31st Annual Meeting
25-27 January 2017
Encourage your student to take part in the

2017 Arkansas Endangered Species Art Contest!

The 8th Annual Arkansas Endangered Species Art Contest is open for submissions! This competition provides K-12 students an opportunity to learn about threatened and endangered species in Arkansas and to express their knowledge and support of these species through art. For more information, including rules, judging criteria, and prizes, visit https://www.fws.gov/arkansas-es/esdaycontest.html. Entries must be postmarked or submitted electronically by March 1, 2017.
THE EXECUTIVE COMMITTEE WOULD LIKE TO THANK OUR SPONSORS!

EXECUTIVE COMMITTEE
TATE WENTZ, PRESIDENT
ERIC BRINKMAN, PRESIDENT-ELECT
JEFF QUINN, PAST-PRESIDENT
JASON THRONEBERRY, TREASURER
JESSIE GREEN, SECRETARY
Arkansas Convention Center Texarkana

CONVENTION LAYOUT

a. Ballroom A
b. Ballroom B
c. Ballroom C
d. Ballroom D
e. Crossroads Ballroom
f. North Gallery
g. West Gallery
h. Executive Board Room
i. Magnolia Meeting Room
j. West Patio
k. Connections Bar & Grill
l. Outdoor Retreat
# PROGRAM OVERVIEW
American Fisheries Society
Arkansas Chapter 31st Annual Meeting
Arkansas Convention Center, Texarkana, AR

**Tuesday, 24 January 2017**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side Scan Sonar Workshop</td>
<td>8:00 am - 5:00 pm</td>
<td>Magnolia Room (I)</td>
</tr>
</tbody>
</table>

**Wednesday, 25 January 2017**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting Registration</td>
<td>12:00 pm - 6:00 pm</td>
<td>West Gallery (G)</td>
</tr>
<tr>
<td>Presentation Loading</td>
<td>12:00 pm - 1:00 pm</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>President’s Welcome</td>
<td>1:00 pm - 1:20 pm</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Session I</td>
<td>1:20 pm - 3:00 pm</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Break</td>
<td>3:00 pm - 3:20 pm</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Session II</td>
<td>3:20 pm - 5:00 pm</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Presentation Loading</td>
<td>5:00 pm - 6:00 pm</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Poster Session</td>
<td>6:00 pm - 7:00 pm</td>
<td>Ballroom (B)</td>
</tr>
<tr>
<td>Hamburger Bar/Scavenger Hunt</td>
<td>7:00 pm - 9:00 pm</td>
<td>Ballroom (B)</td>
</tr>
</tbody>
</table>

**Thursday, 26 January 2017**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting Registration</td>
<td>7:30 am - 6:00 pm</td>
<td>West Gallery (G)</td>
</tr>
<tr>
<td>Presentation Loading</td>
<td>7:30 am - 6:00 pm</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Session III</td>
<td>8:20 am - 10:00 am</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Break</td>
<td>10:00 am - 10:20 am</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Session IV</td>
<td>10:20 am - 12:00 pm</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Lunch</td>
<td>12:00 pm - 1:20 pm</td>
<td>Texarkana</td>
</tr>
<tr>
<td>Session V</td>
<td>1:20 pm - 3:00 pm</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Break</td>
<td>3:00 pm - 3:20 pm</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Session VI</td>
<td>3:20 pm - 5:00 pm</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Student Social</td>
<td>5:00 pm - 6:00 pm</td>
<td>Ballroom (B)</td>
</tr>
<tr>
<td>Banquet/Awards/Silent Auction</td>
<td>6:00 pm - 9:00 pm</td>
<td>Ballroom (B)</td>
</tr>
</tbody>
</table>

**Friday, 27 January 2017**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alligator Gar Working Group</td>
<td>8:00 am - 9:00 am</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Break</td>
<td>9:00 am - 9:20 am</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Business Meeting</td>
<td>9:20 am - 11:20 am</td>
<td>Ballroom (C/D)</td>
</tr>
<tr>
<td>Past-Presidents’ Luncheon</td>
<td>12:00 pm - 2:00 pm</td>
<td>Pecan Point Gastro-Pub</td>
</tr>
</tbody>
</table>
A need exists within the natural resource community for an inexpensive and rapid technique to visualize and characterize aquatic habitat features in navigable waterways. The Humminbird® Side Imaging system (and a variety of other recreational-grade systems) allows users to quickly capture high-resolution, geo-spatially referenced images of underwater features. Unlike more expensive equipment, the low-cost systems employ a boat mounted transducer that allows for the survey of shallow environments. A growing number of tools exist for geoprocessing raw sonar data into sonar image maps, and for analyzing side scan sonar data. Sonar maps show underwater habitat in a spatial context and can be used within a GIS to map, measure and quantify features such as substrates, large woody debris, some aquatic fauna, and bathymetry. The potential fisheries applications for such detailed habitat maps are numerous and widespread, and the tools and techniques to develop such maps are now within reach natural resource professionals and their agencies/institutions.

Adam J. Kaeser, Ph.D.
Aquatic Ecologist
U.S. Fish and Wildlife Service
1601 Balboa Avenue
Panama City, Florida 32405
adam_kaeser@fws.gov
850-769-0552 ext. 244
WEDNESDAY – 25 JANUARY 2017

12:00 – 6:00  Meeting Registration
12:00 – 1:00  Presentation Loading
1:00 – 1:20  President’s Welcome

Session I – Stream Habitat
Moderator: Jeremiah Salinger, University of Arkansas at Pine Bluff
1:20 – 3:00 PM

1:20  An Evaluation of Continuous Monitoring Data for Assessing Dissolved-Oxygen in the Boston Mountains, Arkansas
Billy Justus*, Lucas Driver, Jessie J. Green, and Nathan Wentz

1:40  Longitudinal Movements Associated with Smallmouth Bass Spawning in an Intermittent Boston Mountain Stream
Jacob H. Martin* (S), and Charles J. Gagen

2:00  Habitat Use by Telemetered Alabama Shad (Alosa alabamae) during the Spawning Migration in the Lower Flint River, Georgia
Aaron Kern*

2:20  Fish-Habitat Associations in the Kings River, Arkansas
Chelsey Sherwood* (S), Ginny Adams, and Reid Adams

2:40  Status and Distribution of the Strawberry Darter in the Tributaries and Main Stem of the Strawberry River Drainage
Kyler B. Hecke* (S) and Steve E. Lochmann

3:00  BREAK – 20 Minutes

Session II – Fisheries Management
Moderator: Geoffry Spooner, University of Central Arkansas
3:20 – 5:00 PM

3:20  Investigating the Commercial Fishery of Lake Apanas, Nicaragua
Jason Olive*

3:40  Evaluating De Gray Lake Hybrid Striped Bass (Morone chrysops x saxatilis): A Species of Controversy
Sean Lusk* and Brett Hobbs
WEDNESDAY – 25 JANUARY 2017
Session II – Fisheries Management
Moderator: Geoffry Spooner, University of Central Arkansas
3:20 – 5:00 PM

4:00 Population Dynamics of Hybrid Striped Bass in Greers Ferry Lake, AR
Matthew L. Horton*, Matthew D. Schroeder, and Thomas R. Bly

4:20 Mitochondrial DNA Variation Reveals Significant Rangewide Genetic Heterogeneity in Paddlefish
Allison M. Asher*, James E. Garvey, and Edward J. Heist

4:40 Calcein Marking: A Non-Lethal Batch Marking Option for Stocking Evaluation
Greyson F. Farris* (S) and Steve E. Lochmann

5:00 – 6:00 Presentation Loading

6:00 – 7:00 Poster Session

7:00 – 9:00 Hamburger Bar/Scavenger Hunt

THURSDAY – 26 JANUARY 2017
Session III – Reservoir Management
Moderator: Michelle Furr, University of Central Arkansas
8:20 – 10:00 AM

8:20 Advanced Fingerling Largemouth Bass Survival and Contribution to Age-0 Cohort 90 Days Post-Stocking
Jeff Buckingham* and Colton Dennis

8:40 Effects of Length Based Regulations on Simulated Trophy Walleye Sander vitreus Fisheries
Anthony V. Fernando*

9:00 Spatial Distributions of Blue Catfish in Lake Dardanelle, and their Influence on Standardized Electrofishing Protocols
Zach Moran* (S) and Joseph N. Stoeckel

9:20 Post-Stocking Predation of Black Crappie and White Crappie in Arkansas Reservoirs
Andrew K. Porterfield* (S) and John R. Jackson

9:40 A Rare Uroglena Bloom in Beaver Lake, Arkansas, Spring 2015
Reed Green* and Brad Hufhines
THURSDAY – 26 JANUARY 2017

10:00 BREAK – 20 Minutes

Session IV – Fish Ecology
Moderator: Greyson Farris, University of Arkansas at Pine Bluff
10:20 – 12:00 PM

10:20 Historic Changes in Fish Assemblage Patterns in the Little Missouri River, Arkansas
Michelle E. Furr* (S), Ginny L. Adam¹, and S. Reid Adams

10:40 Attachment Site Selection and Size Selectivity of Chestnut Lampreys (Ichthyomyzon castaneus) on Rainbow Trout (Oncorhynchus mykiss) in Hatchery Raceways in Arkansas
Jeremiah M. Salinger* (S) and Ron Johnson

11:00 Retrospective Analysis of Fish Communities after Watershed Alteration in the Saline River, Arkansas
Aaron A. Burgad* (S), Ginny L. Adams, and Reid Adams

11:20 Asian Carp Effects on Age-0 Fish Dynamics in Oxbow Lakes of the Lower White River, Arkansas
Joseph Kaiser* (S), L. Lewis, A.N. Hitchcock, Jimmy Barnett, and M.A. Eggleton

11:40 Effects of Asian Carps on Native Fish Assemblages in Oxbow Lakes of the Lower White River, Arkansas
Cody J. Salzmann* (S), Billy G. Justus, Arthur N. Hitchcock, Jimmy Barnett, and Michael A. Eggleton

12:00 LUNCH – 1 Hour 20 Minutes
THURSDAY – 26 JANUARY 2017
Session V – Human Dimensions & Disturbance
Moderator: Brittany McCall, Arkansas State University
1:20 – 3:00 PM

1:20 Mangroves as Nurseries for Caribbean Coral Reef Fish? Maybe Not in the Us Virgin Islands
Richard S. Grippo* and Samantha Richter

1:40 Development and Implementation of a Physical, Chemical, and Biological Survey of Ouachita Mountain Ecoregion Streams
Kevin Schanke*, Jessie J. Green, Katie Rose, Tate Wentz and Jim Wise

2:00 Family and Community Fishing Program: A Successful Promotional Program in Arkansas
Maurice Jackson*

2:20 Persistence and Stability of Ozark Highland Fish Assemblages in Relation to Landscape and Local Variables
Heather Saco, Ginny Adams* and Reid Adams

2:40 Fish Changes to the Arkansas Wildlife Action Plan
Jeffrey W. Quinn*, Brian K. Wagner, and Jason Throneberry

3:00 BREAK – 20 Minutes

Session VI – Aquatic Invertebrates
Moderator: Brie Olsen
3:20 – 5:00 PM

3:20 Coldwater Crayfish Update and Future Plans
Brian K. Wagner*

3:40 Current Status and Habitat Use of the Foushee Cavesnail, Amnicola cora (Hydrobiidae) in Foushee Cave, Independence County, AR
Jason Throneberry* and Mike Slay

4:00 Migration Dynamics of Ohio Shrimp, Macrobrachium ohione, in Arkansas
Geoffry Spooner* (S), Lindsey Lewis, and Reid Adams

4:20 Mussel Restoration: Lessons Learned from Population Augmentations, Reintroductions and Habitat Restoration in Regulated Rivers
Kendall R. Moles*
THURSDAY – 26 JANUARY 2017
Session VI – Aquatic Invertebrates
Moderator: Brie Olsen
3:20 – 5:00 PM

4:40 Development of the Arkansas Center for Biodiversity Collections (ACBC) at Arkansas State University
Brook L. Fluker*, Travis D. Marsico, Stanley E. Trauth, John L. Harris, and Kari Harris

FRIDAY – 27 JANUARY 2017
8:00 – 9:00 Arkansas Alligator Gar Working Group Meeting
9:00 – 9:20 Break
9:20 – 11:20 Business Meeting
12:00 – 2:00 Past-Presidents’ Luncheon
MITOCHONDRIAL DNA VARIATION REVEALS SIGNIFICANT RANGEWIDE GENETIC HETEROGENEITY IN PADDLEFISH

Asher, Allison M.*, James E. Garvey, and Edward J. Heist

1Center for Fisheries, Aquaculture, and Aquatic Sciences, Southern Illinois University, Carbondale, IL 62901
allisonm.asher@gmail.com

We sequenced the complete mitochondrial DNA D-loop region of 576 Paddlefish from 18 sampling locations throughout the range of Paddlefish. In total, 50 unique haplotypes were observed, with 3 to 15 haplotypes per location. We found significant genetic heterogeneity among locations, with the majority of pairwise comparisons (124 of 171) significant at α=0.05 and 40% significant after a Bonferroni correction (α=0.0003). All pairwise comparisons with the Ozark Pool (AR) and Grand Lake (OK) of the Arkansas River drainage were significant. Additionally, all pairwise comparisons with the Ohio River drainage (Greenup Pool, WV, McAlpine Pool, KY, and Tennessee River, TN) were significant with the exception of two isolated gulf coast drainages, Bayou Nezpique (LA) and the Pascagoula River (MS). Comparisons of the Upper Missouri River in North Dakota, the Middle Mississippi River in Arkansas and Missouri, and the Red River in Louisiana and Oklahoma were not significant, indicating gene flow over large distances. The Mantel test for isolation by distance was not significant (r=0.068, P=0.268). Patterns of genetic structure in Paddlefish are shaped by dams, which isolate populations and increase genetic drift among populations, and past stocking practices, which transferred fish among rivers.

Oral – Student

INTENSIVE WHITE CRAPPIE (POMOXIS ANNULARIS) SPAWNING TECHNIQUES USED AT THE JOE HOGAN STATE FISH HATCHERY IN 2016

Baker, Chris*, Jason Miller, Chad Wicker, JJ Gladden

1Arkansas Game and Fish Commission, Lonoke, AR 72086
chris.baker@agfc.ar.gov

The standard stocking of pairs of adult aged crappie into a production pond has been used for years. The results are generally very inconsistent on fingerling length. The purpose of this study is to produce a known number of fry and to determine the appropriate stocking density to produce a consistent fingerling length of 4 inches. This helps with fingerling survival once they are stocked into public waters, as well as with producing the needed number of fish without requiring more pond acreage than what is needed to meet production requests.

Poster – Professional
ADVANCED FINGERLING LARGEMOUTH BASS SURVIVAL AND CONTRIBUTION TO AGE-0 COHORT 90 DAYS POST-STOCKING

Buckingham, Jeff *1 and Colton Dennis1

1Arkansas Game and Fish Commission, Hot Springs, AR 71913
jeffrey.buckingham@agfc.ar.gov

Supplemental stocking of Largemouth Bass (Micropterus salmoides) is a popular management tool for increasing numbers of age-0 bass in a population. Stocking success of fingerling Largemouth Bass is variable and can be impacted by fingerling size. In 2016, hatcheries in Arkansas experimented with different forages (Fathead Minnow, Bluegill, pellet feed) to grow Largemouth Bass fingerlings to an advanced-size (~80 mm). These advanced fingerlings were freeze-branded and stocked into four small Arkansas reservoirs (<700 acres) in September and October 2016. Each forage treatment received a unique brand mark to differentiate between treatments. Reservoirs were sampled via electrofishing 7, 30, 60, and 90 days post-stocking. Survival was estimated using a catch curve. Stocked age-0 bass were on average significantly larger than age-0 wild bass in two of the study lakes at the time of stocking. Fathead minnow treatment bass were significantly larger than the other treatments. The 90 day percent contribution was highly variable amongst study lakes and ranged from 0% to 86%. Average 90 day survival amongst the lakes was 43% and was similar for both wild and stocked bass. Our results will improve stocking strategies of fingerling Largemouth Bass in Arkansas and develop efficient strategies for hatcheries to grow fingerlings to a desired size.

Oral – Professional

RETROSPECTIVE ANALYSIS OF FISH COMMUNITIES AFTER WATERSHED ALTERATION IN THE SALINE RIVER, ARKANSAS

Burgad, Aaron A.*1, Ginny L. Adams1, and Reid Adams1

1Department of Biology, University of Central Arkansas, Conway, AR 72035
aburgad1@cub.uca.edu

Changes in fish communities can be gradual or abrupt after watershed alteration with no return towards earlier structure. The Saline River is one of the longest unregulated rivers in Arkansas (325 km), but anthropogenic activities (e.g., development, logging, and gravel mining) continue to influence fish communities, consequently driving community divergence. We quantified temporal changes in fish communities at six local stream reaches over multiple decades (period I [1969-1971], period II [1980-1982], and period III [2016]). At the broadest spatial scale, fish community composition significantly shifted (PERMANOVA: $P < 0.01$) through time, and similarity percentage analysis (SIMPER) identified a suite of species driving community divergence. Average community dissimilarity was greatest between period I and period III (SIMPER: average dissimilarity = 74%), and three species (Hybognathus nuchalis, Percina vigil-uranidea, and Notropis boops) each contributed to >8% total dissimilarity. Community trajectories in multivariate space at four local stream reaches revealed differences in responses with watershed position. Communities most downstream deviated the furthest from period I with no return towards earlier structure and communities upstream moved less through multivariate space. Our findings suggest fish communities have transitioned permanently to alternative community states after watershed alteration and communities downstream appear the most affected.

Oral – Student
RIFFLE AND RUN-POOL FISH ASSEMBLAGES IN THE CADRON CREEK WATERSHED

Burgad, Aaron A.*1, Jacob R. Waymack1, Chelsey R. Sherwood1, Ginny L. Adams1, and Reid Adams1
1Department of Biology, University of Central Arkansas, Conway, AR 72035
aburgad1@cub.uca.edu

We sampled fishes with seines in riffle and run-pool habitats at six stream reaches within the Cadron Creek watershed, central Arkansas, and examined longitudinal patterns in fish assemblage structure and compared riffle and run-pool fish assemblages. Ordination of fish assemblages in multivariate space revealed distinct differences in species abundance patterns between habitats and fish assemblage composition was significantly different (PERMANOVA: P = < 0.01). Both habitats showed strong longitudinal patterns in multivariate space. At the species level, Noturus exilis and Etheostoma flabellare were strongly associated with riffles, whereas Labidesthes sicculus, Fundulus olivaceus, Lepomis macrochirus, Lepomis megalotis, Lepomis microlophus, and Micropterus punctulatus were strongly associated with run-pool habitats. There was no difference in species richness between habitats, as indicated by overlapping 95% confidence intervals derived from individual-based rarefaction. Species richness increased with catchment area and showed patterns of species addition. We collected one Etheostoma histrio and this collection is noteworthy as this fish is rarely documented in Arkansas River Valley systems above the Fall Line other than the Fourche LaFave River. Our results suggest fish assemblage composition is significantly different between habitats and future monitoring at the mesohabitat scale can provide important insight into assemblage dynamics at smaller spatial scales.

Poster – Student

GENETIC STRUCTURE AND DIVERSITY OF DISJUNCT POPULATIONS OF RAINBOW DARTERS (ETHEOSTOMA CAERULEUM) AND SOUTHERN REDBELLY DACE (CHROSOMUS ERYTHROGASTER) THROUGHOUT THE MISSISSIPPI CORRIDOR.

Dineen, Kyle J.*1 and Brook L. Fluker1
1Department of Biological Sciences, Arkansas State University, Jonesboro, AR 72401
kyle.dineen@smail.astate.edu

Conservation studies of North America’s freshwater fish fauna mostly focus on recently fragmented species or species with naturally small ranges. Our grasp of how recent, natural isolation affects the migration and genetic diversity of common and widespread freshwater fishes is limited. Etheostoma caeruleum and Chrosomus erythrogaster are widespread, abundant, and have overlapping distributions with comparable patterns of naturally disjunct populations on their range margins. Both species have potentially isolated populations on Crowley’s Ridge, Arkansas and the Bluff Hills, Mississippi. These regions are relatively recent geological formations that would have been colonized by these species within the last 10,000 years making these species excellent subjects for studying the impacts of recent, natural genetic isolation. In this study, we analyze microsatellite DNA loci from both species to evaluate genetic diversity and connectivity among populations on Crowley’s Ridge, the Bluff Hills, and larger core populations. Using DNA sequence data, we also test hypotheses about the pattern and timing of colonization of Crowley’s Ridge and the Bluff Hills. The results of this study will provide valuable information about the biogeographic and demographic history as well as the conservation status of these potentially disjunct populations of E. caeruleum and C. erythrogaster.

Poster – Student
BODY SHAPE VARIATION WITHIN AND AMONG LINEAGES OF THE RAINBOW DARTER, *Etheostoma caeruleum*

*Driskill, Kandria N.*, Kyle J. *Dineen*, and Brook L. *Fluker*

1Department of Biological Sciences, Arkansas State University, Jonesboro, AR 72401  
kandria.driskill@smail.astate.edu

The Rainbow Darter (*Etheostoma caeruleum*) is distributed widely throughout the eastern United States, with several disjunct populations in the lower Mississippi River drainage. An unpublished morphological study of *E. caeruleum* suggested several potentially distinct species in the White River drainage and in tributaries of the lower Mississippi River drainage. However, published phylogeographic studies are not concordant with morphological data. This study used geometric morphometrics to evaluate body shape differences of *E. caeruleum* across its range. Specifically, we asked whether differences in body shape corresponded to previously identified lineages or putative species based on meristic data. Preliminary results based on populations from loess habitats of Crowley’s Ridge in Arkansas (St. Francis River drainage) and upland habitats of the Ozark Highlands (White River drainage) revealed some overlap in body shape between distinct lineages. However, disjunct populations from Crowley’s Ridge were somewhat differentiated from other populations based on the distinction of the nuchal hump. Results from this study will provide valuable information about the distinctiveness of potentially unrecognized diversity within *E. caeruleum*.

Poster – Student

CALCEIN MARKING: A NON-LETHAL BATCH MARKING OPTION FOR STOCKING EVALUATION

*Farris, Greyson F.* and Steve E. *Lochmann*

1Department of Aquaculture and Fisheries, University of Arkansas at Pine Bluff, AR 71601  
farrisg5848@uapb.edu

Chemical marking provides a mechanism for identifying hatchery fish in stocking programs. Calcein has advantages over other chemicals. We examined salinities for the osmotic induction of White Crappie and Black Crappie. Experiments consisted of a 3.5-min immersion of five fish in 1 L of solution at salinities ranging from <1 to 50 ppt. Immediate and 24-h mortalities were 0.0% and 0.0—13.0%, respectively for Black Crappie. Similarly, immediate and 24-h mortalities were 0.0% and 0.0—27.0%, respectively for White Crappie. We examined dunking density (kg of fish/L) to maximize efficiency during the marking process. Fish were confined at densities ranging from 0.016-0.250 kg/L in 1L of water for 7 min. Immediate and 24-h mortalities were 0.0% and 0.0—3.0%, respectively for Black Crappie and 4—23% and 8—23%, respectively for White Crappie. Ninety-six thousand Black Crappie and eighty-six thousand White Crappie were calcein marked during fall 2015 at 40 ppt and 0.25 kg/L. Twenty four hour survival of Calcein-marked Black Crappie and White Crappie was 99.5% and 99.6%, respectively. Stocking contribution calculated from trap net efforts for Black Crappies at age-1 ranged from 3.0—4.0%, and 0.6—100.0% at age-1 for White Crappies.

Oral – Student
EFFECTS OF LENGTH BASED REGULATIONS ON SIMULATED TROPHY WALLEYE FISHERIES

Sander vitreus fisheries

Fernando, Anthony V.*

1Arkansas Game and Fish Commission, Russellville, AR 72802
anthony.fernando@agfc.ar.gov

Anglers in Saskatchewan (Canada) targeting trophy walleye Sander vitreus have advocated province-wide adoption of protected-slot limits (PSLs). Life history data are not available for most Saskatchewan walleye populations. To assess the general effects of PSLs and minimum length limits (MLLs) on trophy-producing walleye fisheries, an equilibrium Yield per Recruit model (YPR) and an individual-based model (IBM) incorporating variable recruitment were parameterized using life history data from 22 North American trophy-producing walleye populations. Using the YPR model, yield and weighted-yield (favoring trophy fish) were evaluated for all MLLs and PSLs between 250-750 mm (with 10 mm increments), under combinations of low (0.1), moderate (0.25), or high (0.4) natural and fishing mortalities. The IBM was run unfished for 1,000 years and fished for 500 years with the same combinations of natural mortality, fishing mortality, and regulations (with 100 mm increments), determining equilibrium yield, equilibrium weighted-yield, and time to reach equilibrium for each regulation. Both models always suggested MLLs over PSLs as optimal regulations for maximizing yield, but varied in optimal regulations for maximizing weighted-yield. The IBM took 11.4 ± 39.1 years (mean ± SD) to reach equilibrium suggesting long-term monitoring is needed to assess effects of new regulations on trophy walleye fisheries.

Oral – Professional

DEVELOPMENT OF THE ARKANSAS CENTER FOR BIODIVERSITY COLLECTIONS (ACBC) AT ARKANSAS STATE UNIVERSITY

Fluker, Brook L.*

1Department of Biological Sciences, Arkansas State University, Jonesboro, AR 72401
bfluker@astate.edu

The natural history collections at Arkansas State University (A-State) started with a small collection of plant specimens in 1946 and have since grown to eight collections and >500,000 specimens. The collections represent a significant record of biodiversity for the State of Arkansas, but have suffered in recent decades from overcrowding and neglect, resulting in inefficient and limited use and specimen degradation in some cases. A recently funded NSF grant will assist with the development of the Arkansas Center for Biodiversity Collections (ACBC) on the A-State campus. The goals of this project are as follows: (1) alleviate overcrowding and increase room for growth through installation of high-density storage systems and new cabinetry; (2) secure collections through improved storage media and labeling; (3) complete the digitization of specimen data and provide public access to all collection data; and (4) develop a significant outreach program by providing collections-based workshops and tours of ACBC displays and collections. The long-term goal of the ACBC is to serve as a unified, accessible specimen repository and research center for the State of Arkansas, including the Interior Highlands, Upper Mississippi Alluvial Plain, and Crowley’s Ridge ecoregions.

Oral – Professional
HISTORIC CHANGES IN FISH ASSEMBLAGE PATTERNS IN THE LITTLE MISSOURI RIVER, ARKANSAS

Furr, Michelle E.*, Ginny L. Adams¹, and S. Reid Adams¹
¹Department of Biology, University of Central Arkansas, Conway, AR, 72035
mfleming4@uca.edu

Long-term data sets are required to understand links between land use change and persistence and stability of fish assemblages. Fish surveys conducted in the 1970s and 1980s by students from University of Louisiana at Monroe were available to begin examining changes in fish assemblages in the Little Missouri River watershed. Jaccard Index, Morisita-Horn Index, and Bray-Curtis Index were used to determine similarity between historic and current fish assemblages. Fish assemblages between time periods had low to moderate similarity based on three indices (Jaccard’s: 0.44, Morisita-Horn: 0.51, Bray-Curtis: 0.43). Micropterus punctulatus increased in frequency of occurrence across sites by 75% in the Little Missouri River from early 1970s to 2016. Similarly, Lepomis megalotis increased by 42%, Etheostoma blennioides 25%, Lepomis cyanellus 33%, and Hybognathus nuchalis 17%. Etheostoma collettei decreased in frequency of occurrence by 33% and Etheostoma chlorosoma by 25%. There was an apparent increase in lowland, pool-adapted species across the 12 study sites. Fish assemblage similarity was negatively correlated with development and agricultural land use (rho= -0.57 and -0.25, p>0.05) and positively correlated with forested land use (rho=0.34, p>0.05). Moving forward, we will use environmental variables to evaluate changes in fish assemblage patterns in the Little Missouri River.

Oral – Student

A RARE UROGLENA BLOOM IN BEAVER LAKE, ARKANSAS, SPRING 2015

Green, Reed*¹ and Brad Hufhines²
¹USGS Lower Mississippi-Gulf Water Science Center, Little Rock, AR 72211
²Beaver Water District, Lowell, AR 72745
wrgreen@usgs.gov

A combination of factors triggered a Uroglena volvox bloom and taste and odor event in Beaver Lake, a water-supply reservoir in northwest Arkansas, in late April 2015. Factors contributing to the bloom included increased rainfall and runoff containing increased concentrations of dissolved organic carbon, followed by a stable pool, low nutrient concentrations, and an expansion of lake surface area and littoral zone. This was the first time U. volvox was identified in Beaver Lake and the first time it was recognized as a source of taste and odor. Routine water quality samples happened to be collected by the US Geological Survey and the Beaver Water District throughout the reservoir during the bloom—. Higher than normal rainfall in March 2015 increased the pool elevation in Beaver Lake by 2.3 m (by early April), increased the surface area by 10%, and increased the littoral zone by 1214 ha; these conditions persisted for 38 days, resulting from flood water being retained behind the dam. Monitoring programs that cover a wide range of reservoir features, including dissolved organic carbon, zooplankton, and phytoplankton, are valuable in explaining unusual events such as this Uroglena bloom.

Oral – Professional
MANGROVES AS NURSERIES FOR CARIBBEAN CORAL REEF FISH? MAYBE NOT IN THE US VIRGIN ISLANDS

Grippo, Richard S.*1 and Samantha Richter’
1Department of Biological Sciences, Arkansas State University, Jonesboro, AR 72401
rgrippo@astate.edu

Coral reefs support the highest diversity of fish on the globe and are of great ecological interest and economic value to tourists, including Arkansans. A recently discovered factor supporting high biodiversity on coral reefs is the use of shoreline mangrove forests as nurseries for coral reef fishes, with the juvenile reef fishes hiding in the tangled prop-roots. This phenomenon has been documented on Indo-Pacific reefs, but not yet on Caribbean reefs. We tested whether fish populations on reefs nearer to mangroves forests (<2 km away) were more similar to mangrove fish populations than on reefs at further distances (>5 km away) and thus indicate a supportive relationship between mangroves and corals. Surveys of fish populations on St. John, US Virgin Islands were conducted at mangrove sites, ‘near reef’ sites, and ‘far reef’ sites. Similarity, biodiversity, and species richness indices were calculated and compared among the three types of sites. There were no statistically significant differences found in similarity and diversity among the sites, but species richness in the far sites was significantly higher than the mangrove sites. Our results do not support the mangroves as coral reef nurseries hypothesis and suggest other influences on fish populations on Caribbean coral reefs.

Oral – Professional

STATUS AND DISTRIBUTION OF THE STRAWBERRY DARTER IN THE TRIBUTARIES AND MAIN STEM OF THE STRAWBERRY RIVER DRAINAGE

Hecke, Kyler B.*1 and Steve E. Lochmann’
1Department of Aquaculture and Fisheries, University of Arkansas at Pine Bluff, AR 71601
heckek5732@uapb.edu

The Strawberry Darter Etheostoma fragi is endemic to the Strawberry River drainage and was recently elevated to the species level. A status survey was conducted during the summers of 2015 and 2016. Sixty-four (32 each summer) sites were sampled within the Strawberry River drainage, 32 on the main stem and 32 on tributaries. Sites were surveyed 4 times each throughout each summer using a kick-seine. A total of 236 E. fragi were encountered during both summers. E. fragi were observed at 24 of 64 sites, including 15 tributary sites and 9 main stem sites. Data was analyzed using the software Presence, which estimates occupancy rate and probability of detection. A drainage-wide occupancy rate was estimated to be (mean± standard error) 0.41 ±0.06 and a probability of detection was estimated to be 0.56 ±0.06. Site type (mainstem, tributary) was used in a second model, where an occupancy of 0.30 ±0.09, and a probability of detection of 0.49 ±0.09 for main stem sites were estimated. At tributary sites, an occupancy of 0.51 ±0.09 and a probability of detection of 0.60 ±0.06 were estimated. Occupancy rate appears to be higher in tributaries than the main stem. Compared to an occupancy rate based on historical data (0.73 ±0.11), the current occupancy (0.41 ±0.06) of sites appears to be lower lower. This data may now be used to determine what conservation measures should be taken to preserve this species.

Oral – Student
Population Dynamics of Hybrid Striped Bass in Greers Ferry Lake, AR

Horton, Matthew L. 1, Matthew D. Schroeder1, and Thomas R. Bly1

1Arkansas Game and Fish Commission, Mayflower, AR 72106
matthew.horton@agfc.ar.gov

Little has been reported on Hybrid Striped Bass (Morone chrysops X Morone saxatilis) populations in Arkansas, where they have been cultured and stocked by the Arkansas Game and Fish Commission since the 1970s. Greers Ferry Lake, a 13,355 ha, multipurpose, United States Army Corps of Engineers reservoir, is home to the 27 lb. 5 oz. world record Hybrid Striped Bass. Greers Ferry’s hybrid striped bass population was evaluated with multiple gear types, in 2014 and 2015. Mean relative weight was estimated to be 77. Additionally, relative weights were negatively correlated with the number of Hybrid Striped Bass and number of year classes per 25.4-mm length group. Fifteen year classes of fish were obtained from the 141 fish collected by all sampling gears. Total annual mortality was estimated to be 28% with a theoretical maximum age of 13. Relative to other Hybrid Striped Bass populations in the southeastern United States, Greers Ferry’s population exhibit slower growth and greater longevity, but share a similar growth trajectory. Hybrid Striped Bass have not been stocked since 2015 due to the overall poor condition of sportfish species and apparent loss of the Threadfin Shad population. Future management of this species is currently being evaluated.

Oral – Professional

Family and Community Fishing Program: A Successful Promotional Program in Arkansas

Jackson, Maurice1

1Family and Community Fishing Program, Arkansas Game and Fish Commission, Little Rock, AR 72205
maurice.jackson@agfc.ar.gov

Citizens of the Natural State have always valued its unique natural landscape, lakes, and wildlife. In order to insure Arkansas’s great beauty, the decision was made to help fund the efforts of the Arkansas Game and Fish Commission (AGFC) with the 1/8 cent sales tax. The effort began with getting families out to fish during the 70’s, when AGFC would host community fishing events in a pond that was previously behind the State capital. Large groups would come and fish in the pond that was stocked by AGFC’s hatcheries. Since then, a parking lot now covers the pond behind the capital but what spawned from a once yearly event produced the current AGFC’s Family and Community Fishing Program (FCFP). Arkansas is unique because the state has additional funds for fish and wildlife management and enhancement projects. Some of AGFC’s projects include providing fish to more than 30 FCFP locations, promoting fishing by targeting children in schools, and offering community fishing events which target families. The inception of the 1/8 cent sales tax has allowed a generation of Arkansans to be exposed to fishing and fishing related programs. In order to reach out to the next generation, a marketing expert was recently hired to assist AGFC’s efforts in increasing the public interest in fishing. This presentation will focus on AGFC’s past techniques used to get communities involved in FCFP and will present initiatives underway to expand FCFP’s impact zone, and continue to increase public interest in the outdoors and fishing.

Oral – Professional
AN EVALUATION OF CONTINUOUS MONITORING DATA FOR ASSESSING DISSOLVED-OXYGEN IN THE BOSTON MOUNTAINS, ARKANSAS

Justus, Billy*, Lucas Driver¹, Jessie Green², and Nathan Wentz²
¹USGS Lower Mississippi-Gulf Water Science Center, Little Rock, 72211
²Arkansas Department of Environmental Quality, 5301 Northshore Dr. North Little Rock, AR 72118
bjustus@usgs.gov

Continuous (or near-continuous) water-quality monitoring data can be more useful for assessing the degree of variability over space and time than data collected periodically at discrete points in time. We assessed continuous dissolved-oxygen (DO) data collected at five USGS monitoring sites to evaluate assessment methodology that Arkansas applies to Boston Mountains streams with watersheds >10 mi² (i.e. streams are listed as impaired when more than 10% of the DO measurements are less than 6 mg/L). We evaluated data for periods of record available when stream temperatures exceeded 22° C, which Arkansas considers to be the “critical season”, from 2013 to 2015. Our results indicated that current assessment methodology for the Boston Mountains is effective at identifying streams with various degrees of impairment. The two sites designated as least disturbed by nutrient and land use indices exceeded the Arkansas DO standard for <4% of unit values (measurements), while the three sites that were moderately and most disturbed exceeded the 6 mg/L standard for 20 to 33% of unit values. Our analysis also demonstrated the importance of other continuous constituents such as pH and specific conductance for indicating the degree that factors such as photosynthetic processes and groundwater interactions influence DO concentrations.

Oral – Professional

ASIAN CARP EFFECTS ON AGE-0 FISH DYNAMICS IN OXBOw LAKES OF THE LOWER WHITE RIVER, ARKANSAS

Kaiser, Joseph E.*¹, Lindsey Lewis², Arthur N. Hitchcock³, Jimmy Barnett¹, and Michael A. Eggleton¹
¹Department of Aquaculture and Fisheries, University of Arkansas at Pine Bluff, AR 71601
²U.S. Fish and Wildlife Service, Conway, AR 72032
³U.S. Fish and Wildlife Service, St. Charles, AR 72140
⁴Arkansas Game and Fish Commission, Little Rock, AR 72205
kaiserj0724@uapb.edu

Asian carps (Silver Carp Hypophthalmichthys molitrix and Bighead Carp H. nobilis) have become highly abundant in the lower White River within the past decade. The effects of Asian carp densities and biomass approaching saturation levels and the cumulative effects of compounding year classes on native fish recruitment and growth are essentially unknown. Asian carps have been purported to have negative ecological impacts on native fisheries both in the U.S. and other areas of the world where introductions have occurred. In some areas, commercial fisheries have declined following Asian carp establishment. However, research on the effects of Asian carp invasions and establishment in Arkansas are mostly lacking. In addition, Asian carp effects are suspected to be more significant on juvenile fishes because of their planktivorous feeding habits. This proposed study aims to assess the effects of Asian carp establishment on age-0 fish dynamics, using previously studied lower White River oxbow lakes as study areas. The particular species of interest are expected to include two predators, two planktivores, and two omnivores. This study represents a logical first step preceding future studies concerning carp bioenergetics and more detailed experimental studies of interactions between carps and native fishes.

Oral – Student
HABITAT USE BY TELEMETERED ALABAMA SHAD (*ALOSA ALABAMAE*) DURING THE SPAWNING MIGRATION IN THE LOWER FLINT RIVER, GEORGIA

*Kern, Aaron*\(^1\)

\(^1\)Arkansas Game and Fish Commission, Camden, AR 71711
aaron.kern@agfc.ar.gov

The Alabama Shad (*Alosa alabamae*) is an anadromous clupeid that lives in the northern Gulf of Mexico and ascends freshwater rivers in spring to spawn. Populations have experienced substantial range-wide declines due to habitat alteration and the largest known population of Alabama Shad is found in the Apalachicola River in northwest Florida. To assess movement during the spawning migration, 250 Alabama Shad were fitted with transmitters and transported upstream of Jim Woodruff Lock and Dam during 2010-2014. The 153 relocations from 126 individual fish revealed congregation areas that were suspected to be spawning locations. Alabama Shad appeared to be selecting for Limerock Boulder substrate, avoiding Limerock Fine and Rocky substrates, and using Sandy substrate in the same proportion as its availability. All Limerock Boulder substrate areas on the lower Flint River were identified to focus future efforts to determine exact spawning locations.

Oral - Professional

ENVIRONMENTAL DNA VS. TRADITIONAL SAMPLING: A CASE STUDY USING THE FEDERALLY THREATENED LEOPARD DARTER, *PERCINA PANTHERINA*

*Lee, Taylor K.*\(^1\) and *Brook L. Fluker*\(^1\)

\(^1\)Department of Biological Sciences, Arkansas State University, Jonesboro, AR, 72401
taylor.lee@smail.astate.edu

Traditional methods may not always be reliable when searching for rare species. However, the recent development of environmental (e)DNA techniques represents a valuable tool to help counteract inefficiency associated with traditional sampling. One example for which eDNA may be valuable in the detection of a rare species of fish is the Leopard Darter, *Percina pantherina*. Traditional sampling has failed to detect *P. pantherina* in the Robinson Fork since 2006 and in the Cossatot River since 2011. The objectives of this project are as follows: 1. compare the effectiveness of eDNA water and substrate sampling techniques; 2. compare potential differences in detectability of *P. pantherina* between eDNA, and traditional methods; and 3. determine if there are extant populations of *P. pantherina* in the Cossatot River and Robinson Fork. Species-specific primers that amplify a fragment of the cytochrome b gene were designed and revealed a high degree of specificity for *P. pantherina*. Using PCR, these primers were used to test detectability of *P. pantherina* from eDNA samples. Traditional sampling during 2016 resulted in zero detection of *P. pantherina* within our focal systems. Preliminary eDNA results suggested possible positive hits for *P. pantherina* in both winter and spring samples from 2016.

Poster – Student
EVALUATING DE GRAY LAKE HYBRID STRIPED BASS (*MORONE CHRYSOPS X SAXATILIS*): A SPECIES OF CONTROVERSY

*Lusk, Sean* and *Brett Hobbs*

1Arkansas Game and Fish Commission, Hot Springs, AR 71913

sean.lusk@agfc.ar.gov

In Arkansas, Hybrid Striped Bass (*Morone chrysops x saxatilis*) have been stocked into numerous reservoirs to provide anglers with an additional sport fishing opportunity and to control Gizzard Shad (*Dorosoma cepedianum*) populations. Although Hybrid Striped Bass are sought after by some angle groups, recent creel survey results indicate that few anglers directly target Hybrid Striped Bass. Over the past couple decades many angler groups in Arkansas have developed animosity towards Hybrid Striped Bass claiming that hybrids are becoming overly abundant, in waters where they’re stocked, and are having negative impacts on other sport fish. More recently, Hybrid Striped Bass have been associated with conflicts on two major reservoirs in Arkansas. In response to these conflicts the Arkansas Game and Fish Commission has taken a special interest in the stocking of Hybrid Striped Bass.

Oral - Professional

LONGITUDINAL MOVEMENTS ASSOCIATED WITH SMALLMOUTH BASS SPAWNING IN AN INTERMITTENT BOSTON MOUNTAIN STREAM

*Martin, Jacob H.*, and *Charles J Gagen*

1Department of Biological Sciences, Arkansas Tech University, Russellville, AR 72801

jmartin86@atu.edu

Smallmouth Bass (*Micropterus dolomieu*) are an important sportfish and top predator in Arkansas’ Boston Mountain streams. In this ecoregion, Smallmouth Bass are common in headwater streams that are prone to drying during the summer months. Our objectives were to characterize longitudinal movements of adult Smallmouth Bass and to determine the timing of spawning events along with environmental variables during the likely spawning months of June and July. Thirty Smallmouth Bass were captured and implanted with radio transmitters in March and tracked weekly in the Illinois Bayou until August 2016. Young-of-the-year (YOY) Smallmouth Bass were collected using electrofishing from May through August 2016 and otoliths were used to back-calculate spawn date. Stream discharge and water temperature were measured during the tracking period. The proportion of individuals that moved over 100 m/wk was at its highest during April and May, where about 50% of individuals moved over 100 m, prior to the presumptive spawning peak and this proportion gradually declined to 13% through July and August. We attributed the reduced movement to reduced surface streamflow in portions of the river which tended to restrict fish to remaining isolated pools. Minimum daily water temperature was inversely correlated to movement (*p* ≤ 0.01, *r*=0.79). Peak spawning success in this system occurred during 10 days in early June indicating that spawning was likely a pulse event rather than prolonged. The majority of spawning occurred during low flow and at temperatures between 18 °C and 25 °C. We found no significant difference between net longitudinal movements before, during, or after spawning events (*X²* =0.46, d.f. 1, *p*=0.54).

Oral – Student
SPATIOTEMPORAL POPULATION DYNAMICS OF THE CADDO MADTOM (*NOTURUS TAYLORI*)

*McCall, Brittany L.*, and *Brook L. Fluker*¹

¹Department of Biological Sciences, Arkansas State University, Jonesboro, AR, 72401
brittany.mccall@smail.astate.edu

The Caddo Madtom (*Noturus taylori*), an endemic to the Ouachita Mountain Ecoregion, was one of 404 species petitioned for listing on the Endangered Species Act by the Center for Biological Diversity. A previous survey stressed concerns of a population decline with evidence of small effective population sizes, historical between-drainage differentiation, and recent reservoir-induced within drainage differentiation. With microsatellite DNA loci, mitochondrial (mt) cytochrome *b* DNA sequence data, and intensive seasonal sampling we test multiple hypotheses involving patterns of within and among drainage connectivity, spatiotemporal population dynamics, and habitat preferences. Preliminarily, Bayesian phylogenetic analysis of mtDNA using coalescent models resolve the Caddo and Ouachita river drainages as reciprocally monophyletic with recent divergence in the late Pleistocene (approx. 125,000 years ago). The microsatellite data suggest a similar pattern of significant between drainage differentiation (*F*ₚₛ = 0.14). Of 15 historical localities, 11 have been thoroughly sampled for presence/absence, and 8 of 11 localities were successful. Five of the 15 historical localities had an average increase in relative abundance from spring to summer with 0.29 to 9.05 in the Caddo River and 0.09 to 4.75 in the Ouachita River. Results from this study will aid in future listing decisions by state and federal agencies.

Poster – Student

MUSSEL RESTORATION: LESSONS LEARNED FROM POPULATION AUGMENTATIONS, REINTRODUCTIONS AND HABITAT RESTORATION IN REGULATED RIVERS

*Moles, Kendall R.*, ¹

¹Arkansas Game and Fish Commission, Little Rock, AR 72205
kendall.moles@agfc.ar.gov

Mussel populations are in a precipitous decline throughout much of the southeastern United States; several species have gone extinct, numerous populations have been extirpated, and other populations are but a remnant of what they once were. The fragmentation of mussel populations mandates an active approach for their conservation and restoration. Consequently, restoration of mussel populations is a priority for many state and federal agencies. Some of the tools necessary for restoration are available. However, identification and restoration of suitable habitats for augmenting or reintroducing mussels has not kept pace with the development of culture techniques and identification of donor populations for translocation. In some instances, the success or failure of restoration projects were dependent on subtle differences in physiology and behavior of mussel species. There is a critical need for an objective evaluation of existing habitat, identification of the factors involved in the local demise of mussel populations and most importantly, amelioration of these factors. If mussel conservation is to succeed in altered systems, we must closely match species physiology and behavior with the modified habitats to insure the highest probability of success.

Oral – Professional
SPATIAL DISTRIBUTIONS OF BLUE CATFISH IN LAKE DARDANELLE, AND THEIR INFLUENCE ON STANDARDIZED ELECTROFISHING PROTOCOLS

Moran, Zach* and Joseph N. Stoeckel†

1Department of Biological Sciences, Arkansas Tech University, Russellville, AR 72801
zmoran@atu.edu

Fisheries scientists have recently focused on creating standardized low-frequency electrofishing procedures for sampling Blue Catfish Ictalurus furcatus. Current procedures do not account for spatial distributions. This can result in inefficient sampling because Blue Catfish are a highly mobile predator that cluster in pelagic habitats. We compared telemetry data from 23 large (774-1040mm) and 20 small (560-700mm) Blue Catfish, to electrofishing data collected via a systematic random sampling design to determine how capture rates were related to the habitats occupied by the acoustically-tagged fish. We divided Lake Dardanelle, Arkansas (17,806 hectares) longitudinally into a lacustrine, transition, and riverine section, and collected 8,029 Blue Catfish in 456 samples taken from channel edge, main channel, adjacent flat, and wing dyke habitats. The majority of Blue Catfish were captured on channel edge habitats (N= 3,731), while main channels (N=2,231), and wing dykes (N=1,642) were also significant producers of fish. In proportion to available habitats, Blue Catfish selected for deep (> 6 m) channel edges in the lacustrine and transition zones, and current seams near wing dyke scour holes in the riverine sections. We determined that Blue Catfish congregate in habitats that offer relief from high current and sunlight while also providing an abundance of food items. Sampling deep channel edge habitats in lacustrine and transition zones, and wing dykes in the riverine section of Lake Dardanelle led to the highest sampling efficiency of both large, and small fish.

Oral – Student

INVESTIGATING THE COMMERCIAL FISHERY OF LAKE APAÑAS, NICARAGUA

Olive, Jason*

1Arkansas Game and Fish Commission, Camden, AR 71730
jason.olive@agfc.ar.gov

Lake Apanas, a ~ 5,200 ha impoundment of the Tuma River in the mountains of northern Nicaragua, was constructed in 1964 for hydropower generation. The CentroAmerica power plant is one of only two large-scale hydroelectric projects in Nicaragua, and produces approximately 10% of the electricity used in the country. The primary source of income for eight communities surrounding the reservoir is artisanal (small scale commercial) fishing. Non-native Tilapia (Oreochromis niloticus and mossambicus) make up the majority of the catch, with native Guapote and Mojarra spp. serving as highly desired bycatch. Most of the mountainous watershed is planted with vegetables or coffee, and sedimentation appears to be a problem. Local fishers only have access to and the financial resources to acquire very rudimentary equipment, and although the communities have been fishing this lake for at least two generations, their methods appear to be largely ineffective. With that being the case, there is a question of whether low catch rates are related to a low population density or ineffective gear/methods. Nicaragua is the second poorest country in the Western Hemisphere; and their national fisheries management agency, INPESCA, has limited capacity to manage inland fisheries. The Nicaragua Inland Fisheries Development Foundation was established to help address issues related to sustainable development of robust inland commercial fisheries, starting with Lake Apanas.

Oral – Professional
POST-STOCKING PREDATION OF BLACK CRAPPIE AND WHITE CRAPPIE IN ARKANSAS RESERVOIRS

Porterfield, Andrew K.*1 and John R. Jackson1

1Fisheries and Wildlife Science Program, Arkansas Tech University, Russellville, AR 72801
aporterfield1@atu.edu

Supplemental stocking has been widely used by state agencies as a management tool for White Crappie Pomoxis annularis and Black Crappie P. nigromaculatus. While previous studies have quantified contribution of stocked crappie to wild populations, little information exists on factors that impact survival of stocked crappie. Our goal was to evaluate post-stocking mortality due to predation and changes in spatiotemporal predator relative abundance. Seven medium-sized (113-223 ha) reservoirs throughout Arkansas were stocked once at a single location during November or December 2015. Three reservoirs were stocked with Black Crappie and four reservoirs were stocked with White Crappie. Fish were marked with calcein in the hatchery and were identified with a BlueStar light. Each reservoir was sampled once 13-23 days prior to stocking, once 4-8 hours post-stocking, and once 10-14 days post-stocking using a boat-mounted electrofisher at night. Four consecutive 200 m shoreline segments on both sides of the stocking point were sampled. All observed predation losses occurred the night of stocking with Largemouth Bass Micropterus salmoides and Spotted Bass M. punctulatus accounting for all but three occurrences. Estimated predation losses ranged from 0-5% across the reservoirs. Of the bass with crappie in their stomachs, 79% were collected within 200 m of the stocking point. Frequency of bass in this section that had consumed crappie ranged from 0-100% across the reservoirs. Analysis of bass CPUE data revealed no significant interaction between sample date and shoreline segment, indicating that stocking events did not influence predator movement beyond 200 m.

Oral – Student

FISH CHANGES TO THE ARKANSAS WILDLIFE ACTION PLAN

Quinn, Jeffrey W.*, Brian K. Wagner2, and Jason Throneberry3

1Arkansas Game and Fish Commission, Mayflower AR 72106
2Arkansas Game and Fish Commission, Benton, AR 72105
3Arkansas Natural Heritage Commission, Little Rock, 72201
jeffrey.quinn@agfc.ar.gov

The Arkansas Game and Fish Commission revised the Arkansas Wildlife Action plan during 2015 (http://www.wildlifearkansas.com/strategy_2015.html), and this plan describes the Species of Greatest Conservation Need (SCGN) that may receive funding through the State Wildlife Grant Program. In this presentation, we review the State Wildlife Grant Program, how species were added and removed from the list, recent changes to the list of SGCN, and high-priority conservation issues that were identified. A total of 66 fish species were listed as SGCN. Twenty-one were added and three were removed. Most species added to the plan were infrequently collected, but some were newly described species. Leopard Darter Percina pantherina, Least Darter Etheostoma microperca, and Beaded Darter Etheostoma clinton are examples of highly-imperiled species with unique conservation challenges. Climate change may have unknown impacts on SCGN fishes. Thermal tolerances are generally unknown for SCGN species, and baseline stream temperature data are generally unavailable for many rivers. The 2015 plan will be used to prioritize projects that will receive State Wildlife Grant funding over the next decade.

Oral – Professional
Studies examining relationships between land use and fish assemblage persistence and stability are rare but necessary to understand associations at multiple temporal and spatial scales. We examined persistence and stability over 32–43 years in four streams in the Ozark Highlands by repeating previous surveys. Sites located within smaller catchments (<120 km²) exhibited the lowest and most variable persistence and stability suggesting smaller catchments were more vulnerable across time. Within smaller catchments, assemblage persistence was significantly correlated to both forest (rho = 0.43) and pasture (-0.47) and weakly correlated with urban (-0.41) land use; in contrast, persistence in larger catchments was only significantly correlated with urban (-0.78) land use. Stability was significantly correlated to pasture (-0.42) land use in small catchments and was not significantly correlated with land use in larger catchments. Seven species showed significant range expansions across all four systems, and one species, Micropterus dolomieu, exhibited a range reduction (from 20 to four sites). At sites where Micropterus dolomieu was missing, we observed colonization of Micropterus punctulatus and M. salmoides. An apparent downstream shift of headwaters species was detected in two systems and suggests a change in upstream hydrology. In-stream habitat reflected changes in land use and may provide proximate factors that explain the correlation between assemblage shifts and land use.

Oral – Professional

ATTACHMENT SITE SELECTION AND SIZE SELECTIVITY OF CHESTNUT LAMPREYS (ICHTHYOMYZON CASTANEUS) ON RAINBOW TROUT (ONCORHYNCHUS MYKISS) IN HATCHERY RACEWAYS IN ARKANSAS

Salinger, Jeremiah M. #1,2 and Ron Johnson 2
1Department of Aquaculture and Fisheries, University of Arkansas at Pine Bluff, AR 71601
2Department of Biological Sciences, Arkansas State University, Jonesboro, AR 72401
salingerj4692@uapb.edu

In North America, the invasive sea lamprey (Petromyzon marinus) has been well-studied due to its high ecological impact at the expense of parasitic lampreys native to the continent. The present study attempts to bridge some of that knowledge gap by examining attachment site selection and size-selectivity of the native chestnut lamprey (Ichthyomyzon castaneus) on rainbow trout (Onchorhynchus mykiss) in a hatchery setting. Data were analyzed using a Fisher’s exact test and one-tailed relativized t-tests in R v.3.0.2. Attachment site selection was found to be non-random, with 95% of attachments being dorsal. Data for attachment site selection are consistent with those of previous studies of chestnut, western river (Lampetra ayresii), Arctic (Lethenteron camtschaticum), and European river (L. fluviatilis) lampreys, and inconsistent with data from studies of sea, silver (I. unicuspis), and Pacific lampreys (Entosphenus tridentatus). Chestnut lampreys in this setting were found to be negatively size-selective for host standard length and non-selective for host mass. These findings are largely inconsistent with those of previous studies of size-selectivity by parasitic lampreys. Further research into attachment site selection by this species should be done in a field setting, and additionally examine the effect of host species on attachment site selection. The negative selectivity exhibited by the chestnut lampreys in this study may be explained by a trade-off between risk of bodily harm to the lamprey from collision with abrasive substrates and maximizing blood meal intake from a host.

Oral – Student
EFFECTS OF ASIAN CARPS ON NATIVE FISH ASSEMBLAGES IN OXBOY LAKES OF THE LOWER WHITE RIVER, ARKANSAS


1Department of Aquaculture and Fisheries, University of Arkansas at Pine Bluff, AR 71601
2USGS Lower Mississippi-Gulf Water Science Center, Little Rock, AR 72211
3U.S. Fish and Wildlife Service, St. Charles, AR 72140
4Arkansas Game and Fish Commission, Little Rock, AR 72205
salzmac5384@uapb.edu

Population ranges of Silver Carp Hypopthalmichthys molitrix and Bighead Carp H. nobilis (Asian carps) have grown tremendously in the U.S. during the past two decades. Although both species were evaluated as potential biological control agents and for commercial aquaculture production in the early 1970s, individuals were being collected in the White River basin by 1975. The sources of these introductions were likely accidental releases, escapes from state hatcheries, and/or survivors from known stockings. Niche models have indicated that most riverine habitats in the Mississippi River and its main tributaries are suitable for completion of Asian carp life cycles. With respect to the lower White River, Asian carps have already invaded and established and are of concern to natural resource agencies. This study aims to assess the probable effects of Asian carp establishment on native fish assemblages in previously studied oxbow lakes in the lower White River. Native fish assemblage responses to Asian carps will be accomplished by comparing fish assemblage data collected during 2017 to historical data collected during 2002-2005 prior to Asian carp establishment. Characterization of these effects will aid fisheries managers in forecasting future impacts on further range expansions by Asian carps.

Oral – Student

DEVELOPMENT AND IMPLEMENTATION OF A PHYSICAL, CHEMICAL, AND BIOLOGICAL SURVEY OF OUACHITA MOUNTAIN ECOREGION STREAMS

Schanke, Kevin*, Jessie Green1, Katie Rose1, Tate Wentz1 and Jim Wise1

1Office of Water, Arkansas Department of Environmental Quality, North Little Rock, AR 72218
Schanke@adeq.state.ar.us

In January 2016 ADEQ began a two and a half year project to collect physical, chemical, and biological data from 62 wadeable streams in the Ouachita Mountains. This multi-faceted project was designed to determine how alteration impacts stream condition, re-evaluate least disturbed conditions, and improve resolution of physical, chemical, and biological metrics within the Ouachita Mountain ecoregion. Sites were selected along an alteration gradient based on 15 land use metrics. Monthly water quality samples are continually being collected at each site and analyzed for anions, nutrients, and metals. Physical and biological sampling has begun and will finish this fall. Preliminary results indicate a strong correlation between land alteration and water chemistry. These findings when paired with biological data will provide a basis for future ADEQ decision making.

Oral – Professional
FISH-HABITAT ASSOCIATIONS IN THE KINGS RIVER, ARKANSAS
Sherwood, Chelsey*1, Ginny Adams1, and Reid Adams1
1Department of Biology, University of Central Arkansas, Conway, AR 72035
csherwood1@cub.uca.edu

The Kings River is a free-flowing river that is home to several species of fish endemic to the Ozark Mountains and a Species of Greatest Conservation Need, Notropis ozarcanus. Despite being recognized as a regionally important aquatic resource; no basin wide studies of fishes have been conducted. We collected a total of 13,928 individuals encompassing 43 species across 21 sites via seines. Total abundance ranged from 187 to 1189 and species richness ranged from 3 to 29 species at a given site. We classified 27 of the 43 species collected as intolerant. Percent intolerant ranged from 12% to 96% at a given site. Using non-metric multidimensional scaling we found a general grouping of sites from upstream to downstream. Campostoma spp. and other catostomids were strongly associated at sites with longer, wider, and shallower pools. We also compared The Nature Conservancy sites that were degraded to reference sites and found there was a significant difference in fish assemblage composition between sites. We found that Campostoma spp. was most abundant at degraded sites and our sensitive minnow species such as Notropis nubilus and Notropis telscopus were highest in the reference sites. Baseline data will be used in future assessments of fish-habitat relationships.

Oral – Student

MIGRATION DYNAMICS OF OHIO SHRIMP, MACROBRACHIUM OHIONE, IN ARKANSAS
Spooner, Geoffrey*1, Lindsey Lewis2, and Reid Adams1
1Department of Biology, University of Central Arkansas, Conway, AR 72035
2US Fish and Wildlife Service, Conway, AR 72032
gspooner1@cub.uca.edu

The Ohio shrimp (Macrobrachium ohione) is amphidromous, requiring a marine environment for early juvenile development, but other life stages are completed in freshwater. The historical range of Ohio shrimp included the Ohio River and Upper Mississippi River, but abundance upriver of Louisiana has reportedly declined. Current distribution, abundance, and life history of Ohio shrimp are relatively unknown upriver of Louisiana. Wire-meshed traps were deployed at three sites along the mainstem Mississippi River and at sites in the Lower Arkansas, White, and St. Francis rivers from March-November 2016. Total catch greatly increased during May/June (20.9 – 27.3 °C), peaked during June/July (29.5 °C), and declined during August/September. Preliminary examination of shrimp collected from May-July suggests sex ratios of migrants varied with size/age class. Age-0 migrants (TL range 21.8 – 43.3 mm) were female-skewed (522 females: 278 males), whereas older shrimp, presumably continuing upstream migration, were male-skewed (48 females: 235 males). Age-0 shrimp migrate further than 600 river kilometers from the Gulf of Mexico, and preliminary data suggest a number of older Ohio shrimp, primarily males, also continue upriver migration. Despite historic density decline, Ohio shrimp likely remain important components of food webs in the lower Mississippi River and its tributaries.

Oral – Student
ANALYSIS OF BODY SHAPE VARIATION AMONG RESTRICTED AND WIDESPREAD POPULATIONS OF THE SOUTHERN REDBELLY DACE, CHROSOMUS ERYTHROGASTER

Thomas, Dustin R.*, and Brook L. Fluker1

1Department of Biological Sciences, Arkansas State University, Jonesboro, AR 72401
dustin.thomas1@smail.astate.edu

The Southern Redbelly Dace (Chrosomus erythrogaster) has a widespread distribution throughout most of the eastern United States, with several disjunct populations in midwestern states and in the lower Mississippi River drainage. Of particular interest are potentially isolated populations on Crowley’s Ridge in Arkansas and the Bluff Hills in Mississippi. Currently, it is unclear whether these populations share connections with larger core populations in the nearby Ozark and Eastern highlands, or represent isolated populations on these “upland islands” within the Gulf Coastal Plain. This study used geometric morphometric techniques to evaluate body shape differences among C. erythrogaster from loess habitats of Crowley’s Ridge and the Bluff Hills and upland habitats of the Ozark and Eastern Highlands. Preliminary results suggest that overall body depth of the focal populations on Crowley’s Ridge and Bluff Hills is intermediate to populations in the Ozarks and Eastern Highlands. Moving forward, we hope to determine whether these shape differences represent adaptations to unique loess habitats, correspond to genetic structure, or are related to other factors. In conjunction with an ongoing population genetic study, results from this study will provide valuable information about the distinctiveness of potentially isolated populations in Arkansas and Mississippi.

Poster – Student

CURRENT STATUS AND HABITAT USE OF THE FOUSHEE CAVESNAIL, AMNICOLA CORA (HYDROBIIDAE) IN FOUSHEE CAVE, INDEPENDENCE COUNTY, AR

Throneberry, Jason*1 and Mike Slay2

1Arkansas Natural Heritage Commission, 1100 North Street, Little Rock, AR 72201
2The Nature Conservancy, Fayetteville, AR 72701
jason.throneberry@arkansas.gov

The Foushee Cavesnail, Amnicola cora Hubricht 1979 (Gastropoda: Neotaenioglossa: Hydrobiidae), is a single-site endemic stygobiont found in Foushee Cave, Independence Co., Arkansas. Because little information was available concerning this species, a project was initiated in 2007 to establish baseline data on habitat use and population size. Sampling trips were made during late spring and summer months to minimize disturbance to hibernating gray bats (Myotis grisescens) and at monthly intervals to minimize in-stream trampling of cavesnails. We established 25 permanent sampling locations along the first ~1,000 m of cave stream and counted snails that occurred within a 0.05 m² quadrat placed haphazardly at each location. To characterize habitat use, we quantified snail position on substrate and measured water depth, flow, and substrate proportions. Sampling occurred during 12 visits from 2007 to 2014. The surveys yielded a significant difference (p < 0.001) between the numbers of snails among habitat types, with riffles having more snails than pools. Also, there was a strong preference (p < 0.001) for cobble and rock substrate. The potential for groundwater impacts to the cave system was assessed with funding from Arkansas Game and Fish Commission, and this funding was used to delineate the recharge boundary, characterize vulnerability, and document point hazards. Following the recharge delineation, a landowner parcel assessment was conducted to identify landowners interested in selling property and several land acquisitions were completed. As a result of these acquisitions, over 80% of land recharging groundwater to Foushee Cave is part of a new Arkansas state natural area.

Oral – Professional
COLDWATER CRAYFISH UPDATE AND FUTURE PLANS

Wagner, Brian K.*

Arkansas Game and Fish Commission, Benton, AR 72015
bkwagner@agfc.state.ar.us

The Coldwater Crayfish (*Orconectes eupunctus*) is found only in the Eleven Point, Spring, and Strawberry river drainages of Missouri and Arkansas. It is designated as “imperiled” in Missouri, a “species of greatest conservation need” in Arkansas, “threatened” by the American Fisheries Society, and has been petitioned for protection under the Endangered Species Act. Prior to 2010 it was documented from only 28 locations in Missouri and Arkansas. A cooperative study during 2010-2011 sampled 104 stream segments, detecting *O. eupunctus* in only 9 segments, confirming its rarity. All segments except one (3rd order) were 4th order or larger, suggesting the species favors larger stream habitats. In 2005, specimens collected from the Eleven Point River were observed to have characteristics intermediate between *O. eupunctus* and *O. ozarkae*, and genetic work during the 2010-2011 study suggests this may represent a distinct species. *Orconectes eupunctus* in the Strawberry River appears to be limited to an approximately 30-mile-long section in the middle portion of the river. Efforts were made in 2016 to better understand their range in the Strawberry, and plans are being developed to examine possible correlation with stream temperature moderation via spring inputs.

**Oral – Professional**