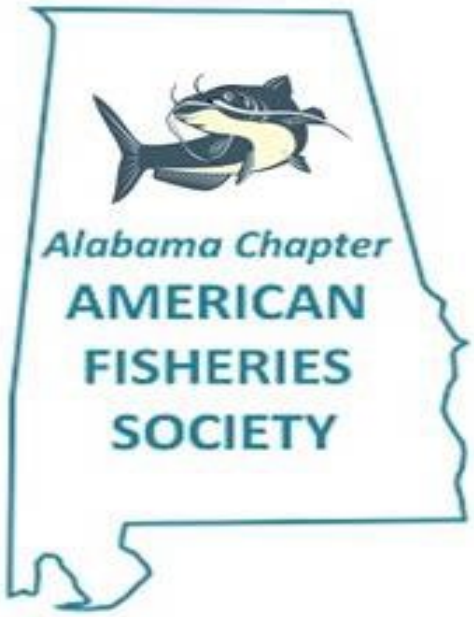
2019 Annual Meeting
Alabama Chapter of the American Fisheries Society



Five Rivers Delta Center

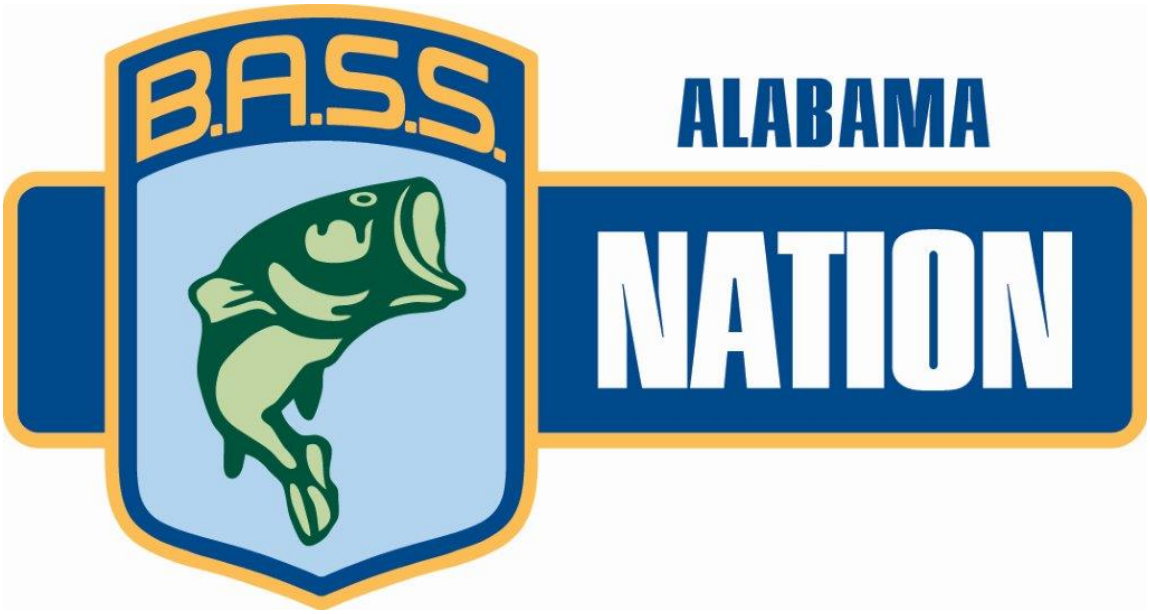
Spanish Fort, Alabama
February 21-22, 2019

Current Officers

President:	Dave Armstrong
President-elect:	Josh Yerby
Past President:	Mark Meade
Secretary:	Michael Sandel
Treasurer:	Parker Nenstiel
AU Subunit President:	Henry Hershey

Corporate Sponsors

Gold Level Sponsors



Program Schedule

All presentation activities to be held in Tensaw Theatre Building Room

Thursday, February 21

12:00 – 4:30 PM	Meeting Registration & Load Talks
12:45– 1:00 PM	Opening Remarks
1:00 – 2:40 PM	Student Presentations – Session A
2:40 – 2:50 PM	Break
2:50 – 4:30 PM	Student Presentations – Session B
4:30 – 5:00 PM	Poster Set-up (Delta Hall Lobby)
5:00 – 6:30 PM	Poster Presentations & Social
6:30 – 8:30 PM	Banquet & Student Awards

Friday, February 22

8:30 – 9:00 AM	Business Meeting/Meeting Registration
9:00 – 10:20 AM	Presentation-Session C
10:20 – 10:30 AM	Break
10:30 – 12:10 PM	Presentations – Session D
	Adjourn

Presentation Schedule

Thursday, February 21 SESSION A (STUDENTS)

Moderator: Kyle Bolton, ADCNR

1:00 pm. Genetic architecture of early life history for Channel catfish (*Ictalurus punctatus*) ♀ x Blue catfish (*Ictalurus furcatus*) ♂ hybrid production. Jaelen N. Myers et al.

1:20 pm Shoreline rotenone application to control largemouth bass (*Micropterus salmoides*) recruitment in small impoundments. Tyler S. Coleman et al.

1:40 pm Current distribution of habitat use of the threatened snail darter (*Percina tanasi*) in Alabama. Kurtis Shollenberger et al.

2:00 pm Determination of age of hybrid catfish and Channel catfish from commercial fish farms to better understand the "big fish" problem in West Alabama. Daniel Creel et al.

2:20 pm Dispersal and Fate of Stocked Rainbow Trout (*Oncorhynchus mykiss)* in an Alabama Tailwater. Sarah Baker and Steve Sammons

2:40 – 2:50 pm BREAK

SESSION B (STUDENTS)

Moderator: Seth Wood, ADEM

2:50 pm Physiological and behavioral impacts of acute anthropogenic noise on stream fishes. Ryan Friebertshauser et al.

3:10 pm Assessing the usage of time-lapse digital cameras to obtain angler effort estimates on Alabama Reservoirs. Robert Eckelbecker and Matt Catalano

3:30 pm Shark movements and residency near artificial habitats in the northern Gulf of Mexico. Ashley Altobelli and Stephen Szedlmayer

Thursday, February 21 continued

3:50 pm Mortality estimates for Red snapper (*Lutjanus campechanus*) based on acoustic telemetry and conventional tagging in the northern Gulf of Mexico. Peter Mudrak and Stephen Szedlmayer

4:10 pm Individual variability in salinity use of Red drum (*Sciaenops ocellatus*). T. Reid Nelson and Sean P. Powers.

4:30 – 5:00 PM Poster Set-up (Delta Hall Lobby)

5:00 – 6:30 PM **Poster Presentation**

Gray snapper (*Lutjanus griseus*) abundance and distribution in the Alabama artificial reef permit zone. Edward Kim and Sean Powers

Spatial distribution and abundance of Greater amberjack (*Seriola dumerili*) in the Alabama artificial reef permit zone (AARPZ). Justin McDonald and Sean Powers

An aquatic melting pot: mapping genetic homogenization among fish populations of the Tenn-Tom waterway. P. Kiersten Schellhammer and Michael Sandel

Investigating genetic divergence in Southern Populations of Northern Walleye (*Sander vitreus*). Dominique Dawson and Michael Sandel

Applying genomic strategies to characterize the invasive green swordtail (Xiphophorus hellerii), an aquatic ornamental fish species. Anna Eastis and Michael Sandel

Metabarcoding for freshwater fish of the Mobile basin watersheds. John Larrimore and Michael Sandel

Friday, February 22 SESSION C

Moderator: Josh Yerby, Alabama Power Company

8:30 am Business meeting

9:00 am ADEM Rivers and Reservoirs Monitoring Program: intensive survey data and implications for the fishery. Fred Leslie

9:20 am Status of the Alabama Department of Environmental Management's fish tissue monitoring program. Michael Len

9:40 am Fish community structure and biotic integrity of six wadeable streams in the Metro-Columbus Area, Georgia. Phil Carson and Steve Sammons

10:00 am Update on where we are regarding crayfish research in Alabama. Stuart W. McGregor et al.

10:20 – 10:30 am BREAK

SESSION D

Moderator: Kyle Moon, Alabama Aquarium and Pond

10:30 am Weiss bypass adaptive management plan: A biological monitoring overview. Jeff Baker

10:50 am Population and life-history characteristics of two black bass species in the Flint river system, Georgia. Steven M. Sammons

11:10 am The Alabama Fish Farming Center: Thirty-seven years of service to the aquaculture industry and Alabama's recreational pond owners. Past, present, and future. Gregory N. Whitis and Luke A. Roy

11:30 am Response of Alabama marine and estuarine fishes to artificial reef addition and enhancement. Mark A. Albins et al.

11:50 am An update on the current status of adult Red Drum (*Sciaenops ocellatus*) in the northern Gulf of Mexico. Crystal L. Hightower et al.

ADJOURN

ABSTRACTS

ORAL PRESENTATIONS (STUDENT SESSIONS)

Jaelen N. Myers (Student), jnm0041@auburn.edu, 217-791-7717

GENETIC ARCHITECTURE OF EARLY LIFE HISTORY TRAITS FOR CHANNEL CATFISH, *Ictalurus punctatus* ♀ × BLUE CATFISH, *I. furcatus* ♂ HYBRID PRODUCTION

Jaelen N. Myers[a], Nagaraj Chatakondi[b], Ian A.E. Butts[a]

[a] School of Fisheries, Aquaculture and Aquatic Sciences, Auburn University, Auburn, Alabama, 36849, United States of America
[b] USDA-ARS Catfish Genetics Research Unit, National Warmwater Aquaculture Center, Stoneville, Mississippi 38776, United States of America

In the United States, catfish farming in Mississippi, Arkansas, Alabama, and Texas, accounts for nearly 70% of total freshwater aquaculture production, where the channel catfish ♀ × blue catfish ♂ hybrid constitutes the majority (50-75%) of the harvest. This is mainly because hybrid catfish are superior for pond culture, as they exhibit improved growth, disease resistance, feed conversion, and harvestability. Although the industry has seen sustained growth, there are still challenges associated with inconsistent production of hybrid catfish fry. In this study, we used a quantitative genetic breeding design to assess genetic, environmental, and gene by environmental interactions in order to detail the genetic architecture of fitness in the hatchery during the critical early life history stages. Males and females were crossed in a fully factorial design in triplicate. Offspring from each family were split into 2 temperature-controlled environments, based on conditions that mimic early (26.6° C) and late (32.2° C) seasonal rearing environments. Embryonic survival, hatching success, as well as larval morphology (e.g. body area, total length, yolk-sac area) and deformities were quantified at three specific developmental stages during early ontogeny. Variation in the early performance traits was partitioned to additive genetic (sire effect), non-additive genetic (dam × sire interaction), maternal (difference between dam and sire variance), and other remaining environmental effects. Together, this allowed us to identify the variation caused by specific parentage as well how this is impacted by environmental stimuli, increasing our understanding of hatchery techniques for successful hybrid production. This information has important implications for the long-term sustainable development of hybrid catfish for aquaculture purposes as well as for understanding genetic variation during early life history in fishes.

Tyler Steven Coleman (Student), tsc0018@auburn.edu, 716-777-0957

Shoreline rotenone application to control largemouth bass (*Micropterus salmoides*) recruitment in small impoundments.

Tyler Steven Coleman[1], Matt Catalano[1], Graves Lovell[2], Rusty Wright[1], Dennis DeVries[1]

Auburn University, Department of Fisheries, Aquaculture and Aquatic Sciences, Auburn, AL 36849[1]
Alabama Department of Conservation and Natural Resources[2]

Direct control of largemouth bass (*Micropterus salmoides* [LMB]) recruitment would greatly benefit small impoundment (<50 ha; ie., recreational fishing ponds and small lakes [SI]) management. Reducing LMB population density is an important challenge but is necessary to maintain desirable growth rates, body condition, and size structure. Common gears (hook-and-line, electrofishing) used for the mechanical removal of LMB are inefficient at capturing age-0 fish, making the recruitment of these populations difficult to control directly. Thus, these time consuming and expensive efforts usually target adults (age 1+) for removal and must be sustained annually to obtain the desired result. The development and refinement of methods for direct control of LMB recruitment would greatly benefit SI management. Application of the piscicide rotenone along the shoreline is one such approach that has been attempted on a limited basis. The only published peer-reviewed study that has quantitatively evaluated the effectiveness of this approach suggested that this methodology has potential. The present study evaluates the influence of shoreline rotenone treatment on age-0 and age-1 LMB densities in SI's. Twenty SI's were observed for this study and only half were treated with rotenone while leaving the others as untreated controls. The treatment was applied twice during the summer of 2017 and 2018. Data was collected using annual spring electrofishing and seine catch rates just before and after each treatment. State agencies, private consultants, and landowners could practice this study for important SI management implications. If shoreline rotenone treatments prove effective in reducing LMB recruitment and increasing growth rates, then this approach will be a valuable tool for recreational fishing SI management.

Kurtis Shollenberger (Student), krs0067@tigermail.auburn.edu

Current Distribution and Habitat Use of the Threatened Snail Darter (*Percina tanasi*) in Alabama

Kurtis Shollenberger, Carol Johnston, Alexis Janosik

Auburn University, Auburn, AL
University of West Florida, Pensacola, FL

The Alabama portion of the Tennessee River system is home to over 175 species, and among these are many endemics that are being threatened with extirpation due to habitat loss. This has increased the need for the monitoring and conservation of these fishes. The snail darter (*Percina tanasi)* is a threatened species endemic to the Tennessee River drainage in Alabama and Tennessee. Recent surveys have identified snail darters outside of their known range in Alabama. Effective conservation of threatened species requires the ability to confidently detect where the species exist. Traditional survey methods alone are too unreliable to definitively say where the snail darter exists today, as they are either too rare or currently dispersing into systems where they are not known to occur. A relatively new technique for validating the presence of such species is utilizing environmental DNA, referred to as eDNA. We used eDNA to assess *P. tanasi* presence throughout the Tennessee River system in Alabama. A total of 57 unique sites were sampled and 29 came back positive for *P. tanasi* DNA, indicating their presence at those locations. This study has confirmed the known localities of *P. tanasi* in the Bear Creek, Elk River, and Paint Rock River. We also have discovered several new localities throughout the mainstem Tennessee River and in Shoal Creek, near Florence, Al. Side scan sonar techniques are being applied to compare habitat availability surrounding negative and positive eDNA sites. These results will allow us to determine critical localities and habitat types that sustain *P. tanasi* populations. These findings can inform biologists on where to prioritize conservation efforts and further, could lead to studies assessing movement and relatedness between populations in this system.

Daniel Creel (Student), jdc0037@auburn.edu, 334-422-5177

DETERMINATION OF AGE OF HYBRID CATFISH AND CHANNEL CATFISH FROM COMMERCIAL FISH FARMS TO BETTER UNDERSTAND THE "BIG FISH" PROBLEM IN WEST ALABAMA

Daniel Creel[1], Terrill R. Hanson[2], Luke A. Roy[3], Steve Sammons[4]

[1] Auburn University, School of Fisheries, Aquaculture, and Aquatic Sciences, Auburn, AL 36849
[2] Auburn University, School of Fisheries, Aquaculture, and Aquatic Sciences, Auburn, AL 36849
[3] Alabama Fish Farming Center, Greensboro, AL 36744
[4] Auburn University, School of Fisheries, Aquaculture, and Aquatic Sciences, Auburn, AL 36849

The Alabama catfish industry in 2019 is facing a serious oversupply issue that has negatively impacted both commercial farms and catfish processing plants. Compounded on to this problem is an over-abundance of "big fish" currently on farm inventories in Alabama. Catfish processors have defined "big fish" as fish greater than 4 pounds. Once this threshold weight has been achieved, the catfish are too large for the mechanized lines at the processing plants and must be hand filleted at the expense of more labor. Currently, catfish processors in Alabama are paying only half price (~$0.50/pound) for fish between 4 and 6 pounds. Catfish farmers are not receiving any compensation for fish larger than 6 pounds, which are simply deemed unacceptable and logged as "weigh backs." Many of these problems can be tracked back to inefficiencies related to seining in addition to other factors. The purpose of this project is to determine at what age the fish become oversized and inform producers of economically viable ways to reduce the occurrence of "big fish" on their farms. Despite the widespread adoption of hybrid catfish, there has been no scientific documentation of age in relationship to growth in production ponds within the catfish industry, with large hybrids being reported to exceed 50 lbs in some instances. In addition, there is scarce data in the scientific literature documenting age and growth of large channel catfish on commercial farms. To age the catfish, we collected 50 fish from each harvest event sampled to determine the age of different size classes of fish (range of 1.5 – 34 lbs) in commercial ponds to provide much needed information on harvest efficiency. We documented the length, weight, sex, and collected the otoliths from each individual fish sampled to determine their growth rates with respect to their age.

Sarah Baker (Student), szw0099@auburn.edu, (208) 936-5027

Dispersal and Fate of Stocked Rainbow Trout in an Alabama Tailwater

Sarah Baker and Steve Sammons

Auburn University, School of Fisheries, Aquaculture, and Aquatic Sciences, 203 Swingle Hall, Auburn, AL 36849

Hypolimnetic discharge from reservoirs in the southern United States provide cold enough water temperatures to support successful Rainbow Trout fisheries in regions where they otherwise could not exist. The Sipsey Fork tailrace below Lewis Smith Dam in Northern Alabama provides such an opportunity and is stocked with Rainbow Trout each month. Our research objective is to describe post-stocking dispersal and fate of these stocked Rainbow Trout. In a recent creel survey, only 4 to 23% of the trout stocked each month were harvested indicating that the ultimate fate of the majority of stocked Rainbow Trout is unknown. In spring, summer, and fall 2017, and winter 2018, we tagged and manually tracked cohorts of Rainbow Trout to document movement patterns and determine approximate longevity in the fishery. Tagged trout were tracked at least once per week for the first five weeks post-stocking. We calculated Rainbow Trout dispersal, range, and persistence using ArcMap and R. In spring, summer, and fall 2018, we used mark-recapture methods and diets analysis to assess the threat potential predators posed to Rainbow Trout. Knowledge regarding the dispersal and fate of stocked Rainbow Trout in this system will allow more efficient management of the fishery, leading to increased recruitment, retention and satisfaction of anglers that utilize this resource.

.

Ryan Friebertshauser (Student), rjf0030@tigermail.auburn.edu, (440) 840-9511

Physiological and behavioral impacts of acute anthropogenic noise on stream fishes

Ryan Friebertshauser [1], Carol Johnston [1], and Daniel Holt [2]
[1] Auburn University, Department of Fisheries and Aquaculture, Auburn, AL
[2] Columbus State University, Department of Biology, Columbus, GA

While the expansion of anthropogenic noise studies in aquatic habitats has produced many conservation-based results for marine organisms, little attention has been payed to the potential impacts on freshwater stream fishes. Recent work showed that Blacktail Shiner (*Cyprinella* venusta), a hearing specialist, exhibited multiple responses to road noise. However, assemblage-wide effects of anthropogenic noise pollution have not been studied. By examining six metrics of stress on four ecologically and evolutionarily disparate species of sympatric stream fishes, this laboratory experiment aimed to describe the potential negative impacts of anthropogenic noise on these understudied organisms. Each species studied represents a unique combination of hearing ability (specialist or generalist) and vertical zonation within the water column (benthic or pelagic). The anthropogenic noise source used throughout this research was an underwater audio recording of a train crossing a stream via a steel/cement bridge. Physiological and behavioral metrics were measured and compared across the presence and absence of noise playback. Noise playback had no effect on blood glucose levels, however, the presence of noise produced significant changes in ventilation rate, total swim distance, and both chronic and acute swimming velocity in a portion of the species. In certain metrics, effects of noise were observed in species contrary to what would be hypothesized based on their historical hearing ability designations. These results demonstrate that predicting physiological or behavioral responses to this type of stressor cannot be accomplished by simply considering hearing ability or water column position. More importantly, we show that anthropogenic noise can disrupt a variety of behavioral and physiological processes, suggesting potential fitness consequences, and should be considered an environmental stressor and driver of habitat degradation to the fishes affected.

Robert Eckelbecker (Student), rwe0006@auburn.edu, 207-505-0048

Assessing the usage of time-lapse digital cameras to obtain angler effort estimates on Alabama reservoirs

Robert Eckelbecker and Matthew Catalano

Auburn University, School of Fisheries, Aquaculture, and Aquatic Sciences, Auburn, AL 36849

We compared different creel survey methods at three Alabama reservoirs (Harris, Jordan, and Mitchell) to identify approaches that could improve precision or reduce costs. We were particularly interested in whether time-lapse photos taken at boat ramp parking lots could be used as an index of fishing effort to improve the temporal coverage of sampling at relatively low cost. Angler effort was estimated independently through the use of roving creels, access point creels, aerial census counts, and fixed-location digital camera images of boat ramps. Evaluation of the accuracy of angler effort from time-lapse photos was analyzed based on ramp specific access point creel surveys that occurred simultaneously. We compared a reservoir-wide effort index from time-lapse photos of all boat ramps with aerial census counts using an analysis of covariance that varied by reservoir, season, and day type. If the relationships are strong between both the aerial counts and access point creel surveys to the camera images, then these angler effort estimates from remote cameras could reduce the amount of effort needed for on-site survey samples.

Ashley Altobelli (Student) ana0027@auburn.edu 412-956-1294

Shark movements and residency near artificial habitats in the northern Gulf of Mexico

Ashley Altobelli[1] and Stephen Szedlmayer[1]

[1]School of Fisheries, Aquaculture and Aquatic Sciences, Auburn University, 8300 State Hwy 104, Fairhope, AL 36526

In the present study, acoustic telemetry was used to assess the residency patterns of four shark species around artificial reefs in the northern Gulf of Mexico. Eight Sandbar Sharks (*Carcharhinus plumbeus*), five Atlantic Sharpnose Sharks (*Rhizoprionodon terraenovae*), four Bull Sharks (*Carcharhinus leucas*) and two Nurse Sharks (*Ginglymostoma cirratum*) were monitored within a 64 km^2 area from one to 449 days. Mean residency indices (±SD) were 0.151 ± 0.160 (range = 0.004 - 0.432) for Sandbar Sharks, 0.06 ± 0.05 (range = 0.02 - 0.10) for Nurse Sharks, 0.013 ± 0.020 (range = 0.001 – 0.049) for Atlantic Sharpnose Sharks and 0.012±0.010 (range = 0.001 – 0.024) for bull sharks, however no significant differences were detected among species ($F_{4,17}$ = 2.29, P = 0.09).
Sandbar Sharks showed greater residency in fall ($F_{3,65}$ = 3.81, P = 0.014) and Bull Sharks showed greater residency in summer ($F_{3,28}$ = 54.29, P < 0.001). Five individuals also made long-distance seasonal migrations. Two Sandbar Sharks were detected off Florida (229 - 512 km), one Sandbar Shark was detected off South Carolina (1,894 km), one Bull Shark was detected in the Florida Keys (858 km) in two years, and one Nurse Shark was detected as far as the Florida Keys in three years (230 - 856 km). All migrating sharks subsequently returned after each migration, indicating that some show philopatry to the artificial reefs even after travelling long distances. Homing behaviors were also apparent for some individuals: One Sandbar Shark returned to the same site after travelling 3,788 km round-trip and one Nurse Shark emigrated and returned to the same sites four consecutive years. The residencies, migrations and philopatry observed in present study indicate that the artificial reefs off coastal Alabama are important habitats for shark species and their effects may extend beyond the northern Gulf of Mexico.

Peter Mudrak, pam0007@auburn.edu, 251-990-4858

Mortality Estimates for Red Snapper, *Lutjanus Campechanus*, Based on Acoustic Telemetry and Conventional Tagging in the Northern Gulf of Mexico.

Peter Mudrak and Stephen Szedlmayer

Auburn University, School of Fisheries, Aquaculture, and Aquatic Sciences, 8300 St. Hwy. 104, Fairhope, AL 36532

Red snapper, *Lutjanus campechanus*, is an economically important species in the northern Gulf of Mexico, and accurate estimates of mortality rates are crucial for proper management of the species. This study used highly accurate estimates of tagging mortality, natural mortality, and angler non-reporting obtained from telemetry tracking of red snapper to calibrate a conventional tagging study with higher sample sizes. The resulting estimates of fishing mortality (*F*) were higher in telemetry tracked red snapper in 2015 (*F* = 1.05), 2016 (*F* = 0.55), and 2017 (*F* = 0.49) than for red snapper with conventional tags (2015 *F* = 0.44, 2016 *F* = 0.34, 2017 *F* = 0.27). Tag return rates were significantly higher for red snapper that were released on big (> 25 m^2) reefs compared to small reefs, reefs with published locations compared to reefs with unpublished locations, and reefs that were closer to shore (< 33 km) than reefs that were further from shore (33 to 65 km). The calibrated tag return rates for big and small reefs were combined with a fishery independent population estimate, resulting in an average *F* of 0.22 for 2015 and 2016.

T. Reid Nelson (Student) tnelson@disl.org , 251-861-2141 x2384

Individual variability in salinity use of Red Drum (*Sciaenops ocellatus*)

T. Reid Nelson[1,2] and Sean P. Powers[1,2]

[1]Department of Marine Sciences, University of South Alabama, Mobile, AL 36688, USA
[2]Dauphin Island Sea Lab, 101 Bienville Blvd, Dauphin Island, AL 36528, USA

Intrapopulation diversity in euryhaline fishes provides population persistence with fluctuating environmental and anthropogenic impacts. This diversity has been defined by the contingent hypothesis and variable migratory strategies across salinity boundaries and/or distinct salinity use can both fit this hypothesis. Diversity in salinity use is likely present in Red Drum and identification of this diversity is essential for proper management and persistence of this valuable estuarine dependent species. To identify salinity diversity in Red Drum, lifetime otolith elemental ratios were used as indirect proxies of salinity exposure in fish collected from nearshore spawning aggregations. Based on the Sr:Ca ratios during the first four years of life, two distinct clusters of fish were identified, one that utilized low-salinity/freshwater (< 2 psu) and one that utilized higher salinities as juveniles. Addition of Ba:Ca to analysis resulted in similar clusters, but another cluster with elevated Ba:Ca was identified. Unfortunately, otolith transects became similar among fish later in life indicative of maturation and growth effects and could not be used as indirect proxies of salinity exposure. Age distributions were similar among clusters, and the low-salinity grouping exhibited slightly slower growth than other clusters. These results indicate that a regulatory mechanism is likely present contributing to the persistence of salinity use clusters in juvenile Red Drum and these clusters fit the contingent hypothesis, resulting in distinct low-salinity/freshwater and higher salinity contingents. Maintenance of these contingents through proper management is essential for population persistence and this contingent structure is likely present in other euryhaline estuarine dependent fishes.

POSTER PRESENTATIONS

Edward Kim (Student), ekim@disl.org, 484-995-6194

Gray Snapper (*Lutjanus griseus*) abundance and distribution in the Alabama Artificial Reef Permit Zone

Edward Kim[1,2] and Sean Powers[1,2]

[1]University of South Alabama, Department of Marine Sciences, Mobile, AL 36688
[2]Dauphin Island Sea Lab, Dauphin Island, AL 36528

Gray Snapper (*Lutjanus griseus*) constitute a significant recreational and minor commercial fishery throughout the Gulf of Mexico. A 2018 assessment by the Southeast Data, Assessment, and Review (SEDAR) determined that the Gulf of Mexico stock is not currently overfished nor undergoing overfishing. However, geographical gaps in our understanding of the habitat requirements of these fish that could better inform fishery management still exist, particularly within Alabama waters. This study aims to address the abundance and distribution of the Gray Snapper population through the analysis of remotely operated vehicle (ROV) footage taken in the Alabama Artificial Reef Permit Zone (AARPZ), a more than 1000 square mile area offshore containing a variety of artificial reefs such as chicken coops and pyramids. Results will elucidate habitat preferences across different artificial and natural structures as well as estimate abundances on these structures throughout the spatial coverage of the AARPZ. The findings of this research will introduce new data to be taken into account in future stock assessments of this species in both Alabama and the Gulf of Mexico. Further work is anticipated for abundance and distribution of estuarine-dependent juvenile and subadult populations in coastal regions of the state as well as sex-specific age and growth modeling.

Justin McDonald (Student), jmcdonald@disl.org, 251-861-2141 x2384

Spatial Distribution and Abundance of Greater Amberjack (*Seriola dumerili*) in the Alabama Artificial Reef Permit Zone (AARPZ)

Justin McDonald [1,2] and Sean Powers [1,2]

[1] University of South Alabama, Department of Marine Sciences, Mobile, AL 36688
[2] Dauphin Island Sea Lab, 101 Bienville Boulevard, Dauphin Island, AL 36528

Greater Amberjack (*Seriola dumerili*) are a popular sportfish found throughout the waters of the Gulf of Mexico and an important commercial and recreational fishery. This species occupies similar habitats as other popular reef fish, such as Red Snapper, resulting in increased fishing pressure on the population due to accidental catch. According to the 2017 stock assessment conducted by South East Data, Assessment, and Review (SEDAR), Gulf of Mexico Greater Amberjack are designated as overfished and are subject to overfishing. This latest assessment indicated that the stock will no longer rebuild by 2019 as previously projected and triggered a reduction in acceptable biological catch (ABC) limits. The purpose of this study is to examine the spatial distribution of Greater Amberjack throughout the Alabama artificial reef permit zone (AARPZ) to determine habitat preferences among reef types and across depth strata, as well as determine relative abundance. This will be achieved through analysis of fish catch data, along with remotely operated vehicle (ROV) video footage, obtained from fishery independent vertical longline sampling from 2011 through 2016.

P. Kiersten Schellhammer (Student) pkierstens@gmail.com 205-614-8879

An Aquatic Melting Pot: Mapping Genetic Homogenization Among Fish Populations of the Tenn-Tom Waterway

P. Kiersten Schellhammer and Michael Sandel

1 # COLLEGE DR, 4447 THE UNIVERSITY OF WEST ALABAMA PO BOX, LIVINGSTON, AL 35470

The Tennessee and Mobile River Basins represent the two most biodiverse watersheds in North America, unfortunately, the same rivers are now recognized for their imperilment, as they are home to a number of threatened and endangered species. Many fish populations of the Mobile River Basin are recognized as distinct endemic species. Genetic homogenization, therefore, represents a threat to native biodiversity in Alabama by the loss of heritable variation. In 1984, with the completion of the Tenn-Tom waterway, the Mobile and Tennessee River basins united hydrologically, providing an opportunity for gene flow between fish populations that had been separated for at least 5 million years. Examining mitochondrial DNA variation in the Bullhead Minnow (Pimephales vigilax) across in the Tennessee River, Mobile River, and neighboring watersheds along the Gulf Coast we find evidence for distinct native haplogroups with genetic exchange along the Tenn-Tom waterway.

Dominique Dawson (**Undergrad)**, dawsond8633@gmail.com, 423-3621189

Investigating Genetic Divergence in Southern Populations of Northern Walleye (*Sander vitreus*)

Dominique Dawson & Michael Sandel

The University of West Alabama, Biological and Environmental,
100 US-11, Station 7 Livingston, AL 35470-2099

The walleye, *Sander vitreus* (Teleostei: Percidae), is a popular commercial and sport fish that is widely distributed across North America, and a large piscivore that aggregates to spawn in gravel along river riffles or lake reefs (Colby et al. 1994; Jennings et al. 1996). Populations of *S. vitreus* in the USA occur in the St. Lawrence-Great Lakes, Arctic, and Mississippi River basins from Quebec to Northwest Territories in Canada, south to Alabama and Arkansas. Broad scale relationships within Northern walleye show genetic isolation across geographic distances, but within local drainage basins genetic divergence is not common. Gulf Coastal Plain walleye appear to be a divergent group from the Northwest populations (Stepien et al. 2009). The southern walleye of the Mobile Basin population appears to exhibit some vicariance from the northern population due to the bioclimatic differences between the geographical areas. We aim to determine if there is a significant divergence between the northern and southern populations of walleye (*S. vitreus),* by analyzing the mitochondrial DNA using the primer Cytochrome Oxidase I to create an ancestral phylogenic tree, while implementing eDNA techniques to reveal more information about the distribution of the populations.

Anna Eastis (Student), eastisa@uwa.edu, 205-xxx-xxxx

Presentation Title: Applying Genomic Strategies to Characterize the Invasive Green Swordtail (Xiphophorus hellerii), an Aquatic Ornamental Fish Species

Anna Eastis & Michael Sandel

The University of West Alabama, 100 US-11, Livingston AL, 35470

Invasive aquatic species are an ongoing issue in North America due to their environmental and economic impacts. Important pathways for introduction of ornamental species include accidental aquaculture escape and intentional release from aquaria. The introduction on non-native species can threaten biodiversity and ecosystem health, such as displacement of native fish species (Gurevitch and Padilla 2004; Clavero and Garcı´a-Berthou 2005; Capps and Flecker 2013). There are one hundred nonindigenous freshwater fishes that have established and localized populations in Florida (Tuckett et al. 2015), and the Green Swordtail (*Xiphophorus hellerii*) is one of such tropical species. It is native to Central America and is usually found in ponds, rivers, and swift-flowing streams and is characterized by its sexual dimorphism (Axelrod and Wischnath 1991; Miller 2005). We have collected swordtails from Hawaii, Wyoming and Florida for analysis of mitochondrial and nuclear DNA. Applying genomic methods allow for the investigation of hybridization patterns, population-level genetic structure, and detection of this invasive species with environmental DNA (eDNA). Results from this study will aid in conservation and management of native species as well as grasping the invasive spread of *X. hellerii*.

John Larrimore (Student), larrimorej2@uwa.edu, 334-830-5334

Metabarcoding for Freshwater Fish of the Mobile Basin Watersheds

John Larrimore and Michael Sandel

University of West Alabama, Department of Biology, Livingston, AL 35470

Alabama has a higher number of freshwater fish species than any other state in the United States. Many of these species are currently imperiled. The process of effectively catching specimens from freshwater ecosystems in Alabama can be expensive and time-consuming, so the use of environmental DNA (eDNA) to determine which species are present within a particular area is invaluable for research. However, having a database of mitochondrial DNA sequences is required to interpret the results obtained from the eDNA samples. We are making a reference database of mitochondrial DNA sequences for the species of freshwater fish that are native to the Mobile Basin watersheds of Alabama, through the use of sequences obtained from fin clips and from GenBank. For the amplification of the sequences using polymerase chain reaction (PCR), we will be focusing on the cytochrome oxidase I (COI) gene or the 12S region of the mitochondrial DNA. There are benefits and detriments to either: while there is more data on COI, we hypothesize that PCR using COI would be biased towards certain species and could provide inaccurate results. The mitochondrial DNA sequences obtained were aligned using the BioEdit software, and the alignments were used to create a phylogenetic tree with the Mega7 software. The implications of metabarcoding would not only be to efficiently determine the presence/absence of a particular species but would also determine the relative composition of a particular region.

ORAL PRESENTATIONS (PROFESSIONAL SESSION)

Fred Leslie; fal@adem.alabama.gov; 334-260-2748

ADEM Rivers and Reservoirs Monitoring Program: intensive survey data and implications for the fishery

Fred Leslie

Alabama Department of Environmental Management, 1350 Coliseum Boulevard, Montgomery, Alabama 36110

Following an EPA/ADEM statewide survey in 1985 and an ADEM/Auburn University statewide survey in 1989, the ADEM Reservoir Water Quality Monitoring Program (RWQM) was initiated in 1990 to provide consistent, long-term water quality data for publicly-accessible reservoirs in Alabama. Reservoirs were sampled twice/year (spring, summer) every 2-3 years. In 2005, intensive surveys were initiated to provide full assessments of water quality throughout the algal growing season using a 5-year rotating river basin schedule. Also in 2005, flowing river reaches were added and the name of the program changed to the Rivers and Reservoirs Monitoring Program (RRMP). With increasing emphasis on nutrient impacts to water quality and program development in the years that followed, ADEM staff implemented revisions to the design of the RRMP to better meet water quality assessment needs, impaired waters listing determinations (303d), and nutrient criteria development. Currently, intensive monitoring of river, main-stem reservoir, and tributary embayment stations is conducted monthly, April-October, on a three-year rotating schedule to provide a comprehensive determination of water quality throughout the algal growing season. RRMP data from 2005-2018 will be reviewed during this presentation, with emphasis on nutrient concentrations, algal biomass and dissolved oxygen concentrations that most directly affect reservoir fish communities.

Michael Len, mlen@adem.alabama.gov, 334-260-2787

Status of the Alabama Department of Environmental Management's Fish Tissue Monitoring Program

Michael Len

Alabama Department of Environmental Management, 1350 Coliseum Boulevard, Montgomery AL, 36110

The Fish Tissue Monitoring Program (FTMP) is a cooperative program designed to provide statewide screening of bioaccumulative contaminants in fish tissue. The goal of the program is to provide the Alabama Department of Public Health (ADPH) with data needed for determination of potential risk to those who consume fish from Alabama waters as well as provide data in support of the ADEM water quality assessment and listing process. The program historically exists as a cooperative effort between the ADEM, the ADPH, the Alabama Department of Conservation and Natural Resources (ADCNR) and the Tennessee Valley Authority (TVA). The focus basin for 2018 was the Tennessee River Basin. Samples were also collected within the Tallapoosa River Basin as well as several inland coastal locations. During 2018, 463 fish were sampled from 40 locations.

.

Phil Carson (Research Assistant), prc0013@auburn.edu, (803) 496-4339

Fish Community Structure and Biotic Integrity of Six Wadeable Streams in the Metro Columbus Area, Georgia

Phil Carson and Steve Sammons

Auburn University School of Fisheries, Aquaculture, and Aquatic Sciences, 203 Swingle Hall, Auburn, AL 36849

Six streams in the Columbus, Georgia, metro area were sampled to determine species richness, diversity, and to calculate indices of biotic health. Sampling was conducted using the Georgia Department of Natural Resources (GDNR) Stream Team protocol for sampling wadeable streams with backpack electrofishing units. At each site, habitat assessment was also conducted independently by three crew members according to GDNR protocol. Number of fish collected per site ranged 51-562 and the number of species collected per site ranged 11-23. Shannon's diversity index was highly correlated with the number of species collected while Simpson's diversity index was less affected by the number of species collected. Neither showed a strong correlation to the number of fish collected per site, nor demonstrated a correlation to each other, indicating that they offered different measures of species diversity in these streams. Most streams scored "Fair" or "Poor" for both indices of biotic health, but smaller tributary streams in this area of the Chattahoochee River Basin may naturally exhibit a paucity of certain species that contributed to a few IBI metrics being underscored. Despite the relatively low scores of biotic health for these urban streams, the results of this study indicated that fish communities in these urban streams are fairly diverse. Additionally, species richness and community diversity in these samples were similar to those found in a prior study on 18 Chattahoochee tributaries.

Stuart W. McGregor, smcgregor@gsa.state.al.us, (205) 247-3629

Update on where we are regarding crayfish research in Alabama

Stuart W. McGregor[1], Guenter A. Schuster[2], Christopher A. Taylor[3], Rebecca A. Bearden[1], and E. Anne Wynn[1]

[1]Geological Survey of Alabama, Tuscaloosa, AL 35486
[2]224 Primrose Circle, Richmond, KY 40475
[3]Illinois Natural History Survey, 1816 S. Oak St., Champaign, IL, 61820

Starting in 2005 Drs. Guenter Schuster and Chris Taylor performed an exhaustive literature search and visited museum collections, compiling a database with over 4,600 records documenting 85 crayfish species in Alabama. Subsequently, with ADWFF and USFWS support, GSA staff, Drs. Schuster and Taylor, and associates sampled areas of the state lacking records based on maps generated from the Schuster and Taylor database and surveyed for species petitioned for listing by the USFWS. Our collective projects doubled the database to 9,300 records and allowed informed designation of conservation priority for each species. To date 97 species of crayfishes (94 natives) are recognized, with 15 state endemics, a few species whose taxonomic status remains unclear, and 5 hypothetical species. During our studies 94 of 97 species known from the state were encountered, with only 3 rare troglobites unobserved (but likely extant). The state list will very likely surpass 100 species upon further research. Future research needs include status surveys for CBD petitioned and other rare species including *Barbicambarus simmonsi* (Tennessee Bottlebrush Crayfish), *Cambarus diupalma* (Mountain Fork Crayfish), and *Cambarus veitchorum* (White Springs Cave Crayfish), confirming the presence of hypothetical species *Cambarellus blacki* (Cypress Crayfish, Escambia Co.), *Cambarellus schmitti* (Fontal Dwarf Crayfish, Geneva Co.), *Cambarus cryptodytes* (Dougherty Plain Cave Crayfish, Crystal River aquifer), *Procambarus ablusus* (Hatchie River Crayfish, Bear Creek), and *Procambarus* nr*. barbiger* (Sumter Co. burrows), pursuing area/species specific crayfish surveys including *Cambarus gentryi* (Linear Cobalt Crayfish) and *Barbicambarus simmonsi* in the Central Basin, *Cambarus bartonii cavatus* (Appalachian Brook Crayfish) across the Tennessee Valley, *Cambarus tenebrosus* (Cave Spring Crayfish) in Bankhead National Forest, and burrowers statewide, and initiating studies of crayfish life history and behavior, especially among burrowers on the Coastal Plain.

Jeff Baker, jefbaker@southernco.com, 205-351-1631

Weiss Bypass Adaptive Management Plan: A Biological Monitoring Overview

Jeff Baker

Alabama Power Company, Calera, AL

A 20-mile section of the original Coosa River channel was bypassed with the construction of Weiss Dam. This 20-mile section of river is further subdivided by the confluence of Terrapin Creek approximately 7-miles downstream of the spill way dam. Discovery of the federally endangered Southern Clubshell (*Pleurobema decisum*) in reaches below the mouth of Terrapin Creek initiated discussions between Alabama Power and state and federal agencies regarding flow into this section of river. The upper seven miles of the bypassed river channel did not receive consistent flow for over 50 years until a minimum flow plan (Weiss Bypass Adaptative Management Plan) was implemented in October 2014. The Weiss Bypass AMP is designed to mimic a more natural stream system with natural fluctuations in flow. Flows are calculated as a percentage of flow at an upstream gauging station and vary monthly (4-9%) with adjustments twice a week. Prior to the implementation of the flow plan, biological baselines were established for mollusks, crayfish, macroinvertebrates, and fishes. Alabama Power Company, with the help of various state and government agencies, have collected additional biological information for comparisons with previously collected baseline to evaluate the effects, if any, of the introduced flow. Additional data for fishes, macroinvertebrates, snails, and crayfishes were collected in 2016 and 2017. Additional quantitative data for mollusk were collected in 2017 by Auburn University.

Steven M. Sammons, sammosm@auburn.edu, 334-844-4159

Population and Life-History Characteristics of Two Black Bass Species in the Flint River System, Georgia

Steven M. Sammons, School of Fisheries, Aquaculture, and Aquatic Sciences, 203 Swingle Hall, Auburn University, AL, 36849
Travis R. Ingram and John M. Kilpatrick, Georgia Department of Natural Resources, 2024 Newton Rd, Albany, Georgia, 31701

Black bass *Micropterus* spp. are important components of river fisheries in the southeastern U.S., but little is known about their population characteristics. The Flint River is a 565-km river in west-central Georgia; Lake Blackshear impounds the river approximately 320 km below its source. Largemouth Bass *M. salmoides* and Shoal Bass *M. cataractae* were collected from both systems from 2009-2013 to examine age and growth characteristics. Shoal Bass were only found in the river and grew faster than Largemouth Bass in both river and reservoir. Longevity of Largemouth Bass was greater than Shoal Bass throughout the river, with fish collected up to age 13, compared to age 11 for Shoal Bass, but was similar between the river and reservoir. Female Largemouth Bass grew faster than males, but Shoal Bass growth was similar between sexes. Recruitment of Largemouth Bass was more inconsistent than Shoal Bass in the Flint River and negatively affected by high flows; whereas, Shoal Bass recruitment was not related to flow. Growth and mortality of black bass in these rivers approximated those seen for congeners in reservoirs across the southeastern U.S., demonstrating that these populations are capable of supporting quality fisheries with potential for anglers to catch trophy-sized individuals.

Gregory N. Whitis whitign@auburn.edu 334-624-4016

The Alabama Fish Farming Center: Thirty-seven years of service to the aquaculture industry and Alabama's recreational pond owners. Past, present and future.

Gregory N. Whitis and Luke A. Roy

Alabama Fish Farming Center, School of Fisheries, Aquaculture and Aquatic Sciences, Auburn University

The Alabama Fish Farming Center first opened in the fall of 1982 in response to a rapidly growing young catfish industry in west Alabama. The Center provided technical advice in management, water quality and disease diagnosis plus engineering assistance with pond designs. As the industry grew from less than 8,000 acres in 1983 to almost 27,000 acres in 2004, the Center provided 24-7 technical assistance. The impact of imports from 2004 to present has resulted in a major shrinkage of the catfish industry. Presently, the Center is involved in many aspects of Alabama's growing aquaculture industry and is now conducting research on inland shrimp production, alternative production systems and disease and vaccine trials. Full time staff include two Ph.D. researchers and one Masters of Aquaculture extensionist plus a support staff of two and a resident graduate student. The Center also provides extensive technical support to Alabama's.

Mark A. Albins, mark.a.albins@gmail.com, 251-861-2141 ext. 2190

Response of Alabama marine and estuarine fishes to artificial reef addition and enhancement

Mark A. Albins [1], Crystal L. Hightower [1], Craig Newton [2], Sean P. Powers [1]
[1] Dauphin Island Sea Lab, Center for Ecosystem Based Fishery Management, Fisheries Ecology Lab, Dauphin Island, Alabama 36528
[2] Alabama Department of Conservation and Natural Resources, Marine Resources Division, Dauphin Island, Alabama 36528

Artificial reefs are often used to increase fishing opportunities, particularly in areas like the Northern Gulf of Mexico, where natural reef habitat is limited. Yet, the ecological and fisheries benefits of such reefs remain a topic of debate. Reefs could serve to attract animals away from nearby habitats making them easier to catch. Reefs could also increase limited resources resulting in increased production. Beginning in the early 1950s, an extensive network of artificial reefs has been deployed in the inshore and offshore waters of Alabama to enhance fishing opportunities and increase the amount of high-quality habitat available for important fisheries species. The Alabama Department of Conservation and Natural Resources, Marine Resources Division has recently (2016-2018) deployed approximately 430 new reefs and enhanced approximately 100 existing reefs in this network. We used fisheries-independent survey tools to assess changes in fish population structure and community composition on a subset of these reefs. Preliminary results indicate that fish abundance and biomass at offshore sites have increased dramatically since reef deployment. However, compared to controls, fish populations at inshore sites do not, as yet, appear to have been affected by reef addition or enhancement. Next steps include more detailed examinations of changes in size-structure of important fisheries species and changes in community composition on these reefs through time. We are also collaborating with other researchers to elucidate the links between primary production and fish production on these reefs to determine whether and to what degree the new reefs are resulting in increased fish production.

Crystal LouAllen Hightower, CHightower@disl.org, 251-861-2141 x2097

An update on the current status of adult Red Drum (*Sciaenops ocellatus*) in the northern Gulf of Mexico

Crystal L. Hightower[1], Sean P. Powers[1], J. Marcus Drymon[2], and T. Reid Nelson[1]
[1] University of South Alabama, Department of Marine Sciences, Mobile, Alabama 36688
[2] Mississippi State University Extension, Biloxi, Mississippi 39532

Based on the duration of the 1987 federal harvest moratorium, Gulf of Mexico Red Drum have remained a data-limited species for over thirty years. Despite their popularity as an inshore sportfish, little is known about their post-escapement distribution and abundance in offshore waters of the Gulf of Mexico. The latest gulf-wide stock assessment recommended increased sampling across the Gulf of Mexico for adult Red Drum for comparison to historical data. They recommended purse seine as the least size-selective sampling gear for Red Drum in offshore waters. To compare current age composition and update biological information for adult Red Drum, we sampled schooling Red Drum throughout the Gulf Coast from western Louisiana to the eastern Alabama barrier islands via purse seine from 2014-2017. Red Drum ranged from 561-1018 mm total length and 2-26 years old. Size distribution showed Louisiana Red Drum were larger than those collected in Alabama (K-S; $p < 0.001$); although, there was no difference in age composition (K-S; $p=0.968$). This may be a result of higher quality forage for Louisiana Red Drum. Coarse gut content analysis also showed feeding during spawning aggregations. Overall, purse seine sampling was successful; however, due to the lack of a traditional commercial fishery and the ephemeral nature of the schools, obtaining samples via this method proved to be logistically difficult. Trends in abundance over time may be monitored through ongoing fishery independent surveys, specifically bottom longline.