American Fisheries Society
Arkansas Chapter

32nd Annual Meeting
23-25 January 2018
UAPB & Pine Bluff

UNIVERSITY of ARKANSAS AT PINE BLUFF
1873
School of Agriculture, Fisheries and Human Sciences

**ON THE COVER: Artwork by Olaf Nelson. Redhorse ID cheatsheets can be downloaded from moxostoma.com. Art prints are also available.*

ARKANSAS CHAPTER OF THE AMERICAN FISHERIES SOCIETY

EXECUTIVE COMMITTEE – 2017-2018

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JESSIE GREEN, SECRETARY

FOR ASSISTING WITH PLANNING OF THE 2018 MEETING,
THE CHAPTER GREATLY APPRECIATES:

ETHEL CREGGETT, UAPB FACILITIES MANAGEMENT
RICHARD REDUS, UAPB TECHNICAL SUPPORT
FRED FRAZER, UAPB-AQFI TECHNICAL SUPPORT
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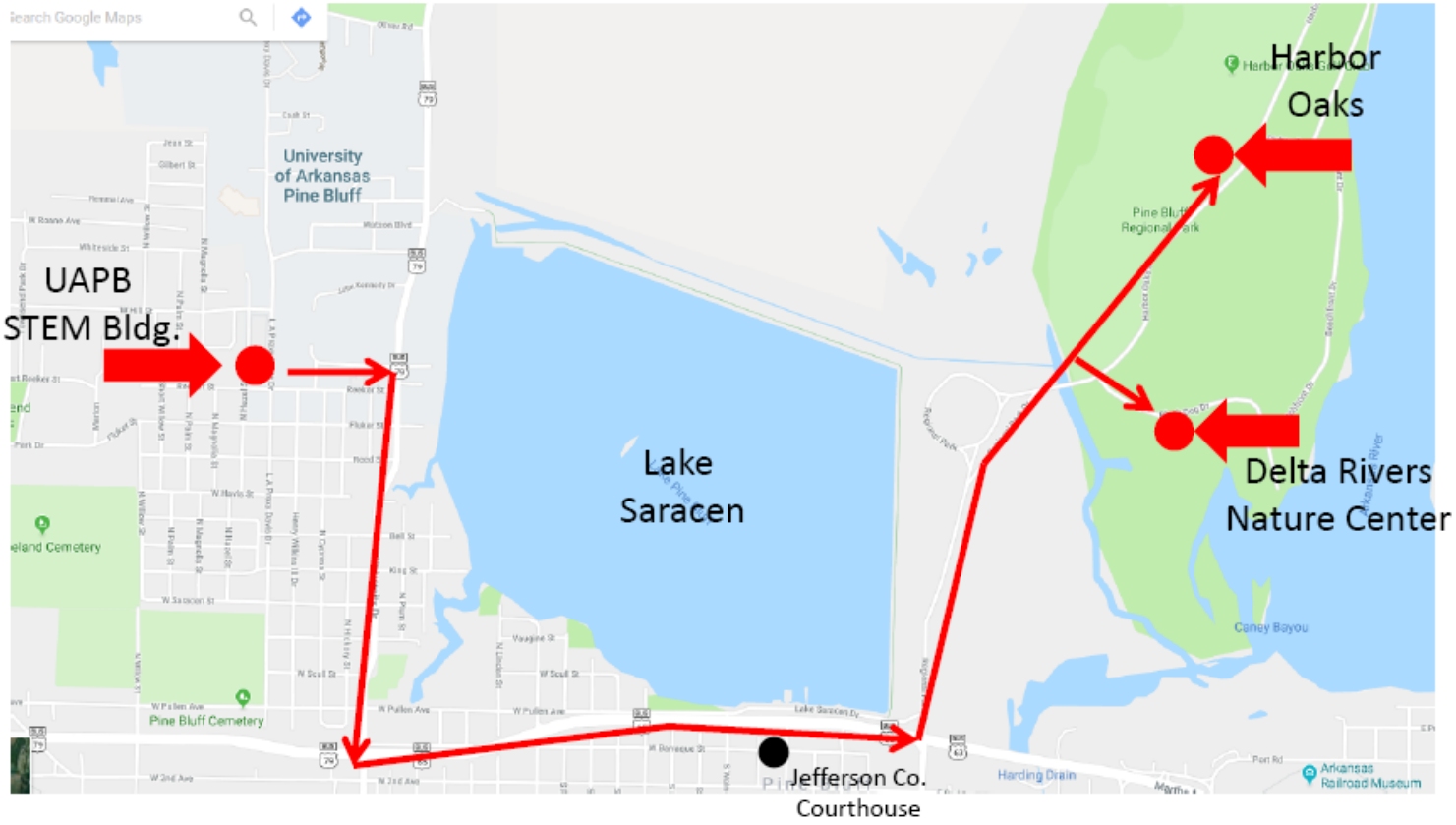
POSITIVELY PINE BLUFF

The Wood Shed BBQ & Catering

Harbor Oaks

Directions from UAPB – STEM Building to the Social and Banquet



January 10, 2018

Dear Chapter Membership:

Welcome to the 32nd Annual Meeting of the Arkansas Chapter of the American Fisheries Society. Please make full use of this opportunity to reconnect with our fisheries colleagues from around the state, network with new ones, and learn about the excellent aquatic research that is occurring throughout Arkansas. For some, this will be an opportunity to visit a part of the state you have never seen. Take time to see Bayou Bartholomew, "The World's Longest Bayou" and one of Arkansas's most diverse stream communities that flows through Pine Bluff. You will also have the opportunity to learn more about the Arkansas Delta at the Arkansas Game and Fish Commission's Mike Huckabee Delta Rivers Nature Center during the Welcome Social Tuesday evening. The Chapter's Conference Organizing Committee has planned an excellent meeting. Thank you for attending, and I hope you enjoy the experience.

Eric Brinkman
President
Arkansas Chapter AFS

UNIVERSITY of ARKANSAS AT PINE BLUFF
1873
School of Agriculture, Fisheries and Human Sciences

January 9, 2018

Dear Conference Attendees:

Welcome and greetings on behalf of the organizing committee of the 32nd annual meeting of the Arkansas Chapter of the American Fisheries Society (AFS). The organizers working in concert with the Chapter's Executive Committee have worked diligently at planning the conference, which we hope you find meaningful and informative. We are also very happy to be hosting the conference at the University of Arkansas at Pine Bluff for the first time. In addition, we are utilizing the University's newest facility – the Science Technology Engineering and Math (STEM) Building. Opened in 2014, this facility houses the University's STEM Academy. When you can, feel free to look around the building and check it out.

This year's Arkansas Chapter AFS meeting promises to be among the best, with over 30 oral presentations and posters, and a mussel identification short course being taught by malacologists from the Arkansas Game and Fish Commission. We will also have two off-site events, including a welcome social at the Gov. Mike Huckabee Delta Rivers Nature Center and a conference banquet at Harbor Oaks Restaurant & Golf Club. We hope the conference will be beneficial and well worth your trip to Pine Bluff. Please enjoy the conference, and feel free to ask for anything you might need.

Best Wishes,

Michael A. Eggleton
Conference Program Chair
Arkansas Chapter AFS

PROGRAM OVERVIEW

American Fisheries Society

32nd Annual Meeting of the Arkansas Chapter of the American Fisheries Society

University of Arkansas at Pine Bluff, Pine Bluff, AR

Tuesday, 23 January 2018

Activity	Time	Location
Mussel ID Workshop	8:30 am – 11:30 am	Holiday Hall – Room 105C
Meeting Registration	12:00 pm – 5:30 pm	STEM Conference Lobby
Presentation Loading	12:00 pm – 1:00 pm	STEM Conference Room
Chancellor's Welcome	1:00 pm – 1:10 pm	STEM Conference Room
President's Welcome	1:10 pm – 1:20 pm	STEM Conference Room
Session I	1:20 pm – 3:00 pm	STEM Conference Room
Break / Poster Session	3:00 pm – 3:20 pm	STEM Conference Lobby
Session II	3:20 pm – 5:00 pm	STEM Conference Room
Presentation Loading	5:00 pm – 5:30 pm	STEM Conference Room
Welcome Social	6:30 pm – 9:00 pm	Delta Rivers Nature Center

Wednesday, 24 January 2018

Activity	Time	Location
Meeting Registration	7:30 am – 5:00 pm	STEM Conference Lobby
Presentation Loading	7:30 am – 1:00 pm	STEM Conference Room
Session III	8:10 am – 10:10 am	STEM Conference Room
Break / Poster Session	10:10 am – 10:30 am	STEM Conference Lobby
Session IV	10:30 am – 11:50 am	STEM Conference Room
Lunch – On Your Own	11:50 am – 1:20 pm	UAPB, Pine Bluff, and White Hall
Session V	1:20 pm – 3:00 pm	STEM Conference Room
Break / Poster Session	3:00 pm – 3:20 pm	STEM Conference Lobby
Session VI	3:20 pm – 5:00 pm	STEM Conference Room
Banquet/Silent Auction	6:30 pm – 9:00 pm	Harbor Oaks Restaurant & Golf Club

Thursday, 25 January 2018

Activity	Time	Location
Chapter Business Meeting	8:30 am – 10:00 am	Haley Auditorium/1890 Extension Bldg.
Alligator Gar Working Group	10:00 am – 11:00 am	Haley Auditorium/1890 Extension Bldg.
Past-President's Luncheon	11:30 am – 1:30 pm	Harbor Oaks Restaurant & Golf Club

TUESDAY, 23 JANUARY 2018

12:00 – 5:30 PM Meeting Registration

12:00 – 1:00 PM Presentation Loading

1:00 – 1:10 PM Chancellor's Welcome, Dr. Laurence B. Alexander

1:10 – 1:20 PM President's Welcome, Eric Brinkman

*denotes presenter (S) = signifies student presenter

Session I
Moderator:
1:20 – 3:00 PM

Fisheries Management
Charlie Jordan, Arkansas Tech University

1:20 (1) **Potential Diet and Habitat Overlap Between Hybrid Striped Bass (*Morone chrysops* x *M. saxatilis*) and Largemouth Bass (*Micropterus salmoides*) on DeGray Lake, Arkansas: a Meta-analysis**
Jeremiah Salinger* (S) and Steve Lochmann

1:40 (2) **Neosho Smallmouth Bass Spawning Movements and Associated Environmental Conditions in a Seasonally Discontinuous Boston Mountain Stream**
Jacob Martin* (S) and Charles Gagen

2:00 (3) **Greers Ferry Tailwater Versus the World: a Meta-analysis and Comparison of Brown Trout Spawning**
Doug Zentner* (S), Steve Lochmann, and Jonathan Spurgeon

2:20 (4) **Seasonal Habitat Use, Movement, and Exploitation of Sauger (*Sander canadensis*) in the Arkansas River**
Peter Leonard* (S), John Jackson, and Frank Leone

2:40 (5) **Stocking Assessment and Long-Term Impacts of Stocked Non-Native Walleye on the Native Population in the Eleven Point River, Arkansas**
Dustin Thomas* (S), Brook Fluker, and Brett Timmons

3:00 – 3:20 PM **BREAK**

Session II
Moderator:
3:20 – 5:00 PM

Fisheries Management
Doug Zentner, University of Arkansas at Pine Bluff

3:20 (6) **Survival of Largemouth Bass in the Lake Dardanelle Nursery Pond**
Anthony Fernando* and Frank Leone

3:40 (7)	**A Survey of Recreational Fishing and Floating Use on the Buffalo River from September 2013 through August 2014** Stan Todd* and Shawn Hodges
4:00 (8)	**Analysis of AGFC Historical Crappie Trap-Netting Data** Aaron Kern* and Andrew Yung
4:20 (9)	**Crappie Lead Net Sampling Pilot Project** Andrew Yung*
4:40 (10)	**Effect of Ocean Acidification on Deep Sea Spotted Ratfish (*Hydrolagus colliei*): Physiological Consequences on Acid-base Balance, Ion-regulation, and Nitrogenous Waste Dynamics** Jyotsna Shrivastava* (S), Amit Sinha, Ronny Blust, and Gudrun de Boeck
5:00 – 5:30 PM	Presentation Loading
6:30 – 9:00 PM	Welcome Social at Gov. Mike Huckabee Delta Rivers Nature Center

WEDNESDAY, 24 JANUARY 2018

Session III **Moderator:** **8:10 – 10:10 AM**	**Lake Management & Invasive Species** **Jeremiah Salinger, University of Arkansas at Pine Bluff**
8:10 (11)	**Reservoir Fisheries Habitat Partnership: Partnering to Improve Fisheries Habitat in Reservoirs Across the Nation** Reed Green* and Jeff Boxrucker
8:30 (12)	**Monitoring Harmful Algal Blooms in Arkansas** Brie Olsen* and Tate Wentz
8:50 (13)	**Mitigating Cyanobacterial Blooms and Cyanotoxins in Hypereutrophic Ponds Following the Application of Environmental-Friendly Hydrogen Peroxide-based PAK® 27 Algaecide** Amit Sinha*, Reed Green, and John Howe
9:10 (14)	**Modeling Range Expansion of Northern Snakehead in Arkansas** Shannon Smith*, Justin Homan, Micah Tindall, and Steve Lochmann
9:30 (15)	**Effects of Bigheaded Carps on Native Fish Assemblages in Oxbow Lakes of the Lower White River, Arkansas** Cody Salzmann* (S), Joe Kaiser, Shannon Smith, and Mike Eggleton

9:50 (16)	**Age-0 Fish Characteristics in Oxbow Lakes of the Lower White River, Arkansas** Joe Kaiser* (S), Cody Salzmann, Shannon Smith, and Mike Eggleton
10:10 – 10:30 AM	**BREAK**
Session IV **Moderator:** **10:30 – 11:50 AM**	**Program Overviews** **Jennifer Main, University of Central Arkansas**
10:30 (17)	**Protecting Arkansas's Aquatic Heritage** Dustin Lynch*
10:50 (18)	**Dam U: The Effort to Establish the Arkansas Stream Heritage Partnership** Darrell Bowman*
11:10 (19)	**Family and Community Fishing Program: A Promotional Program in Arkansas** Maurice Jackson* and Clint Coleman
11:30 (20)	**Youth's Awareness of the Arkansas Game and Fish Commission's Family and Community Fishing Program** Annette Williams Fields* (S) and Steve Lochmann
11:50 AM – 1:20 PM	**LUNCH**
Session V **Moderator:** **1:20 – 3:00 PM**	**Fisheries Techniques & Non-Game Species** **Joe Kaiser, University of Arkansas at Pine Bluff**
1:20 (21)	**Evaluation of Four Low-frequency Electrofishing Pulse Rates for Collecting Blue Catfish (*Ictalurus furcatus*) in the Arkansas River** Charlie Jordan* (S), Anthony Fernando, and Joe Stoeckel
1:40 (22)	**Unmanned Aircraft and the Natural Resource Management Agency** Anthony Fernando*
2:00 (23)	**Use of Otolith Microchemistry to Assess Mixed-origins of Channel Catfish in an Open River-Tributary Network** Jonathan Spurgeon* and Mark Pegg
2:20 (24)	**Status Survey and Conservation Genetic Assessment of the Paleback Darter (*Etheostoma pallididorsum*)** Brittany McCall* (S) and Brook Fluker

2:40 (25)	**Gene Flow and Genetic Structure of Two of Arkansas's Rarest Darter Species (Teleostei: Percidae), the Arkansas Darter (*Etheostoma cragini*) and the Least Darter (*E. microperca*)** Justin Baker, Brian Wagner*, and Robert Wood
Session VI **Moderator:** **3:20 – 5:00 PM**	**Contributed Papers** **Brittany McCall, Arkansas State University**
3:20 (26)	**Preliminary Observations on the Ecology of the Fully Aquatic Ouachita Streambed Salamander (*Eurycea subfluvicola*)** Kelly Irwin*
3:40 (27)	**Therapeutic Potential of Bioactive Compounds for Treating Fish Disease** Nitin Challa* (S) and Grace Ramena
4:00 (28)	**The Use of a Kaolinic Clay, AquaPro, for Control of Columnaris Disease in Cultured Fish** Anita Kelly*, Nilima Renukdas, Luke Roy, Matt Barnett, and Ben Beck
4:20 (29)	**CLCA, a Metalloprotease Induced During Pathogenesis, Is a Potential Therapeutic Molecule to Deal With Piscine Disease** Grace Ramena* and Randolph Elble
4:40 (30)	**How Does Brand Affect Demand for Frozen Shrimp? An Analysis of Store-based Scanner Data in the United States** Uttam Deb* and Madan Dey

THURSDAY, 25 JANUARY 2018

8:30 AM – 10:00 AM	Chapter Business Meeting
10:00 AM – 11:00 AM	Alligator Gar Working Group Meeting
11:30 AM – 1:30 PM	Past Presidents Luncheon

Poster Session:

Change in Historic vs. Contemporary Fish Assemblages of the Strawberry River, Arkansas
Jennifer Main* (S), Ginny Adams, and Reid Adams

Wetland Restoration and Conservation in the Lower Mississippi Delta: Programs, Achievements and Challenges
Uttam Deb*, Alexander Kiser (S), and Mike Eggleton

Diel Patterns of Riffle Fish Diversity in the Kings River
Jacob Colbert* (S) and William Glenn

Habitat Associations of Riffle Fishes in an Ozark River Having a Dynamic Gravel Bedload
Chance Garrett* (S), Ginny Adams, and Reid Adams

Comparison of Angler Pressure Counts by Manned and Unmanned Aircraft on Beaver Tailwater
Anthony Fernando*, Wilson Short, and Kristofor Nault

Does Feeding Baitfish and Centrarchids Over Winter Increase Survival?
Anita Kelly*, Luke Roy, and Nilima Renukdas

(1) Potential Diet and Habitat Overlap Between Hybrid Striped Bass (*Morone chrysops* x *M. saxatilis*) and Largemouth Bass (*Micropterus salmoides*) on DeGray Lake, Arkansas: a Meta-analysis

Jeremiah Salinger *and Steve Lochmann*
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salingj4692@uapb.edu

The Arkansas Game and Fish Commission (AGFC) uses fish stockings to create diverse angling opportunities for Arkansans. Stocking of Striped Bass began in the late 1950s, while stocking of hybrid Striped Bass began in the 1970s. In addition to hybrid Striped Bass, DeGray Lake also supports a popular fishery for Largemouth Bass. Concerns have been raised by Largemouth Bass anglers that interspecific competition for food and habitat resources may be occurring. The presented work analyzes the potential of this possibility using literature data. Data were gathered from literature throughout the range of both fishes. Degree of overlap on a seasonal basis was computed using both Pianka's and Schoener's indices. These analyses suggest that, while the potential for habitat overlap between the two fishes is low, the potential for diet overlap may be high. Specifically, the comparison of diet composition suggests significant overlap exists in use of fish as prey items.

Oral – Graduate Student

(2) Neosho Smallmouth Bass Spawning Movements and Associated Environmental Conditions in a Seasonally Discontinuous Boston Mountain Stream

Jacob Martin[1] *and Charles Gagen*[2]
[1]University of Arkansas, Fayetteville, AR
[2]Arkansas Tech University, Russellville, AR
jhm008@uark.edu

Neosho Smallmouth Bass are a top predator and popular sportfish in Arkansas' Boston Mountain streams. In this ecoregion, Smallmouth Bass are common in headwater streams that are prone to drying during the summer months. Thirty Smallmouth Bass were captured and implanted with radio transmitters in March, and tracked weekly in the Middle Fork of Illinois Bayou through August 2016. Age-0 Smallmouth Bass were collected using electrofishing from May through August 2016, and otoliths were used to back-calculate spawn date. Movement overall was low and minimum daily water temperature was inversely correlated to weekly Smallmouth Bass movement ($r = -0.79$, $p < 0.01$). Peak spawning in this system occurred during 17 days from May 25th to June 10th, indicating that individuals that successfully recruited to a catchable size (25 mm) were spawned over a short time-period. Furthermore, the majority of spawning occurred on the falling limbs of hydrographs between 17°C and 25°C. This spawning duration is short compared to what is known about the northern sub-species. Additionally, spawning occurred at slightly higher temperatures than what has previously been documented.

Oral – Graduate Student

(3) Greers Ferry Tailwater Versus the World: a Meta-analysis and Comparison of Brown Trout Spawning

***Doug Zentner**, Steve Lochmann, and Jonathan Spurgeon*
University of Arkansas at Pine Bluff, Pine Bluff, AR
zentnerd5954@uapb.edu

Brown Trout have an almost worldwide distribution and are heavily studied. However tailwater fisheries remain understudied, especially in Arkansas. Within Arkansas, the Greers Ferry Tailwater (GFTW) has the only self-sustaining population of Brown Trout. Little is known about their spawning, or how they compare to the global population. Therefore, our objectives were to (1) compare spawning times reported in the literature to GFTW, (2) establish generalized spawning suitability curves using literature data, and (3) compare curves to measurements from GFTW. Spawning dates were summarized from literature data and compared to field observations. Generalized habitat suitability curves were developed for substrate size, water velocity, and depth then compared to field observations. Spawning started later in 2017 than previously reported within Arkansas tailwaters, but was within the timeframe reported in global literature. A majority of sample data fell within the predictions from generalized suitability curves. Anecdotally, it appears that spawning time is variable within tailwater fisheries and is possibly regulated by abiotic variables. Our generalized suitability curves appear to predict areas where spawning will occur in GFTW, but water fluctuations affected curve accuracy. This information is beneficial to both trout and habitat management in systems with regular water fluctuations like GFTW.

Oral – Graduate Student

(4) Seasonal Habitat Use, Movement, and Exploitation of Sauger (*Sander canadensis*) in the Arkansas River

***Peter Leonard**[1], John Jackson[1], and Frank Leone[2]*
[1]Arkansas Tech University, Russellville, AR
[2]Arkansas Game and Fish Commission, Russellville, AR
pleonard@atu.edu

Sauger (*Sander canadensis*) are a native game fish present in the Arkansas River and have been known to aggregate below lock and dams during seasonal migrations. With no current minimum length limit in place by the Arkansas Game and Fish Commission, these aggregations put sauger at risk of growth overfishing. We are conducting a study to estimate exploitation and model minimum length limit regulations. We will collect 300 sauger from Pool 9 and 300 from Lake Dardanelle using gill nets. Fish will be tagged with rewards ranging from $10 to $50. High reward tag returns will be used to estimate return rate. Twenty percent of fish will be double tagged to estimate tag retention. We will use FAMS to model sauger population characteristics with a 356-mm (14-in) length limit. We will also implant 50 acoustic telemetry tags in sauger to access habitat use and movement for a one year time span using both active and passive receivers.

Oral – Graduate Student

(5) Stocking Assessment and Long-Term Impacts of Stocked Non-Native Walleye on the Native Population in the Eleven Point River, Arkansas

Dustin Thomas[1]*, Brook Fluker*[1]*, and Brett Timmons*[2]
[1]Arkansas State University, Jonesboro, AR
[2]Arkansas Game and Fish Commission, Jonesboro, AR
dustinraythomas@gmail.com

The spring-fed Eleven Point River in Arkansas contains a natural population of Walleye *Sander vitreus*. Supplemental stocking of Walleye in Arkansas has occurred in the Eleven Point River since 1986. The river is managed for multiple sport fish species, but it was not until 2002 that researchers began to investigate the complexities of Walleye stocking programs in the Eleven Point River. Researchers discovered a unique mitochondrial DNA haplotype for the native population in the Black River drainage. The native haplotype is identified as haplotype C or Black River Strain Walleye. From 1986 to 2011, a non-native northern strain known as White River Strain Walleye or haplotype A were stocked into the Eleven Point River. This project will assess the impact and success of the Walleye stocking program. It will also assess the impact of the non-native strain on the native strain and other sport fish species such as Smallmouth Bass, *Micropterus dolomieu*. Preliminary data will be presented from 2017 sampling in the Eleven Point River, which follows a 6-year gap in Walleye stocking from 2011 to 2017, and will be compared to data collecting during 2011.

Oral – Graduate Student

(6) Survival of Largemouth Bass in the Lake Dardanelle Nursery Pond

Anthony Fernando *and Frank Leone*
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Nursery ponds provide an environment free of piscivorous fish for small fingerlings to grow during their first summer. Larger fingerlings have been shown to have better survival and higher stock contribution. To evaluate nursery pond effectiveness, 37,944 fingerling Largemouth Bass (LMB) marked with a freeze-brand were stocked into the Lake Dardanelle Nursery Pond (LDNP) in June 2017. An additional 4,532 advanced fingerling LMB marked with a left fin clip were stocked into the LDNP at the end of October. Electrofishing of LDNP allowed a mark-recapture estimate that 7,558 ± 731 fish remained in the pond, of which 3,035 were freeze branded. Prior to draining LDNP we set block nets at the mouth of the outlet cove. Electrofishing obtained 70 cove-resident LMB which were marked with a right fin clip. Post draining electrofishing allowed for estimates of 638 ± 464 total LMB in the outlet cove by mid-November, of which 159 were freeze branded. Prior to release, LMB from LDNP exhibit instantaneous daily mortality lower than that of similar sized fish stocked directly into large reservoirs, but higher than wild LMB. Substantial mortality is experienced at LDNP during release. Expansion of this study to other nursery ponds is planned for 2018.

Oral – Professional

(7) A Survey of Recreational Angling and Floating Use on the Buffalo River, AR from September 2013 Through August 2014

Stan Todd[1] *and Shawn Hodges*[2]
[1]Arkansas Game and Fish Commission, Mountain Home, AR
[2]Buffalo River National Park, Harrison, AR
charles.todd@agfc.arkansas.gov

Floater use and angler creel were surveyed from September 1, 2013 through August 31, 2014 for the Buffalo River, AR. The study was precipitated by increasing mortality of Smallmouth Bass and potential for disturbance of nesting fish by recreational floaters. Float use was estimated through use of time lapse cameras while floater characteristics were generated through floater interviews. A four-fold increase in boater traffic has occurred over the past 20 years, with 2.8 million floater hours and expenditures totaling $29 million annually. Twenty two percent of floaters were anglers, expending 321,000 hours fishing and $7 million annually. Catch rate of fish was 0.95 fish per hour or 305,000 fish annually. Smallmouth Bass were most often targeted with a catch rate of 0.45 fish per hour or 146,000 fish annually. Harvest rates were very low at 0.004 fish per hour overall and 0.001 Smallmouth Bass per hour. We estimated that only 300 Smallmouth Bass are harvested annually. Thus, increasing fishing mortality is not likely due to harvest, but more likely post hooking mortality. Peak floating use during the Smallmouth Bass nesting period remains a concern.

Oral – Professional

(8) Analysis of AGFC Historical Crappie Trap-Netting Data

Aaron Kern *and Andrew Yung*
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aaron.kern@agfc.ar.gov

Crappie spp. are the second-most sought-after sportfish by Arkansas anglers, and receive considerable management effort. AGFC has historically used a Crappie Assessment Score to assess crappie populations. This score is computed using 5 parameters (Recruitment, Density, Age Structure, Size Structure, and Growth Rate). These parameters were analyzed, by ecoregion and species, as a complement to AGFC Crappie Management Team's revisions to the Crappie Management Plan. It appears that density-dependent parameters (Recruitment, Density) may have a strong influence on the overall Crappie Assessment Score, and may skew this score positively for lakes dominated by White Crappie and negatively for lakes dominated by Black Crappie. Managers should be cautious when using score-based methodologies for fish population assessment to ensure that any possible sampling bias is not exacerbated during score computation.

Oral – Professional

(9) Crappie Lead Net Sampling Pilot Project

Andrew Yung
Arkansas Game and Fish Commission, Camden, AR
andrew.yung@agfc.ar.gov

For decades, state game and fish agencies have primarily utilized trap nets for sampling crappie populations. Years of sampling effort has indicated this gear type does not adequately sample fish across all waterbodies in Arkansas. For example, sampling events in lakes and reservoirs with steep banks and/or waters where crappie species do not regularly use the littoral zone tend to result in little to no fish collected. Lead nets provide a gear type with the ability to be fished in deeper, offshore habitats, which biologists have previously been unable to sample due to trap net gear limitations. The AGFC Crappie Management Team recently initiated a pilot study on 7 lakes to investigate the future incorporation of lead net sampling into the current revision of the Statewide Crappie Management Plan.

Oral – Professional

(10) Effect of Ocean Acidification on Deep Sea Spotted Ratfish (*Hydrolagus colliei*): Physiological Consequences on Acid-Base Balance, Ion-Regulation, and Nitrogenous Waste Dynamics

Jyotsna Shrivastava[1], *Amit Sinha*[2], *Ronny Blust*[1], *Greg Goss*[3], *and Gudrun De Boeck*[1]
[1]University of Antwerpen, Antwerpen, Belgium
[2]University of Arkansas at Pine Bluff, Pine Bluff, AR
[3]University of Alberta, Edmonton, Canada
Jyotsna.Shrivastava@uantwerpen.be

This study was aimed at investigating the net acid-base flux, nitrogenous waste excretion (ammonia and urea) and ion-regulation in deep sea fish, the spotted ratfish *Hydrolagus colliei*, mediated by ocean acidification. Fish were exposed to 1.5% pCO2 (~15,000 ppm) for a period of 0 h (control), 4 h, 12h, 24 h and 48 h. Ocean acidification induced a drastic reduction in intracellular pH (RBC) after 4 h of exposure and thereafter values restored to control level. Respiratory acidosis resulted in blood pH depression. Blood pH subsided relative to the control throughout the exposure, and was momentarily compensated by an increase in plasma [HCO3-]. In addition, these reductions in blood pH were complemented by a parallel increment in plasma TCO2 level. Ammonia and urea excretion rate remained virtually unchanged. Likewise, ion-homeostasis was maintained during exposure episodes as no remarkable changes for Na+ and Cl- ion level in plasma were recorded. Slight and temporary increment for net H+ flux rate was observed. Overall, the present findings suggest that under ocean acidification threat spotted rat fish prioritize intracellular blood pH homeostasis over extracellular blood pH, and were compensated by bicarbonate taken up from the environmental seawater.

Oral – Graduate Student

(11) Reservoir Fisheries Habitat Partnership: Partnering to Improve Fisheries Habitat in Reservoirs Across the Nation

Reed Green[1] *and Jeff Boxrucker*[2]
[1]Reservoir Fisheries Habitat Partnership, Little Rock, AR
2Reservoir Fisheries Habitat Partnership, Norman, OK
wrgreen@sbcglobal.net

The Reservoir Fisheries Habitat Partnership (RFHP) promotes the protection, restoration, and enhancement of habitat for fish and other aquatic species and communities in reservoir systems. The RFHP is committed to integrating watershed conservation, in-reservoir management, and the management of downstream flows to address aquatic habitat impairments holistically. It relies on partnerships to do this. It assesses and prioritizes reservoirs of greatest conservation need, and acquires and develops the science, technology, tools, best management practices, and monitoring protocols needed for successful fisheries management and fish habitat conservation in those reservoirs and their associated systems. It shares that knowledge with, and provides material support to, all Fish Habitat Partners and other conservation entities with reservoir interests and issues. It facilitates, informs, equips, and supports a bottom-up approach to implementation of reservoir system conservation.

Oral – Professional

(12) Monitoring Harmful Algal Blooms in Arkansas

Brie Olsen *and Tate Wentz*
Arkansas Department of Environmental Quality, Little Rock, AR
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In 2015 a Harmful Algal Bloom (HAB) Workgroup was created in Arkansas consisting of members specializing in water resources and public health. Goals of the HAB Working Group include developing a statewide standard for cyanobacteria and cyanotoxins, establishing a response plan to HAB events, and promoting a monitoring system on lakes prone to cyanobacterial blooms. One of the greatest limitations to properly achieving these goals is a lack of long-term water quality data on lakes. Statewide monitoring on susceptible waterbodies is an essential part of predicting, preventing and responding to cyanobacterial events. Water resource managers have utilized creative methods to obtain these much needed data. One of the most efficient ways to collect water quality data spanning a wide spatial and temporal scale has been through the use of volunteers. In an effort to increase understanding of HAB events and confidence in making lake management decisions throughout the state, the HAB Workgroup plans to implement a statewide Citizen Science Lake Monitoring Program. With increased communication, knowledge, and data availability among water resource managers in Arkansas, the ultimate goal of the workgroup is to ensure cohesive and appropriate responses to future HAB events.

Oral – Professional

(13) Mitigating Cyanobacterial Bloom and Cyanotoxins in Hypereutrophic Ponds Following the Application of Environmental Friendly Hydrogen Peroxide-based PAK® 27 Algaecide

Amit Sinha[1]*, Reed Green*[2]*, and John Howe*[1]
[1]University of Arkansas at Pine Bluff, Pine Bluff, AR
[2]U.S. Geological Survey, Little Rock, AR; sinhaa@uapb.edu

We examined the effectiveness of PAK® 27 to selectively suppress noxious cyanobacteria bloom in hypereutrophic aquaculture ponds. PAK® 27 is a relatively new hydrogen peroxide based active compound (27% H_2O_2). Overall, the aim of present study was to (i) investigate the efficacy of PAK® 27 to suppress cyanobacterial growth, and determine the most appropriate dose to potentially inhibit target cyanobacterial bloom without affecting non-target biota including eukaryotic phytoplankton and zooplankton, (ii) ascertain whether application of PAK® 27 can destroy cyanotoxins such as microcystins, (iii) evaluate whether the applied dose of PAK® 27 leaves any long term traces of H2O2 in the water, and (iv) gain insights on the longevity of the PAK® 27 application. We observed that PAK® 27 corresponding to 2.5 mg/L H_2O_2 can suppress the dominating cyanobacterium *Planktothrix* sp. bloom without affecting the non-targeted eukaryotic phytoplankton and zookplankton community. PAK® 27 also is effective at diminishing total microcystin concentration. We also revealed that the added PAK® 27 degrades within a few days, and thereby leaves no long-term H_2O_2 traces in the environment. Unlike 2.5 mg/L H_2O_2, higher doses of PAK® 27 exert negative impacts on non-targeted eukaryotic phytoplankton and zooplankton communities.

Oral – Professional

(14) Modeling Range Expansion of Northern Snakehead in Arkansas

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Northern Snakehead *Channa argus* have been expanding their range within Arkansas and recently into Mississippi. We examined their range expansion since 2008 for potential spatial trends using a GIS. Initial analysis of presence-only location data indicated very little movement of the mean (geographic) center of snakehead locations but exhibited a trend of expansion north-south rather than east-west. We also attempted to characterize areas of Arkansas and Mississippi that might be most susceptible to colonization. Modeling of these areas was done using machine based learning maximum entropy modeling (MaxEnt). Parameters of the model included land cover type, minimum and maximum temperatures, and annual precipitation. Based on MaxEnt models of these parameters and snakehead presence data the GIS generated maps of areas with a low to high likelihood of colonization. Although preliminary and not fully comprehensive, these models have the potential to inform researchers about snakehead movement into new areas and provide insight on where the forefront of invasion may likely occur.

Oral – Professional

(15) Effects of Bigheaded Carps on Native Fish Assemblages in Oxbow Lakes of the Lower White River, Arkansas

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Abundances of bigheaded carps (primarily Silver Carp *Hypopthalmichthys molitrix*) have grown tremendously within the lower White River during the past decade. Multiple user groups and management agencies have expressed concern about the potential impacts of carp establishment on native fishes. This research aims to quantify relationships between native fish assemblages and recently established bigheaded carps in oxbow lakes in the lower White River. Oxbow lake fish assemblages were sampled using experimental gill nets, mini-fyke nets, and boat-mounted electrofishing during the summer and fall 2017. In addition, current assemblages were compared with historical data collected during 2002-2005, prior to carp establishment. Using 15 study lakes, a carp density gradient was established using average rank abundances from multiple gear types (i.e., gill nets, boat-mounted electrofishing, visual counts, GoPro camera counts). Preliminary results suggested comparable richness and diversity between historical (i.e., pre-carp) and current (i.e., post-carp) datasets. Some structural changes occurred with respect to rare species (i.e., <1% of the total catch), with 12 and 13 species being lost and gained, respectively. Impacts of further range expansions by bigheaded carps in Arkansas are unclear. However, preliminary effects observed in this study suggest possible negative influences on native fish assemblages.

Oral – Graduate Student

(16) Age-0 Fish Characteristics in Oxbow Lakes of the Lower White River, Arkansas

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During the past decade, bigheaded carps (primarily Silver Carp *Hypopthalmichthys molitrix*) have become highly abundant in the lower White River. Bigheaded carp effects are suspected to be more consequential towards juvenile fishes due to their high degree of planktivory. However, research on the effects of carp invasions and establishment on age-0 fishes are generally lacking. This study aims to quantify the effects of recently established bigheaded carps on age-0 cohorts of several resident fish species in well-studied oxbow lakes of the lower White River. Using 15 study lakes, age-0 fishes were collected with mini-fyke nets and boat-mounted electrofishing during summer (July-August) and fall (September-November) 2017. Collections targeted four piscivores, three omnivores, and two planktivores. Preliminary catch-per-unit-effort (CPUE) of Largemouth Bass, Spotted Bass, Gizzard Shad, and White Crappie differed between summer and fall seasons with electrofishing. Bluegill CPUE also differed between summer and fall with electrofishing and mini-fyke nets. Future analyses will examine relationships between juvenile fish measures (e.g., size, condition, weight-length coefficients, and growth) and a bigheaded carp density gradient quantified from a companion study.

Oral – Graduate Student

(17) Protecting Arkansas' Aquatic Heritage

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The Arkansas Natural Heritage Commission (ANHC) has been working since 1973 to conserve Arkansas's natural communities and the rare, threatened, and endangered species that comprise them. Out of the 972 rare species of plants and animals that ANHC currently tracks, 291 species (around 30%) are primarily aquatic for all or part of their life cycle. I will provide an overview of ANHC's role in protection of our aquatic resources, including examples of imperiled species from different taxonomic groups in different ecoregions and the unique conservation challenges facing them.

Oral - Professional

(18) Dam U: The Effort to Establish the Arkansas Stream Heritage Partnership

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The Arkansas Stream Heritage Partnership (ASHP) is being created to focus on restoring stream connectivity in Arkansas. The partnership exists to help promote better communication and cooperation amongst all interested potential players in dam removal and stream barrier improvement projects in Arkansas, including state and federal agencies, non-profs and other NGOs, conservation organizations, and private and public owners of stream barriers. The partnership aims to develop a database of all dams in state and associated stream data, identify issues for dam owners seeking removal, develop a cohesive process to guide dam owners with removal projects, establish funding sources, etc. The partnership is non-regulatory and opportunistic. To start the conversation, a dam removal workshop was held at Department of Arkansas Heritage, January 10 and 11, 2018. American Rivers and Southern Aquatic Resource Partnership and Arkansas Natural Heritage Commission conducted the workshop and it was hosted Department of Arkansas Heritage, along with planning and financial support from Arkansas Game and Fish Commission Fisheries Division, Central Arkansas Water, The Nature Conservancy, Arkansas Chapter American Fisheries Society, and planning support from US Fish and Wildlife Service Conway Office, and Arkansas Natural Resource Commission. The introductory workshop introduced the ASHP and focused on all aspects of dam removal.

Oral - Professional

(19) Family and Community Fishing Program: A Promotional Program in Arkansas

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The Family and Community Fishing Program (FCFP) has been around in its current format for over 15 years. The program was created after the passing of the 1/8 cent sales tax amendment, and has provided many urban Arkansans a convenient place to go fishing close to home at one of the FCFP's 36 locations around the state. In order to remain relevant over time, the program has had to adapt to changing conditions. This presentation will focus on some of the Arkansas Game and Fish Commission's past efforts to get individuals and communities involved in FCFP and will detail some current and future initiatives aimed at expanding FCFP's impact zone, and continuing to increase public interest in fishing and the outdoors. This includes working with a marketing coordinator on staff and working to develop evaluation tools to measure the program's reach and effectiveness.

Oral – Professional

(20) Youth's Awareness of the Arkansas Game and Fish Commission's Family and Community Fishing Program

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A survey was conducted to exam youth's awareness of the Arkansas Game and Fish Commission's Family and Community Fishing Programs (FCFP) and Family and Community Fishing Program lakes (FCFP lakes). The survey was administered at the annual 2017 Inclusion and Multicultural 700 Youth Empowerment Summit in Little Rock, Arkansas. There were 700 youth that attended the event and 241 surveys were completed, with 216 being usable. Eighty-seven percent of the participants were 16-19 years old, 61% were females, and 39% were males. Ninety-six of the participants were African-Americans between the ages of 16-19 years old and 82% were unaware of FCFPs. Almost 89% did not know what FCFP did and 80% fished rarely or never, though 10% sometimes or often used FCFP lakes. Eighty-five percent were not at all likely, or slightly likely, to purchase a fishing license in the future. Even among those that fished routinely, 79% didn't know what the FCFP did. Results from this survey should assist AGFC managers in setting priorities for future programming and marketing.

Oral – Graduate Student

(21) Evaluation of Four Low-frequency Electrofishing Pulse Rates for Collecting Blue Catfish Ictalurus furcatus in the Arkansas River

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Low-frequency electrofishing is an effective gear for collecting Blue Catfish *Ictalurus furcatus*, but the relative effectiveness of specific low-frequency pulse rates has not been fully evaluated. Differences in total catch, catch rate, and length frequency distributions were tested among four pulse rates: 7, 10, 12, and 15 pulses per second (pps). We used a random block design in July 2017 on 19 wing dikes in Winthrop Rockefeller Lake; all wing dikes were sampled once at each pulse rate with a rest period of four days between sample runs. Duration of sample runs was 5 minutes and temperature ranged between 28.7 and 31.7^{o}C. A total of 691 fish were collected, 12 pps had significantly greater total catch of N_{12} = 247, and 7 pps had significantly lower total catch of N_{7} = 94. Seven pps had significantly lower catch rate than 10 and 12 pps. No difference in catch rate was observed among other pulse rates. Significantly fewer fish >300 mm were collected at 7 pps compared to all other pulse rates, but there was no difference among 10, 12, and 15 pps. Our results indicated that Blue Catfish sampling at 12 pps was the most efficient of the pulse rates tested.

Oral – Graduate Student

(22) Unmanned Aircraft and the Natural Resource Management Agency

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The Arkansas Game and Fish Commission (AGFC) began operating small unmanned aircraft (sUAS) for fish and wildlife management purposes in February 2017. Standardized Operating Procedures for operation of sUAS by AGFC's fisheries division were approved in May 2017. Using sUAS, Fisheries Division has completed several projects producing orthomosaic maps, conducting angler pressure counts, and collected data for vegetation analysis. Fisheries Division has also assisted sister divisions with forest resource analysis and bird habitat assessment. Additionally, 2017 saw the first formal requests from the general public to use sUAS on WMAs and AGFC managed lakes. Informal procedure for dealing with these requests was developed. In October 2017, AGFC was issued its first Certificate of Authorization from the FAA which allows the agency to self-certify its pilots with the first pilot training class scheduled for January 2018. This presentation describes AGFC's unmanned aircraft activities to date, and shares "lessons learned" related to unmanned aircraft over the past year.

Oral – Professional

(23) Use of Otolith Microchemistry to Assess Mixed-Origins of Channel Catfish in an Open River-Tributary Network

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An understanding of factors responsible for population structure including the origins of individuals from among habitats is fundamental to conservation and management of large-river fishes. The prevalence of population mixing of channel catfish *Ictalurus punctatus* was evaluated within a large-river tributary environment using information from recent environmental history and natal origin derived from otolith microchemistry. Trace elements in water and otoliths were assessed using univariate and multivariate statistical approaches. Water and otolith trace elements differed among river segments facilitating classification of channel catfish to the river segment of capture. Accuracy of the classification tree model for juvenile channel catfish ranged from 44% to 88%. Recent environmental and natal origin microchemistry signatures suggested the channel catfish population within a large-river tributary comprises individuals from multiple locations. Population demographics of channel catfish is likely influenced by mixing of individuals from across the riverine-network. Consideration of the importance of connectivity between main-stem and tributary systems may, therefore, benefit conservation and management of channel catfish and other large-river fishes displaying similar life-history strategies.

Oral – Professional

(24) Status Survey and Conservation Genetic Assessment of the Paleback Darter (*Etheostoma pallididorsum*)

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The Paleback Darter (*Etheostoma pallididorsum*), a Species of Greatest Conservation Need for Arkansas, has been petitioned for federal listing by the Center for Biological Diversity, among 404 other southeastern aquatic species. A prior allozyme-based study found evidence warranting conservation concern for the species status. Therefore, the objectives were to (1) survey historic localities, (2) estimate relative abundance on a seasonal basis, and (3) assess population dynamics and phylogeographic history with microsatellite DNA loci and mitochondrial cytochrome b DNA sequences. Following a two year survey in the Caddo and Ouachita River drainages, relative abundance (catch per unit effort) was comparable among the drainages (0.59 and 0.54, respectively). Analyses of microsatellite DNA loci resulted in low, but significant structure among sampled localities ($F_{st} = 0.17$, $P < 0.001$). Bayesian phylogeographic analyses resulted in the Caddo and Ouachita rivers being reciprocally monophyletic, with divergence estimated at 0.06-MYA. Population genetic diversity was relatively low (He = 0.67; mean alleles per locus (A) = 5.53), but results were comparable to close relatives *Etheostoma boschungi* (He = 0.67; A = 6.74) and *E. tuscumbia* (He = 0.57; A = 5.53). Overall, results suggested that *E. pallididorsum* populations were relatively stable and abundant at sampled localities.

Oral – Graduate Student

(25) Gene flow and genetic structure of two of Arkansas's rarest darter species (Teleostei: Percidae), the Arkansas darter, *Etheostoma cragini*, and the least darter, *E. microperca*

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Distinguishing the effects of historical fragmentation from those of contemporary landscape modification is important to understanding human influences on gene flow and population dynamics. We examined the effects of fragmentation operating over separate timescales on two darter species, *Etheostoma cragini* and *E. microperca*, from the Ozark Highlands. These species now occur within this region only in highly isolated habitats. We separated fragmentation effects at distinct spatial and temporal scales by using several molecular loci (mtDNA/nuclear DNA/nuclear microsatellite DNA). Sequence divergence among Ozark and northern populations of *E. microperca* indicate long-standing isolation. Both species were further isolated in unique 'island' habitats, sometimes at fine spatial scales, as shown by sequence divergence among Ozark Highland populations of *E. cragini*. Microsatellite data also revealed additional subdivision among Arkansas populations with *E. cragini* divided into three distinct populations and *E. microperca* into two. Overall, migration rates were similar among contemporary and historical time periods although patterns of asymmetric migration were inverted for *E. cragini*. Estimates of contemporary effective population size (N_e) were substantially lower for both species than past population sizes. Overall, historical processes involving natural fragmentation have had long-lasting effects on these species, potentially making them more susceptible to current anthropogenic impacts.

Oral – Professional

(26) Preliminary Observations on the Ecology of the Fully Aquatic Ouachita Streambed Salamander (*Eurycea subfluvicola*)

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The recently discovered Ouachita Streambed Salamander (*Eurycea subfluvicola*; Steffen et al. 2014) is found in a single first order stream basin in the east-central Ouachita Mountains of Hot Spring County. It currently has one of the smallest known ranges of any vertebrate in North America. This paedomorphic species inhabits stream segments with seasonally discontinuous surface flow where streambed substrate composition is sediment free chert colluvium creating interstitial spaces for salamander access to subsurface water during low flows. Annual surface activity is bimodal; late January – May and November – early December, at water temperatures ranging from 8.7 – 16° C. Gravid females with well-developed eggs have been observed in late November. Adult *E. subfluvicola* and larvae of syntopic sister species *E. multiplicata* are nocturnally active foragers. Wild caught animals have regurgitated foods, predominated by isopods (*Lirceus* sp.) and one instance of aquatic oligochaete worms. The Ouachita Dusky Salamander *Desmognathus brimleyorum*, a known predator of *Eurycea* spp., is present within the

stream basin yet notably absent from stream segments where *E. subfluvicola* is observed. Field observations suggest a strong correlation of salamander presence with isopod concentrations near upwelling groundwater conduits. Ongoing research, using eDNA sampling, has failed to locate additional *E. subfluvicola* populations.

Oral – Professional

(27) Therapeutic Potential of Bioactive Compounds for Treating Fish Disease

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Bacterial diseases like columnaris caused by *Flavobacterium columnare*, result in huge economic loss to aquaculture farmers. The stringent regulations on the antibiotic use calls for new alternative solutions that can be safe and cost-effective to prevent and treat fish diseases. Plant extracts are well known for their anti-microbial properties and they could be potential alternative candidates. Usage of plant extracts as therapeutics is largely used for human pathologies but there is limited knowledge for the same to treat piscine disease. We have evaluated the anti-microbial properties of extracts from eleven herbs and spices and compared their antimicrobial effect with commercially available antibiotic Oxytetracycline (Terramycin® 200), that is used to treat columnaris. We found that all the extracts (50mg/ml) we have tested, had bactericidal effects against *F. columnare* (3 x 108 CFU/mL). Interestingly, *Syzygium aromaticum*, *Cuminum cyminum* and *Thymus vulgaris* showed highest antimicrobial activity against *F. columnare*, with an average inhibition of 20 mm and *Cinnamomum verum* showed 18 mm, which was similar to oxytetracycline (30 µg). We speculate that the extracts we have identified could serve as potential alternative therapeutics to treat columnaris in fish that would have fewer or no regulations and be cost-effective.

Oral – Graduate Student

(28) The Use of a Kaolinic Clay, AquaPro, for Control of Columnaris Disease in Cultured Fish

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Sportfish producers in Arkansas are interested in inexpensive treatments for the bacterial disease Columnaris, caused by *Flavobacterium columnare*. Columnaris is particularly prevalent during feed training of centrarchids, such as largemouth bass *Micropterus salmoides*, and immediately following harvest of crappie *Pomoxis spp*., redear sunfish *Lepomis microlophus*, and bluegill *Lepomis macrochirus*, held in vats prior to shipment. Largemouth bass fingerlings are harvested

and held for several weeks in vats during the feed training process. A commercial research demonstration trial with two commercial sportfish farms in Arkansas was conducted to test the efficacy of kaolin clay to prevent outbreaks of Columnaris. AquaPro, (Imerys, Georgia, USA), was utilized as a prophylactic treatment for largemouth bass, crappie, bluegill, and redear sunfish. Participating producers treated fish in vats with 1 ppt kaolin or 0 ppt kaolin (control) as a prophylactic treatment and also during active Columnaris infections. Samples of fish were brought to the UAPB Lonoke Fish Health Services Laboratory. Gills, fins, and tissues of treated and non-treated fish were examined visually for the presence of Columnaris both before and after treatment. Fish tissue samples were also sampled to confirm the presence/absence of Columnaris using real time PCR. AquaPro was useful as a prophylactic but did not successfully prevent mortalities during severe outbreaks of Columnaris.

Oral – Professional

(29) CLCA, a Metalloprotease Induced During Pathogenesis, is a Potential Therapeutic Molecule to Deal with Piscine Disease

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Bacterial disease by *Flavobacterium columnare,* and *Aeromonas hydrophila,* cause significant economic loss to the aquaculture farmers. The stringent regulations on the use of antibiotics and low efficacy of available vaccines, creates the need for new solutions. Bacterial and parasitic infections damage the epithelial tissues immune-compromising the fish. Our goal is to identify new therapeutics to prevent and treat piscine diseases. CLCAs are predominantly expressed in the epithelium and endothelium of chordates and required for maintaining epithelial integrity. We have shown that CLCA2 interacts with EVA1 and loss of either protein results in EMT and compromised barrier function. On the other hand, metalloproteases in mucus cleave bacterial proteins, activate immune response, or produce antimicrobial peptides. Interestingly, we find that CLCA2 is a self-cleaving metalloprotease that has a metal binding motif HEXXH conserved across species. We found that Zn+2 catalyzed CLCA2 cleavage and the E to Q mutation in HEXXH abolished its proteolytic activity. Thus, CLCA2 is a Zn+2 dependent, self-cleaving metalloprotease expressed at cell-cell junctions. It maintains epithelial integrity, and stress/pathogenic insult results in CLCA self-cleavage, and immune response and mucus secretion. Therefore, we speculate that sCLCA could serve as a potential therapeutic for piscine bacterial diseases.

Oral – Professional

(30) How Does Brand Affect Demand for Frozen Shrimp? An Analysis of Store-Based Scanner Data in the United States

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Shrimp is the most-consumed seafood in the United States in terms of volume per capita. In 2014, per capita consumption of shrimp was 4.0 pounds followed by salmon (2.3 pounds), Tuna (2.3 pounds) and Tilapia (1.4 pounds). Consumption of shrimp in the country has doubled over the last two decades. The present study investigates the influence of brands on consumer demand and retail prices of frozen shrimp in the United States at a disaggregated product and market level. The study is based on data collected for the period 2009 to 2013 by the Nielsen Company under the Expanded All Outlets Combined (xAOC) ScanTrack data programs. It has quantified price premium for different brands, shrimp products and sizes, and measured brand loyalty of shrimp consumers in different market locations. It has analyzed market prices, purchase volume of shrimp products under promotional schemes and regular price situations, and market share of different brands. Our study contributes to the demand literature by expositing the demand relationships between brands and frozen shrimps sold in the retail stores in different markets of the country. Findings of this study would help to better understand the role of brands in shrimp marketing through the grocery stores.

Oral – Professional

Diel Patterns of Riffle Fish Diversity in the Kings River
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Little research has been conducted on diel movements of fishes in upland rivers, but studies suggest diel fish use of habitats can differ among species and size/age classes. Riffles are important, shallow-water habitat for feeding and spawning, but our understanding is incomplete since a majority of data have been collected during daytime. Eleven riffles in the Kings River, Arkansas were sampled (9/9-10/17) during the day using a 3-meter long, 4.75mm-mesh seine net. These eleven riffles were re-visited two weeks later (9/22-23/17) with sampling beginning at 9:00 pm. Kick sets were performed in riffles until all microhabitats were sampled and it was determined that a good representative community sample had been collected. Several species of benthic and pelagic fishes (e.g., *Noturus albater*, *Noturus exilis*, and *Fundulus catenatus*) were collected in higher abundances during the night sampling in comparison to daytime samples. Species' abundance patterns and variation in standard length will be examined. Diel patterns of fish assemblages within the riffles may be due to predator evasion, prey availability, and/or competition. Knowledge of diel movements exhibited by these species can provide understanding of the value of riffles to stream fishes, as well as insight into conservation/restoration efforts of freshwater streams and rivers.

Poster– Undergraduate Student

Wetland Restoration and Conservation in the Lower Mississippi Delta: Programs, Achievements and Challenges
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Historically the Mississippi Alluvial Valley supported an estimated 10 million ha of bottom land hardwoods and wetlands. In the last century, wetlands were reduced by more than 50% of their historic range. Loss of wetlands resulted reduction of wetland ecosystem services such as natural flood control, nutrient sequestration, habitat for migrating and residential wildlife and fish, natural water filtration, and many other services. To overcome this situation, Natural Resources Conservation Service (NRCS) and some other organization (such as Ducks Unlimited) have initiated wetland restoration and conservation programs since early 1980s. We have summarized the programs and projects implemented by different organizations. We have also documented scope, coverage and achievements of various projects. Through a systematic review of existing literature, we have made a synthesis of impacts of these projects on water quality, flood control, and habitat for residential and migratory wildlife. Finally, we have identified the lessons learnt from these projects and articulated implications for future implementation of such programs.

Poster – Professional

Comparison of Angler Pressure Counts by Manned and Unmanned Aircraft on Beaver Tailwater

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The Arkansas Game and Fish Commission (AGFC) budgeted approximately $250,000 for air operations in fiscal year 2017, 74.2% of which was for aerial observation by manned aircraft. Small unmanned aircraft (sUAS, "drone") have lower operating costs than manned aircraft. Cost savings could be experienced if sUAS were to replace manned aircraft; however, it is necessary to validate that the data from sUAS are equivalent to data from manned aircraft. We used sUAS (DJI Mavic Pro) to conduct angler pressure counts in 4 management zones of the 12.1 km Beaver Tailwater simultaneously to manned aircraft. Paired counts of bank/wade anglers, boats, boat anglers, and boat occupants were compared using the Wilcoxon paired signed rank test. A significant difference was found between paired counts of boat anglers ($V = 55$, $p < 0.01$). No significant difference was found between paired counts of bank/wade anglers, boats, or the sum of boat anglers and boat occupants ($V = 7\text{-}32$, $p > 0.05$). The sUAS may better discriminate whether a boat occupant was fishing than the manned aircraft. Cost estimates developed using data derived from this study suggest AGFC may save 71-84% on costs related to aerial observation when sUAS can be substituted for manned aircraft.

Poster - Professional

Habitat Associations of Riffle Fishes in an Ozark River Having a Dynamic Gravel Bed Load

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The streams of the Arkansas Ozarks have experienced extensive erosion and gravel intrusion due to changing land use. As a result, modifications to instream habitat have resulted in an increase in transverse and diagonal gravel bars along with associated shallow, low flow riffles. This study was conducted to determine if variation in riffle habitat (depth, velocity, substrate size) affects the riffle fish community. Understanding how fishes are using different riffle habitats is crucial to ensuring restoration efforts provide the necessary habitats for fishes throughout their various life history stages. For this study 22 riffles were sampled in the King's River, Arkansas using seines and kick set methods. Fishes were preserved in 10% formalin and identified in lab; standard lengths of benthic fishes were taken. Habitat data was collected at each riffle including velocity, pebble count, depth, and water quality. The King's River exhibited a gradient in available riffle habitat with two extremes being shallower, slower, wider riffles with smaller substrate (unstable riffles) and deeper, faster, narrower riffles with larger substrate (stable riffles). Differences in abundance and richness of fishes were found between the two riffle types.

Two species *Etheostoma zonale* and *Noturus albater* were found at different lengths in the two riffle types.

Poster – Undergraduate Student

Does Feeding Baitfish and Centrarchids Over Winter Increase Survival?

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Baitfish and sportfish producers in Arkansas reported excessive losses of fish in the spring of 2013 following pond harvests. Most of the fish that were unaccounted for were small, less than 7.5 cm. with the largest losses occurring in fathead minnows, golden shiners, and bream ponds. One hypothesis for losses is tied to winter feeding practices. Typically, baitfish and sportfish farmers reduce feeding in the fall and feed very little during winter. In order to test the impact of winter feeding on fish survival, growth, and lipid storage a series of experiments were conducted with fathead minnows, hybrid crappie, hybrid bluegill, native bluegill, and redear sunfish. The experiments were conducted in temperature controlled aquarium systems equipped with nine tanks. Three dietary feeding regimes were implemented (each triplicated) which included feeding ad libitum twice per week, once per week, or once per month throughout the 13-week trial. At the beginning and end of the experiment fish were collected for lipid analysis. After 13-weeks, fathead minnows fed twice per week had weight gains of nearly 3%, while the fish offered feed once per week and once per month had negative weight gains of -2.3 and -10.1%, respectively. Results of trials with the four centrarchid species revealed that there were no differences in final weight, survival, weight gain, or specific growth rate among fish offered the different feeding regimes.

Poster – Professional

Change in Historic vs. Contemporary Fish Assemblages of the Strawberry River, Arkansas

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The Strawberry River is the most diverse river in Arkansas with 107 documented species. The Strawberry River is a tributary to the Black River, located in the Salem Plateau of the Ozark Highland and Mississippi Alluvial Plain. The poultry industry has experienced the most rapid growth in north Arkansas, including the Strawberry River watershed. Approximately 60% of this watershed is forest and 29% pasture. This watershed is of big concern due to the increasing poultry industry and the potential impact that poultry could have on the diversity of fishes in the watershed. Historical fish assemblage data from 9 sites was compared to contemporary data (2017) to determine if land use change is affecting the fish communities of the Strawberry River.

A total of 9,659 individuals representing 67 species were collected across the 9 sites both contemporary and historical. 63 were collected in 2017 and 48 historically. Species relative abundance was compared between time periods with a nonmetric multidimensional scaling (NMDS), 2-dimensional. There was no significant difference between historic and contemporary fish assemblages (MRPP p=0.642) based on Bray-Curtis. Stability and persistence will be determined for the 9 sites.

Poster – Graduate Student

NOTES: