwater fishery represented 3% of the fish collected. Most coolwater fishes sampled were nongame darter species. The last coldwater sportfish collected occurred 16.5 km downstream of the MWA. This sample location contained one shoal where the last coldwater sportfish was found. Coldwater fishes were confined to pool/shoal habitat and did not occupy pool-only habitat. These results suggest that fish are not confined by the arbitrary designation that is the MWA.

---

(15) Lake DeGray vegetation re-establishment project – vegetation mapping update

Scott Jones* (University of Arkansas at Pine Bluff)

The Arkansas Game and Fish Commission initiated a vegetation re-establishment project on Lake DeGray in 2019 utilizing up to 22 stationary floating vegetation dispersion cages, termed “Arkansas Cubes,” loaded primarily with coontail (Ceratophyllum demersum). A concurrent project using commercially-available down and side-imaging sonar systems has been implemented to track the expansion of naturally-rebounding and emerging colonies in sixteen sites featuring Arkansas Cubes and five sites without. Submerged aquatic vegetation has been detected throughout lower Lake DeGray from 377 to 405 feet MSL, with coontail detected most frequently between 388 to 397 feet MSL. Coontail has been observed in ten of sixteen ‘Cube sites. Eight of those sites had coontail directly underneath the ‘Cubes that did not exist before the ‘Cubes were installed. This is compelling evidence that the ‘Cubes have influenced the development of new coontail colonies. However, significant natural regrowth clouds the true impact of the ‘Cubes as coontail has also been observed in four of five ‘Cube-less sites. Insights on general colonization patterns observed in Lake DeGray will be discussed to help guide surveillance programs on other reservoirs selected for Arkansas Cube trials.

---

(16) Importance of habitat and water quality on the South Central Plains macroinvertebrate communities across a disturbance gradient.

Ellie Green*, Edward Wild (Department of Energy and Environment), Molly Wozniak, Ryne Lehman, and Hal Halvorson (University of Central Arkansas)

The Arkansas Division of Environmental Quality in partnership with the University of Central Arkansas conducted a study on wadeable streams in the South Central Plains (SCP) ecoregion to evaluate the physical, biological, and chemical characteristics of streams in the SCP. Seventy-four study sites were selected across a disturbance gradient (very high, high, medium, and low) based on land use and land cover within each watershed. The SCP covers approximately 3.4 million hectares in south Arkansas, and is dominated by pine forest and pasture as land uses. Macroinvertebrate assemblage data was analyzed to assess differences between sites based on disturbance rank, habitat parameters, land use, and water chemistry by using non-metric multidimensional scaling (NMDS), a multi-metric community analysis, and the Hilsenhoff Biotic Index (HBI). The presence of riffles had a significant relationship with macroinvertebrate community scores and HBI scores. NMDS displayed a significant difference between centroids of communities where riffles were present and absent, and where dissolved oxygen was low. Other parameters such as turbidity, conductivity, substrate, and flow displayed weak, but significant relationships. When datasets were separated based on riffle absence/presence, mean HBI scores of sites with riffles increases as disturbance increases, although there was not a significant difference between disturbance categories. However, sites without riffles did not display a relationship between HBI and disturbance. This study demonstrates that within an ecoregion with minimal gradient variation such as the SCP, the presence of riffles has a large effect on macroinvertebrate communities. This study also emphasizes a need for a new approach to analyzing macroinvertebrate communities in low-gradient systems.

---

(17) Importance of habitat and water quality on the South Central Plains fish communities across a disturbance gradient.

Edward Wild*, Ellie Green (Arkansas Department of Energy and Environment), Molly Wozniak, Ryne Lehman, and Hal Halvorson (University of Central Arkansas)

The Arkansas Division of Environmental Quality in partnership with the University of Central Arkansas conducted a study on wadeable streams in the South Central Plains (SCP) ecoregion to evaluate the physical, chemical, and biological characteristics of streams within the SCP. Seventy-four study sites were selected across a disturbance gradient based on land use and land cover within each watershed. Fish assemblage data was examined to determine differences between sites with varying water chemistry, habitat parameters, land use, disturbance, and location within the ecoregion by using non-metric multidimensional scaling (NMDS) and community similarity index (CSI) scores. Land use, major basin, riffle presence, and disturbance bins all displayed significant differences across centroids of the NMDS. However, these grouping variables showed no significant relationship with fish CSI scores, species richness, or percent of sensitive species when the SCP ecoregion was examined as a whole. Whereas, when communities were grouped by sites found within the SCP Ouachita Mountain ecotone and sites found outside of the ecotone, the proportion of sensitive taxa and species richness were significantly higher in fish communities within the ecotone. This study underlines the importance of evaluating sites within ecotones separately in future studies, and accentuates the value of macroecological studies.

---

(18) Temporal assessment of fish communities in the headwaters of a South Central Plains ecoregion watershed

Tara L. Schnelting† and Kyler B. Hecke (Arkansas Tech University)

Among South Central Plains ecoregion fish communities, there is a lack of knowledge on the importance of headwaters in these systems. A new study is needed to understand the functionality of headwaters in respect to fish communities in this ecoregion. We addressed this knowledge gap by assessing seasonal changes of fish communities in headwater streams of a South Central Plains ecoregion watershed in Arkansas (Moro Creek). A total of 16 sites within upper Moro Creek watershed were sampled seasonally (winter, spring, summer, and fall), with a total of four sampling events from Jan.- Oct. 2023. Fish presence/absence data were analyzed using community occupancy modeling to estimate μ: community occupancy mean and Ω: probability of species belonging to a community. A total of 37 species were observed from 10 families across all sites among the seasonal sampling events. The sampling event with the highest species occurrence across the 16 sites was during the fall (n =31), and the lowest species occurrence was during the winter (n =25). The community occupancy mean (μ; ±SE) varied from season to season, 0.22 ±0.03 in the winter, 0.26 ±0.03 in the spring, 0.30 ±0.03 in the summer, and 0.35 ±0.03 in the fall. There appears to be temporal variation in the fish community in the headwaters of Moro Creek. This research will aid in the understanding of South Central Plains fish communities, which will further our knowledge on the functionality of headwater streams in this ecoregion.

---

(19) Hydrologic variability drives environmental and geospatial relationships in Smallmouth Bass distribution

Sarah F. Sorensen† (Arkansas Cooperative Fish and Wildlife Research Unit, University of Arkansas), J. Tyler Fox (The Nature Conservancy), Daniel D. Magoulick (U.S. Geological Survey, Arkansas Cooperative Fish and Wildlife Research Unit, University of Arkansas)

Smallmouth Bass are a widely distributed, generalist species in North America. The Ozark-Ouachita Interior Highlands is the southern extent of their range. As climate change alters temperatures and hydrology throughout the region, Smallmouth Bass distribution patterns are likely to shift. Due to inherent spatial autocorrelation between stream sites, the use of geospatial models is necessary to account for the lack of independence. We utilized Spatial Stream Network (SSN) models to examine occupancy of Smallmouth Bass throughout the Ozark-Ouachita Interior Highlands, with a focus on temperature and hydrologic variation. Overall, Smallmouth Bass were most likely to occur in streams with low hydrologic variation and high amounts of stream flow permanence. When hydrologic variation was low, temperature was the only other environmental variable related to Smallmouth Bass presence. However, as hydrologic variation increased, more environmental variables showed significant relationships with Smallmouth Bass presence. The importance of different distance metrics also shifted as hydrologic variation increased, with streams experiencing higher amounts of variation having a greater importance on flow connectivity and stream distance compared to streams experiencing lesser amounts of variation. Understanding the intricacies of how hydrologic variation and environmental variables interact to affect species is of growing interest, especially as climate change exacerbates hydrologic variation.

Additionally, the model shows how the incorporation of geospatial dynamics is essential to modeling stream dynamics and stream species.

---

(20) Restoring the source - A decade of assessing and removing stream barriers through collaborative partnerships

Ben Thesing* and Raven Lawson (Central Arkansas Water)

Central Arkansas Water (CAW) is the largest provider of drinking water in the state, supplying a half-million people with high-quality, safe, and reliable services from two water sources, Lake Maumelle and Lake Winona. The goals of CAW's Watershed Protection Program are to protect, restore, and enhance the natural watershed environment of these two water sources through a variety of pollution prevention, watershed, and source water protection approaches. Our overall strategy is to maintain and enhance ecological and community sustainability and ultimately ensure CAW can provide excellent drinking water with minimal treatment. Hundreds of structures have been constructed on the rivers and streams of these watershed's ranging from vented ford dams to multi-culvert concrete driveways to State Highways. These anthropogenic changes to the river corridors have occurred over several decades and continue to adversely impact the natural function of these systems and impair water quality. With momentum from the Arkansas Stream Heritage Partnership in collaboration with the Southeast Aquatic Research Partnership, more attention has been brought to the many stream barriers impacting these resources. This presentation will highlight barrier removal projects in the Lake Maumelle watershed, which began in 2013, and the first comprehensive assessment of barriers in the Upper Saline River watershed, part of the Lake Winona system.

---

(21) Collaborative Approach to Large-Scale Restoration on War Eagle Creek

Sean M. Saunders*, Tim W. Burnley (Arkansas Game and Fish Commission), Becky L. Roark, Daniel L. Hagood (Beaver Watershed Alliance), and Jonathan B. Baxter (Partners for Fish and Wildlife, U.S. Fish and Wildlife Service)

War Eagle Creek is the largest tributary to Beaver Lake, drinking water source for 550,000 residents in Northwest Arkansas and segments of War Eagle Creek are listed on the 303(d) list for nonattainment due to turbidity and pathogens. Twenty-seven Species of Greatest Conservation Need occur in War Eagle Creek, including two federally protected species. A collaborative partnership between Arkansas Game and Fish Commission, Beaver Watershed Alliance, the U.S. Fish and Wildlife Service, landowners, nonprofits, state and local governments, and others are working together to remove four steam barriers, including a large dam, to reconnect 434 miles of stream on War Eagle Creek, restore approximately 5,500 linear feet of streambanks, create 5 acres of wetlands, install instream habitat structures, supplement populations of Species of Greatest Conservation Need, and reduce flood and safety hazards for residents and visitors. Efforts also include monitoring and providing community services such as conservation education, training, and sharing informative quantitative data on the benefits of dam removals in the central United States. The War Eagle Creek Barrier Removal project will restore

habitat for target species, as well as provide beneficial outcomes for drinking water, watershed function, wildlife, outdoor recreation, farming, and education.

---

(22) Clearing The Way For Some Dam Work: The Great War Eagle Creek Mussel Rodeo

Kendall R. Moles* (Arkansas Game and Fish Commission)

Restoration of suitable habitats in altered stream systems is paramount to insure the highest probability of success for the conservation of aquatic species. Stream habitat restoration work often require surveys for the presence of listed species in the vicinity of the project to ensure activities are in compliance with the Endangered Species Act. The Huntsville Dam removal project on War Eagle Creek would directly impact 2.3 km of instream habitat. Initial surveys revealed high freshwater mussel abundance but no listed species were present. Additional surveys, with the help of partners, were required to relocate the substantial number of mussels present in the project area. A total of 2,351 mussels, representing 16 species including four Species of Greatest Conservation Need, were collected. Due to the potential dewatering of all instream habitat within the project area, all mussels encountered were removed from the project area. Most individuals were relocated to known mussel beds downstream. A select group of individuals were transferred to Norfork National Fish Hatchery for future propagation efforts with the progeny being used to repopulate the project area once the instream habitat becomes stabilized.

---

(23) Community-level Study of Fish Thermal Tolerance in the Ouachita Mountain Ecoregion

Krista Yari†, Peyton Manry, Matt Gifford, Ginny Adams, and Reid Adams (University of Central Arkansas)

Several rivers in the Ouachita Mountain Ecoregion were designated high priority for monitoring stream temperature, an important variable known to affect physiology and spatiotemporal distribution of aquatic species. The upper Ouachita and Caddo rivers have several fishes that are Species of Greatest Conservation Need which may be at greater risk to increasing stream temperatures, including Etheostoma pallididorsum, Noturus taylori, and Percina brucethompsoni. To address concerns about effects of rising stream temperatures on endemic SGCNs and more widespread taxa, we quantified critical thermal maxima (CTmax) and thermal agitation (Tag) to determine thermal tolerance and behavioral response to thermal stress, respectively. We conducted trials streamside at two field acclimatization temperatures derived from 24-hour stream temperature averages: 24.3 °C in June, and 26.7 °C in July. Leuciscids tended to exhibit the lowest thermal tolerance overall; Miniellus boops represented the lowest CTmax (33.34 °C – 36.78 °C) across species tested in both trials. SGCNs exhibited low to moderate CTmax relative to the overall community, but varied in behavioral response to thermal stress. Etheostoma pallididorsum exhibited the smallest margin between Tag and CTmax (< 2.5 °C), while N. taylori reached Tag an average of 4.75 °C before CTmax. Variation in behavioral response to thermal stress among species experiencing the same thermal regime suggests a potential gap in our contemporary understanding of fish thermal tolerance. Studies attempting to predict responses to climate change may yield greater insight by integrating measures of behavioral response to thermal stress in addition to critical thermal limits.

---

(24) Thermal Tolerances of Fishes Inhabiting a Thermally Dynamic Urban Stream

Peyton Manry†, Krista Yari, Cade Richesin, Matt Gifford, Ginny Adams, and Reid Adams (University of Central Arkansas)

Climate models projecting rapid increases in average temperatures indicate a potential threat to freshwater fishes, particularly species sensitive to environmental disturbance. There is a need for fish thermal tolerance data more directly related to thermal histories experienced in the field (versus lab acclimation procedures) to better understand fish community responses to stream warming. Critical Thermal Maximum (CTMax) values have historically been used to represent the highest temperatures fishes can physiologically tolerate without dying and can be used to compare thermal tolerances among species and across seasons. We measured CTMax of fishes inhabiting an urban stream (Tucker Creek) that had wide-ranging temperatures across months (0.58°C-37.42°C), and that varied up to 10.6°C in July over a 24-hr period and 10.5°C in February. Thermal tolerance trials were conducted during July, March, and May at four field acclimatization temperatures for up to 12 species: 29.31°C in July, 10.18°C and 16.76°C in March, and 23.49°C in May. Thermal Safety Margins were calculated using the difference between CTMax and acclimatization temperature. More thermally tolerant species, such as Gambusia affinis (average CTMax 35.38°C - 41.88°C), were found to have greater thermal safety margins (12.6°C - 25.2°C) across the field acclimatization temperatures than less thermally tolerant species in the community such as Cyprinella lutrensis (average CTMax 32.56°C - 39.72°C) with thermal safety margins ranging from 10.4°C to 22.4°C. Climate change poses the highest risk to freshwater species with low thermal tolerance and plasticity.

---

(25) The Importance of Spatial Scale and Host Distribution in Modelling Suitable Habitat for a Recently Federally Listed Mussel Species

Seth Drake†, Tom Nupp, Kyler Hecke (Arkansas Tech University), and Kendall Moles (Arkansas Game and Fish Commission)

Over 300 species of Unionid mussels occur in North America, more than any other region in the world. Historically numerically dominant, Unionid mussels are now one of the most threatened faunal groups with an estimated 65% considered imperiled. The Ouachita Fanshell (Cyprogenia sp cf. aberti) is a species of mussel native to the Ouachita Mountains that was recently listed as threatened. This species is experiencing declines in historical ranges potentially as a result of habitat alterations from impoundments and agricultural land use. Furthermore, a recent study found genetic differences amongst populations in the Saline and Ouachita River watersheds. As such, our study used maximum entropy modelling (Maxent) to further define reaches of potentially suitable habitat for this species. We compiled occurrence records from gbif.org, AGFC, and USFWS mussel databases. Environmental variables encompassing atmospheric data, hydrology, soil/geology, landcover, and topography were compiled from databases such as WorldClim and StreamCat and were reduced through principal component analysis. We investigated how differences in background point determination, scale of consideration (whole watershed versus split watershed), and incorporation of biological data (e.g. fish hosts) impacted estimates of habitat suitability. We found some differences in amount and position of predicted suitable habitat between background treatments (1494.0 km, 1442.4 km, and 1559.8 km). Furthermore, the spatial scale of consideration changed the contribution of environmental variables and position of predicted suitable habitats. Our analysis provides insight into factors affecting the distribution of Ouachita Fanshell and can provide insight to methodological considerations for modelling habitat suitability for aquatic species.

(26) Reassessing fish state conservation status ranks and entering data into the fish presence database to inform the 2025 revision of the Arkansas wildlife Action Plan

Katie Morris*, Jeff Quinn, Ethan Dodson (Arkansas Game and Fish Commission), and Dustin Lynch (Arkansas Natural Heritage Commission),

We reviewed 265 fish species or unique lineages and assigned state conservation status ranks cooperatively with the Arkansas Natural Heritage Commission. This project was undertaken to update the fish status ranks for the revised Arkansas Wildlife Action Plan due in 2025. The timing of this was ideal because of the release of the new “Fishes of Arkansas” by Robison and Buchanan in 2020. The Arkansas Natural Heritage Commission initiated this project in January 2021 to update the status ranks for the fish species and finished the first phase in February of 2024. The NatureServe Rank Calculator was used to calculate the status rank. Seventy percent of the weight of the calculator comes from rarity (e.g. area of occupancy and range extent) and thirty percent comes from threats. However, a major obstacle was fish distributions from the fish database often did not match the Fishes of Arkansas. The fish collections from numerous major contributors were entered into the database. We added 2815 fish collections and 24,233 species occurrences that increased collections in the database by 30% and species occurrences by 26%. The new state ranks have 45 species ranked S2 (imperiled), S1S2, or S1 (critically imperiled). Twelve taxa were ranked that have never been previously ranked. Our reassessment of state conservation ranks and database upgrades provide a solid foundation for future conservation planning decisions.

(27) Evaluating the Effects of Drought on Endangered Yellowcheek Darter (Nothonotus moorei) and Yoke Darter (Nothonotus juliae) Survival, Growth, and Behavior

Kearstin M. Findley† (University of Arkansas), Daniel D. Magoulick (U.S. Geological Survey, Arkansas Cooperative Fish and Wildlife Research Unit)

Droughts are impacting aquatic systems at greater frequency and intensity worldwide and drying conditions are expected to be exacerbated with climate projections coupled with higher anthropogenic water demands. Riverine systems often lose critical habitat during droughts that can reduce or eliminate species that are unable to respond to water reduction. For many species, there is a knowledge gap regarding how they respond to changes in abiotic and biotic interactions that occur during droughts. Our study utilized laboratory stream mesocosms to evaluate the effects of simulated drought on endangered Yellowcheek Darter (Nothonotus moorei) and Yoke Darter (Nothonotus juliae) survival, growth, and behavior. Passive integrated transponder (PIT) tags were utilized to identify individuals and observe their location in different habitats (riffle, run, pool) created in each mesocosm. Survival was low and did not differ significantly between treatments. Yoke Darters showed significant mass growth in control versus drought treatments (p-value 0.029), whereas Yellowcheek Darter growth did not differ significantly between treatments. Habitat use varied between treatment and species, with control fish using all habitats but drought fish using the run and pool as refuge exclusively after day 30. Yellowcheek Darters had lower tag mortality (17%) than Yoke Darters (31%). This study

provides laboratory drought simulation information for Yellowcheek and Yoke Darters and evaluated the use of PIT tags for small-bodied stream fishes. The information gathered here will provide managers with information to help conserve these two declining species, as well as many other stream fishes in drought-stricken environments.

(28) Occupancy assessment and microhabitat selection of Rocky Shiners in Arkansas

Savannah Wise† and John Jackson (Arkansas Tech University)

The Rocky Shiner Notropis suttkusi is a species endemic to the Little River watershed in southwestern Arkansas. This species is currently classified as data deficient, but petitioned for listing under the Endangered Species Act due to limited range. In order to expand upon the known distribution and abundance of Rocky Shiner, three tributaries to the Little River with historical collections were sampled using the conditional occupancy approach, a method designed for rare species. During the study, 15 of 30 randomly selected sites along the Rolling Fork, Cossatot, and Saline Rivers were sampled using seine netting. Physical habitat and water quality data was collected at each site, and microhabitat was recorded for each seine haul. All fish were identified, and body measurements of Rocky Shiner were recorded. Occupied sites were resampled following the conditional occupancy approach. We performed analyses for microhabitat preference of the species within the seine area. We also conducted preliminary single-season, single-species occupancy modeling to estimate Ψ: informed occupancy rate and p: probability of detection, utilizing the significant results from the microhabitat analysis as covariates. Percentage of gravel and sand substrate were positively associated with presence, and percentage of cobble, boulder, and woody debris were negatively associated. The data collected from the 2023 field season has updated the known range of the species, and the microhabitat data can be utilized to inform future management and listing status of Rocky Shiners.

(29) Status and distribution of Swainia Darters in Arkansas with emphasis on Longdose Darter Percina nasuta

Jeffrey W. Quinn*, Katie Morris, and Ethan Dodson (Arkansas Game and Fish Commission)

We sampled 156 sites at 20 rivers systems and detected 465 Swainia darters (i.e., Longnose Darter Percina nasuta, Slenderhead Darter Percina phoxocephala, Ouachita Darter Percina brucethompsoni) from 2019-2023. Our objective was to determine status of Longnose Darter due to the 2010 petition to list the species under the Endangered Species Act. The description of Ouachita Darter in 2014 revealed that neither Longnose Darter or Slenderhead Darter was monophyletic. Because of this taxonomic confusion, we contributed 131 specimens and 289 fin clips to ddRAD genetic analyses that diagnosed 5-6 new species in the Swainia darter complex. We observed a total of 416 specimens from the Longnose Darter complex, including 23 specimens from the Little Red River watershed, 97 from the upper White River system, and 296 from Arkansas River tributaries. By combining our data with other surveys since 2005, we did not detect any major declines in the distribution of any lineage of Percina nastuta. However, only 13 specimens of Percina sp. cf. phoxocephala have been detected from three streams in the middle White and Black River system since 2005, and this imperiled species deserved further targeted assessment. We recommend that effective population size estimates be determined for each Swainia lineage as a next step to understand risk of extinction and future conservation needs.

Poster Presentation Abstracts

Order	Poster Name and Author(s) *** =** *Presenter, † = Student Presenter*
P-1	**Exploring New Territory: Freshwater Mussels of Arkansas South-Central Plains Ecoregion**

Zach Crain† (Arkansas Tech University), Kyler Hecke (Arkansas Tech University)

Freshwater mussels are one of most imperiled faunal groups in the world. Arkansas has 83 known species of freshwater mussels. Freshwater mussels are understudied, especially in tributaries of Arkansas. Therefore, a meta-analysis was completed of five tributaries of the Ouachita and Saline Rivers in the South-Central Plains Ecoregion of Arkansas to assess known occurrence records of mussels. Information was obtained through communications with Gerry Dinkins and John Harris, gbif.org, invertebase.org, MusselMapR, and 10 published scientific journals and reports. The tributaries: Chemin-A-Haut Bayou (Arkansas Portion), Champagnolle, Derrieusseaux, L'Aigle, and Moro Creeks have the potential to contain 19 species of concern, with potential to find 10 in Chemin-A-Haut Bayou (Arkansas Portion) alone. A study by Hecke et al. 2023 on Moro Creek found five species of mussels: Louisiana Fatmucket, Pondmussel (SGCN), Giant Floater, Texas Lilliput (SGCN), and Tapered Pondhorn (SGCN). There have been no reported specimens of mussels found in Chemin-A-Haut Bayou (Arkansas Portion), Champagnolle, Derrieusseaux, and L'Aigle Creeks. This data further suggests the need for mussel surveys and will be used to inform an upcoming multi-year project in these watersheds. The project will take place over the next three years to address the knowledge gap of mussels in these watersheds. Mussels will be surveyed systemically and sites will be chosen by accessibility and delineating potential mussel beds. Species richness and relative abundance will be estimated by qualitative sampling at each site. This approach gives great spatial coverage of the focal creeks and allows the characterization of longitudinal changes in mussel communities.

P-2 **Land Use Impacts on Fish Communities in the Arkansas Valley Ecoregion: A Preliminary Analysis**

Jarrett Tallent† (University of Central Arkansas), Ryne Lehman (University of Central Arkansas), Ginny Adams (University of Central Arkansas), Reid Adams (University of Central Arkansas)

Stream fish communities are shaped by anthropogenic land use and natural land cover within their upstream catchments. Upstream catchments with high proportions of anthropogenic disturbance tend to have communities composed of more tolerant species, while upstream catchments dominated by natural land cover may be able to support more sensitive species. We have gathered land use and land cover data for 25 sites in the Arkansas Valley Ecoregion to assess how stream fish communities of the ecoregion may be influenced by the surrounding

landscape. We used ArcGIS Pro and the National Land Cover Database layer (2019) to analyze the percentage of anthropogenic land use and natural land cover present in the upstream catchment of each site. Our upstream catchments had a range of anthropogenic land use from 18% to 85% and a range of natural land cover from 15% to 82%. Fishes at each site were sampled using a combination of backpack electrofishing and seining. Intolerant species were associated with sites that had high a percentage of forest cover in the upstream catchment. Sites with greater than 30% pasture or greater than 10% urban land use in the upstream catchment were dominated by tolerant species. Our initial sampling and data analyses suggest that land use in the upstream catchment influences fish community composition within the Arkansas Valley.
Stream fish communities are shaped by anthropogenic land use and natural land cover within their upstream catchments. Upstream catchments with high proportions of anthropogenic disturbance tend to have communities composed of more tolerant species, while upstream catchments dominated by natural land cover may be able to support more sensitive species. We have gathered land use and land cover data for 25 sites in the Arkansas Valley Ecoregion to assess how stream fish communities of the ecoregion may be influenced by the surrounding landscape. We used ArcGIS Pro and the National Land Cover Database layer (2019) to analyze the percentage of anthropogenic land use and natural land cover present in the upstream catchment of each site. Our upstream catchments had a range of anthropogenic land use from 18% to 85% and a range of natural land cover from 15% to 82%. Fishes at each site were sampled using a combination of backpack electrofishing and seining. Intolerant species were associated with sites that had high a percentage of forest cover in the upstream catchment. Sites with greater than 30% pasture or greater than 10% urban land use in the upstream catchment were dominated by tolerant species. Our initial sampling and data analyses suggest that land use in the upstream catchment influences fish community composition within the Arkansas Valley.

P-3 **Responses of fishes to multiple barrier removals on War Eagle Creek**

Claire Binfield[†] (University of Central Arkansas), Ginny Adams (University of Central Arkansas), Reid Adams (University of Central Arkansas)

Dams impact fish passage by isolating upstream reaches, altering seasonal flow patterns, and causing modification of in-stream habitats due to loss of longitudinal connectivity. Low-water road crossings can also act as barriers by reducing fish passage due to altered flow through crossings and altering the structural complexity of the stream bottom. Changes in hydrology and reduced stream connectivity can limit recolonization and impede the dispersal of fishes. Fish responses to removal of barriers are not well documented, and current restoration efforts spearheaded by Arkansas Game and Fish Commission offer a unique opportunity to assess the response of fish communities in War Eagle Creek to removal of a dam and two low-water road crossings. A Before-After-Control-Impact (BACI) design is being used with seven replicate sites established on War Eagle Creek spanning the river segment where the barriers are located and five sites in nearby Kings River serving as controls. Sites were sampled once prior to barrier removal and will be sampled twice a year during low water after removals. At each site, all available habitat in the reach will be opportunistically sampled for fishes and sampling effort will be stratified across pools, riffles, and runs using seines. We will test for differences among sites over time using typical multivariate ordination approaches and associated tests of dissimilarity and dispersion. Habitat data will be assessed temporally, and any associations with fish assemblage structure will be determine using vector overlays. We will present fish data collected prior to barrier removals in War Eagle Creek.

Dams impact fish passage by isolating upstream reaches, altering seasonal flow patterns, and causing modification of in-stream habitats due to loss of longitudinal connectivity. Low-water road crossings can also act as barriers by reducing fish passage due to altered flow through crossings and altering the structural complexity of the stream bottom. Changes in hydrology and reduced stream connectivity can limit recolonization and impede the dispersal of fishes. Fish responses to removal of barriers are not well documented, and current restoration efforts spearheaded by Arkansas Game and Fish Commission offer a unique opportunity to assess the response of fish communities in War Eagle Creek to removal of a dam and two low-water road crossings. A Before-After-Control-Impact (BACI) design is being used with seven replicate sites established on War Eagle Creek spanning the river segment where the barriers are located and five sites in nearby Kings River serving as controls. Sites were sampled once prior to barrier removal and will be sampled twice a year during low water after removals. At each site, all available habitat in the reach will be opportunistically sampled for fishes and sampling effort will be stratified across pools, riffles, and runs using seines. We will test for differences among sites over time using typical multivariate ordination approaches and associated tests of dissimilarity and dispersion. Habitat data will be assessed temporally, and any associations with fish assemblage structure will be determine using vector overlays. We will present fish data collected prior to barrier removals in War Eagle Creek.

P-4 **Coproducing research for preventative aquatic invasive species management in Arkansas**

Lindsey A.P. LaBrie† (Arkansas Cooperative Fish & Wildlife Research Unit; University of Arkansas, Fayetteville;), Caleb P. Roberts: (U.S. Geological Survey; Arkansas Cooperative Fish & Wildlife Research Unit; University of Arkansas, Fayetteville)

Aquatic invasive species are one of the biggest threats to biodiversity throughout freshwater ecosystems across the world. As introduced species establish populations, it becomes increasingly difficult to control them. However, using horizon scanning to anticipate invasions before they begin provides cost savings and foundational knowledge for early detection of invasive species presence, which could lead to rapid and successful early management responses. This can also help in pinpointing the areas or waterbodies most at risk for new invasions. This project has four goals. 1) Identify Arkansas habitats that are most at risk for new invasion by fish species that are currently present in the pet trade, bait, or aquaculture industries in the U.S. 2) Using results from the first objective, create a standardized workflow for conducting in-depth risk assessments of high-risk aquatic nuisance species in Arkansas and create an Arkansas-specific invasive species watchlist. 3) Determine the extent of a current invasion (Silver Carp) in stream reaches upstream of Lake Dardanelle in the Arkansas River using environmental DNA water sampling techniques. 4) Evaluate the public's knowledge of and adherence to invasive species regulations through surveys and Facebook ads, particularly focusing on reaching a wider, more inclusive demographic than previous studies. The end goal of this research is to provide information that informs managers about preemptive, preventative management of aquatic nuisance species in Arkansas.

This poster serves as a preliminary project proposal for a doctoral dissertation, and the author encourages conversation and the exchange of ideas for all aspects of the project.

P-5 **Estimation of a Sportfish Population in an Unmanaged Farm Pond in Arkansas**

Karson Hamilton† (Arkansas Tech University) and Kyler Hecke (Arkansas Tech University)

Population estimation has been a valuable tool for fishery managers regarding the management of sportfish populations. This tool can be used to establish baselines for sportfish species so that proper management objectives can be applied to a fishery. We wanted to use population estimation techniques to estimate the sportfish populations of an unmanaged farm pond (2.5 hectares) surrounded by agriculture fields and deciduous forest and at the edge of the Arkansas Tech University campus. Hook-and-line sampling was used to collect data on sportfish species in this pond. Various lures were used to increase chances of catching a fish. Hook-and-line sampling took place multiple times a week. At least two anglers participated in hook-and-line sampling during each sampling event. Every individual fish caught (>100 mm in length) was tagged with a numbered T-bar anchor tag. Sportfish populations were estimated with the modified Lincoln-Peterson Index. A total of 5 sampling events took place from October-November (2023). A total of 32 Largemouth Bass (Micropterus nigricans) were sampled across all sampling events. There has been 1 recapture during sampling so far. Median catch-per-unit effort (CPUE) across all sampling events was 0.4 (0.3-1.3) fish/hr. The population estimate (confidence intervals) for Largemouth Bass was 41.8 (17.8-66.8). This low population estimate might have been due to varying CPUE and lack of recaptures. Increased CPUE and recaptures would likely increase the population estimation of sportfish species in this farm pond. This data will provide knowledge to inform management decisions regarding the fishery in this farm pond.

P-6 **Spatial Assessment of Slender Madtom (Noturus exilis) Diets within the Illinois Bayou Watershed**

Kade B. Mitchell† (Arkansas Tech University), Kyler B. Hecke (Arkansas Tech University)

The Slender Madtom (Noturus exilis) is a common species with a widespread distribution across the Mississippi River basin. Very little data has been collected on the diet of this species and how it spatially varies. We wanted to spatially assess the diet of Slender Madtoms. Slender Madtoms were sampled from 8 sites in the Illinois Bayou watershed using kick nets. Small-scale gastric lavage was used to extract diet data from all individuals. All prey items were preserved and identified to the genus level (if possible). Bray-Curtis dissimilarity was used to assess the composition of prey items between sites. A total of 157 different prey items from 41 fish (43-88 mm), covering 6 orders were extracted from Slender Madtoms during Fall (2023). Prey items consisted mostly of Chironomids (Non-biting Midges, n= 74), Heptageniid (Flat-headed Mayflies, n= 27), and Philopotamid (Finger-net Caddisflies, n=18). There were varying levels of diversity among Slender Madtom diets from site to site; Shannon-Weiner Species Diversity Index (H=0.10-1.97), Evenness (E=0.65-1.00), and Simpson's Dominance Index (1-D= 0.00-0.80). Slender Madtom diets from the lowest sampling site were more similar to diets from other sites (mean [±SE] Bray-Curtis Distance=0.51 [±0.13]), than the upper most site (mean Bray-Curtis Distance= 0.93 [±0.17]). The most diverse diets observed were from the lowest site on Illinois Bayou (n= 38 prey items, 5 orders), suggesting a spatial relationship in diet diversity. Further sampling will incorporate diets from Slender Madtoms at more sites, and also assess temporal changes in diets from fish at these sites. This research is will aid in the understanding of Slender Madtom diets and how they vary spatially.

P-7 Microhabitat Use of the Highland Darter (Etheostoma teddyroosevelt) in the Illinois Bayou Watershed of Arkansas

Colton W. Morris† (Arkansas Tech University), Kyler Hecke (Arkansas Tech University)

Highland Darters (Etheostoma teddyroosevelt) are an Ozark regional endemic species, occurring in the Arkansas River and upper White River systems of Arkansas, Kansas, Oklahoma, and Missouri. There have been very few studies on this species, specifically those that have quantified the habitat use of this species across its range. A new study was needed to fill in the knowledge gap of microhabitat use by the Highland Darter in Arkansas. We wanted to address this knowledge gap by assessing the microhabitat use of this species in the Illinois Bayou watershed in Arkansas. Highland Darters were observed during snorkel surveys at known and unknown localities for this species. For each unique observation, microhabitat use (1-m2 area) was determined for this species. Various environmental and habitat variables were measured within the area of observation Microhabitat data were assessed across multiple spatial scales (watershed and site). A total of 12 individuals were observed from 3 sites during August-September 2023. At the watershed level, mean (±SE) frequency of substrate in Highland Darter microhabitats were 65.4 (±7.3) % cobble, 15.4 (±7.0) % gravel, 0.7 (±0.7) % bedrock, and 10.2 (±3.6) % sand/silt. Further, at the watershed level, mean estimates of other environmental/habitat variables at Highland Darter microhabitats were 25.4 (±7.3) % for canopy cover, 0.01 (±0.01) m3/sec for discharge, and 0.4 (±0.7) m for depth. There appears to be some spatial variation in the environmental variables within the microhabitat of the Highland Darter. This research is will aid in the understanding of Highland Darter biology and ecology. Future research will assess the seasonality of microhabitat use by Highland Darters.

P-8 **Assessment of aquatic macroinvertebrate assemblages in the Upper Illinois Bayou watershed**

Coley Turner† (Arkansas Tech University), Risa McCollough (Arkansas Tech University), Kyler Hecke (Arkansas Tech University)

There has been increased concern about the effects stream barriers have on aquatic organism passage. However, not much of this focus has been placed on the smaller effects these barriers can have, i.e., macroinvertebrate assemblages. To address this knowledge gap, we collected macroinvertebrate samples from two tributaries (Dare and Dry Creek) with a barrier (artificial and natural) in the Upper Illinois Bayou watershed. Twelve macroinvertebrate samples were collected from each site – six upstream (3 D-frame kick-nets and 3 Hess samples) and six downstream of the barriers. Collected samples were taken back to the lab for identification, and individuals were identified down to family using a dissecting scope. From Dry Creek, 336 individuals from thirteen families across six orders were collected. The Shannon-Wiener index (H') was 0.92 (H' max 2.56), Evenness (J') was 0.36, and Simpson's diversity index (D) was 0.34. At Dare Creek, 1,462 individuals from twenty-six families across seven orders were identified. The Shannon-Wiener index (H') was 0.1.47 (H' max 3.18), Evenness (J') was 0.46, and Simpson's diversity index (D) was 0.63. Heptageniids (Flat-headed Mayflies) and Chironomids (Non-biting Midges) were the most abundant families at both sites. Further analyses will compare the assemblages between upstream and downstream portions of each creek and dissimilarities between the two creeks. These data further aid in our understanding of the effects of stream barriers on aquatic ecosystems and provide direction for further research.

P-9 **Length-Weight Relationship of Flier (Centrarchus macropterus) in Moro Creek**

Jeffrey Phillips† (Arkansas Tech University), Kyler Hecke (Arkansas Tech University)

Length-weight relationships provide foundational knowledge for managing fisheries populations. However, there are many species where the length-weight relationships are not widely understood. The Flier (Centrarchus macropterus) is one species where there is a lack of information regarding its length-weight relationship and spatial variation associated with this relationship. A new study was needed to assess the length-weight relationship for this species. Fliers were

collected from upper Moro Creek during October 2023. Multiple gears (backpack electrofishing and seining) were employed to increase detection of this species. Length (mm), and weight (g) were recorded for every individual observed. A total of 85 Flier were sampled from four sites in the upper Moro Creek watershed, and their average (±SE) length was 75.7 (±1.8) mm and average weight was 8.5 (±0.7). The length-weight for Flier in upper Moro Creek was Log(W) =-4.2 + 2.7Log(L). Mean (±SE) Fulton's condition factor (K) was 1.7 (±0.1), mean LeCren's relative condition factor (Kn) was 1.0 (±0.1), and mean relative weight (Wr) was 100.5 (2.9). Our estimates of condition on this species are similar to other estimates of condition for this species in other water bodies. However, it is apparent that our data displays some sampling bias to older (larger) individuals in this population, which may have influenced our ability to accurately estimate the length-weight relationship of this species. This research provides a foundation of knowledge on the length-weight relationship of Fliers in predominantly lotic ecosystem in Arkansas.

P-10 **Distribution and habitat use of the endemic Ozark Shiner (Paranotropis ozarcanus)**

Alivia Mayes† (University of Central Arkansas), Ginny Adams (University of Central Arkansas), Reid Adams (University of Central Arkansas)

The Ozarks contain a diverse community of fishes, including many endemic species. Paranotropis ozarcanus is endemic to the White and Black river systems, and has been listed as a Species of Greatest Conservation Need due to recent declines and small population sizes. The United States Fish and Wildlife Service is conducting a Species Status Assessment to determine listing priority; however, significant data gaps exist for this species. In a recent community study, a total of 610 P. ozarcanus were collected across 65 sites in the White and Black river systems in Arkansas. Populations appear to be stable over time in these river systems with novel detections at 15 sites where P. ozarcanus were not found historically, while four historic sites yielded no contemporary detections. To better understand habitat use and distribution, we compared contemporary abundance data of P. ozarcanus across mesohabitats and assessed instream habitat variables in relation to presence/absence data. Proportionally, P. ozarcanus were more abundant in pool (0.564 ± 0.064 SE) and run habitats (0.412 ± 0.063 SE) than in riffles (0.002 ± 0.002 SE). Analyzing data using a regression tree showed P. ozarcanus were more frequently present at sites with a pool depth greater than 0.52 m (35 sites, 13.3 individuals) compared to sites with pool depths less than 0.52 m (4 sites, 9.75 individuals) (r2 = 0.272). These data will be used to fill data gaps for the species and to inform better conservation actions such as protecting streams with deeper pools.

P-11 **Why is the Striped Shiner (Luxilus chrysocephalus) declining in the Ozarks?**

Tavis Taylor† (University of Central Arkansas), Ginny Adams(University of Central Arkansas), Reid Adams (University of Central Arkansas)

Data from Arkansas and Missouri indicate a concerning range reduction of the Striped Shiner in the Ozarks, contrasting with the Ouachitas where this decline is not evident. Analyzing a decade of contemporary data alongside historical records from the 1970s and 1980s, we investigated habitat use of the Striped Shiner to understand factors influencing its disparate stability in these regions. In the Ozarks, historical data revealed detections at 54 sites with an average abundance of 16.6 ± 3.6 SE individuals per site. In contemporary data, this declined to 37 sites with an average abundance of 9.9 ± 1.6, marking a 31% reduction in site occurrence and a decrease of 6.7 individuals per site in the Ozarks. Conversely, the Striped Shiner in the Ouachitas showed consistent site detections over time, found at 17 historical sites (average abundance 10.6 ± 2.8) and 16 contemporary sites (average abundance 9.8 ± 2.7). Examining contemporary sites in the Ozarks, Striped Shiners were predominantly found in runs (32%) and pools (68%), with no individuals in riffles. In the Ouachitas, a flow-oriented pattern emerged, with riffles (16%) and runs (63%) as the primary habitats. These findings emphasize the need for conservation efforts in the Ozarks to safeguard Striped Shiner populations, especially when contrasted with relatively stable populations in the Ouachita region. Habitat degradation, particularly changes in habitat quality of runs and pools, could be related to decline of the Striped Shiner in the Ozarks, but investigation of additional factors is needed.

P-12 **Mussel Communities of Two Impacted Tributaries in the Arkansas South Central Plains Ecoregion**

Jimmy Hall† (Arkansas Tech University), Seth Drake (Arkansas Tech University), Kyler Hecke (Arkansas Tech University), Kendall Moles (Arkansas Game and Fish Commission), Parker Brannon (Arkansas Tech University), Savannah Wise (Arkansas Tech University), and Tom Nupp (Arkansas Tech University)

Anthropogenic influences such as mining and water quality degradation from wastewater effluents and agricultural runoff heavily impact freshwater mussel communities. The South-Central Plains (SCP) Ecoregion in Arkansas contains the Smackover Formation, an area that has been exploited for its oil with high frequency of drilling. In 1922 the Smackover pool in Union County was found and quickly became one of the world's most productive oil sites. Hurricane Creek and Smackover Creek, two tributaries within the Ouachita River basin, have experienced negative impacts from oil exploration and mining. However, to our knowledge, mussel communities in these creeks have not been assessed in the past twenty years. We surveyed mussel communities at seven sites on Hurricane Creek and five on Smackover Creek using a rapid assessment protocol. Initially a one-hour broad search was conducted using snorkeling, grubbing, and raking techniques. This search was followed by a 30-minute focused search in the area where the highest abundance of mussels was initially found. Each mussel was identified, measured (mm), and returned to the location where it was initially found. Additionally, we collected basic water quality and habitat parameters. We found five species of native mussels: Eastern Pondmussel (Sagittunio nasutus), Louisiana Fatmucket (Lampsilis hydiana), Texas Lilliput (Toxolasma texasiense), Tapered Pondhorn (Uniomerus declivis), and Yellow Sandshell (Lampsilis teres) (n = 143) across eight sites and no mussels at five sites. Furthermore, we found evidence of active recruitment through the presence of smaller individuals. Our study provides insight into the importance of heavily degraded small streams for mussel populations in the SCP Ecoregion. We also suggest that future survey efforts should incorporate small tributaries in determining mussel distributions.

P-13 **A Survey of Mussels in Small Tributaries of the Ouachita River Headwaters**

Aaron Huckeba† (Arkansas Tech University), Seth Drake (Arkansas Tech University), Kyler Hecke (Arkansas Tech University), Kendall Moles (Arkansas Game and Fish Commission), Tom Nupp (Arkansas Tech University), Risa McCollough (Arkansas Tech University), Nathan Mansor (Arkansas Tech University)

Understanding species distributions is of utmost importance for effective conservation of aquatic resources. Freshwater mussels are among the most imperiled taxonomic groups as they are experiencing rapid declines in the southeastern United States. Standard mussel surveys are typically conducted on larger streams and rivers, leaving small headwater tributaries unsampled. Our study looked to document mussels in headwater tributaries of the Ouachita River watershed. We conducted standardized time-based surveys at 19 sites across nine tributaries using snorkeling, grubbing, and raking methodologies in the summer of 2023. Furthermore, we collected measurements on water quality (pH, conductivity, salinity, total dissolved solids, and temperature) and physical habitat characteristics (substrate, habitat type, and stream width/depth) at each sampling location. Most streams displayed intermittent characteristics, only having disconnected pools as available potential habitat. Mussels were observed at eight of nineteen sites, with no mussels being observed in three streams. A total of 209 individuals across seven species were observed at these eight sites. Lampsilis hydiana (Louisiana Fatmucket) and Toxolasma lividum (Purple Lilliput) were the most abundant species documented. The least abundant species was Strophitus undulatus (Creeper). Our results provide insight into the mussels of small tributaries. Furthermore, documentation of small size classes for some species support that active recruitment is occurring within these streams and suggests that they act as important habitats for mussel populations in this region.

P-14 **Capture fisheries harvest in the United States: Trends, species diversity, and implications**

Uttam Deb*, Md Asadur Rahaman, Shuva Saha (University of Arkansas at Pine Bluff)

Capture fisheries play an important role in the total fisheries production in the United States. In 2020, the United States was the sixth largest producer of capture fisheries production in the world. This paper examines the long-term performance of capture fisheries harvest and diversity in fish species harvested in the United States. We have analyzed the spatial and temporal performance as well as species diversity in capture fisheries harvest in the Pacific Ocean, Atlantic Ocean, and Inland waters of the United States. Over the last five decades, total fish harvest from capture fisheries increased by 62 percent, from 2.89 million tons in 1971 to 4.66 million tons in 2021. Harvest from inland fisheries and the Pacific Ocean increased but declined in the Atlantic Ocean. During this period, total capture fisheries harvest experienced an annual growth rate of 1.08 percent. The species diversity measured through the Simpson Index in capture fisheries fluctuated between 0.83 and 0.90 in the Atlantic Ocean. Species diversity declined in the Pacific Ocean, from 0.92 in 1971 to 0.73 in 2021. There was a drastic fall in species diversity in inland capture fisheries harvest—decreased from 0.85 in 1971 to 0.07 in 2021. Capture fisheries face several challenges, such as overfishing, climate change, invasive species, water quality/quantity impairment, land-use change, and unintentional capture and discarding of non-target species. Finally, the study articulates the implications of research findings for the management strategy of the fisheries sector in the United States.

P-15 DNA barcoding is useful to identify diverse larval fishes collected in drift surveys

Jesse Filbrun* (Southern Arkansas University)

Many freshwater fishes produce small early life stages that behaviorally or passively drift downstream in flowing systems. Collecting early life stages using drift nets, therefore, is a relatively inexpensive and direct method to quantify the timing and intensity of reproductive effort. Although some species have larvae with distinct diagnostic traits, others are morphologically cryptic or are easily damaged in nets. DNA barcoding is an increasingly cheap and easy lab method to confirm identities of larvae relative to adult vouchers. Herein, I provide a successful example of using DNA barcoding to identify drifting larval fishes collected in the middle Pecos River, New Mexico. During 2018–2021, I collected about 12,400 larvae or early juveniles from 144 drift net deployments that totaled 152 hr of soak time and 25,300 m3 of filtered river water. Using the COI DNA barcode, I unambiguously identified 104 representative larvae or early juveniles to species level. In total, I identified 12 species (7 native, 5 introduced) that represented 6 families. Surprisingly, I collected drifting larvae or juveniles of nest-guarding centrarchids and ictalurids, plus non-native Walleye, which presumably leaked from a hatchery-stocked reservoir. Overall, my study demonstrated that drift surveys are useful to quantify reproductive effort at the assemblage level and that DNA barcoding is a cost-effective tool to quickly confirm the identities of morphologically challenging specimens.
Many freshwater fishes produce small early life stages that behaviorally or passively drift downstream in flowing systems. Collecting early life stages using drift nets, therefore, is a relatively inexpensive and direct method to quantify the

timing and intensity of reproductive effort. Although some species have larvae with distinct diagnostic traits, others are morphologically cryptic or are easily damaged in nets. DNA barcoding is an increasingly cheap and easy lab method to confirm identities of larvae relative to adult vouchers. Herein, I provide a successful example of using DNA barcoding to identify drifting larval fishes collected in the middle Pecos River, New Mexico. During 2018–2021, I collected about 12,400 larvae or early juveniles from 144 drift net deployments that totaled 152 hr of soak time and 25,300 m3 of filtered river water. Using the COI DNA barcode, I unambiguously identified 104 representative larvae or early juveniles to species level. In total, I identified 12 species (7 native, 5 introduced) that represented 6 families. Surprisingly, I collected drifting larvae or juveniles of nest-guarding centrarchids and ictalurids, plus non-native Walleye, which presumably leaked from a hatchery-stocked reservoir. Overall, my study demonstrated that drift surveys are useful to quantify reproductive effort at the assemblage level and that DNA barcoding is a cost-effective tool to quickly confirm the identities of morphologically challenging specimens.

P-16 Production and consumption of seafood in Nigeria

Uttam Deb* (University of Arkansas at Pine Bluff), Caleb I Adewale (University of Arkansas at Pine Bluff)

Nigeria ranks third globally for the number of people dependent on coastal fisheries for food and nutrition security. Nigeria has expansive inland water basins and a coastline spanning more than 800 km, providing sustenance for roughly 1.5 million individuals involved in fish-dependent occupations. In Nigeria, fish serves as a significant provider of animal protein. This study analyzes the trends in the nation's seafood output and consumption. Additionally, it investigates the relationship between the nation's production and consumption of fisheries. During the past thirty years, the overall fish output in Nigeria has grown by a factor of 3.4, rising from 316 thousand metric tons in 1990 to 1.08 million metric tons in 2021. Capture fisheries accounted for 75% of the total fish output in 2021. The level of fish consumption in Nigeria has experienced fluctuations throughout the years. The per capita intake of seafood rose from 10.86 kg in 1990 to 15.07 kg in 2011 and then slowly decreased to 8.39 kg in 2021. Nigeria experiences a significant prevalence of food insecurity and undernourishment. The three-year average incidence of undernourishment has risen from 8.8% in 2000-2002 to 15.9% in 2020-2022. Nigeria imports more than 600,000 tons of fish, mostly marine species, to satisfy the nutrition needs of its expanding population. Nigeria's fish and fisheries products imports in 2021 amounted to USD 867.7 million. Hence, the key to enhancing fish consumption and alleviating undernourishment in Nigeria lies primarily in the sustainable management of fisheries resources and the expansion of aquaculture output.

P-17 Monthly evaluation of low-frequency electrofishing for catfish on the White River

Allison S. Copeland*, Justin M. Homan, Micah D. Tindall (Arkansas Game and Fish Commission)

Previous studies on large rivers have shown that low frequency electrofishing catch rates for Blue Catfish were higher in the spring months than the fall months while catch rates for Flathead Catfish were higher in fall than spring. Current Arkansas Game and Fish Commission standard sampling protocols recommend sampling during late summer to early fall. However, little low frequency electrofishing has been performed during spring in Arkansas. This project was designed to compare catch rates and size structure of Flathead Catfish and Blue Catfish monthly from May to September using low-frequency electrofishing on the White River near Des Arc, Arkansas. Catch rate (CPUE) of Flathead Catfish was significantly different between months while CPUE of Blue Catfish was not significantly different between months. Tukey's post-hoc analyses of Flathead Catfish CPUE determined that July CPUE was significantly different than June CPUE. Mean length of Flathead Catfish collected did not vary by month while mean length of Blue Catfish collected was significantly different by month. Mean length of Blue Catfish collected declined throughout the summer. Low frequency electrofishing for Flathead Catfish on the White River should still be performed during the late summer to early fall. Blue Catfish catch rates were too low to recommend changes to standard sampling protocols.