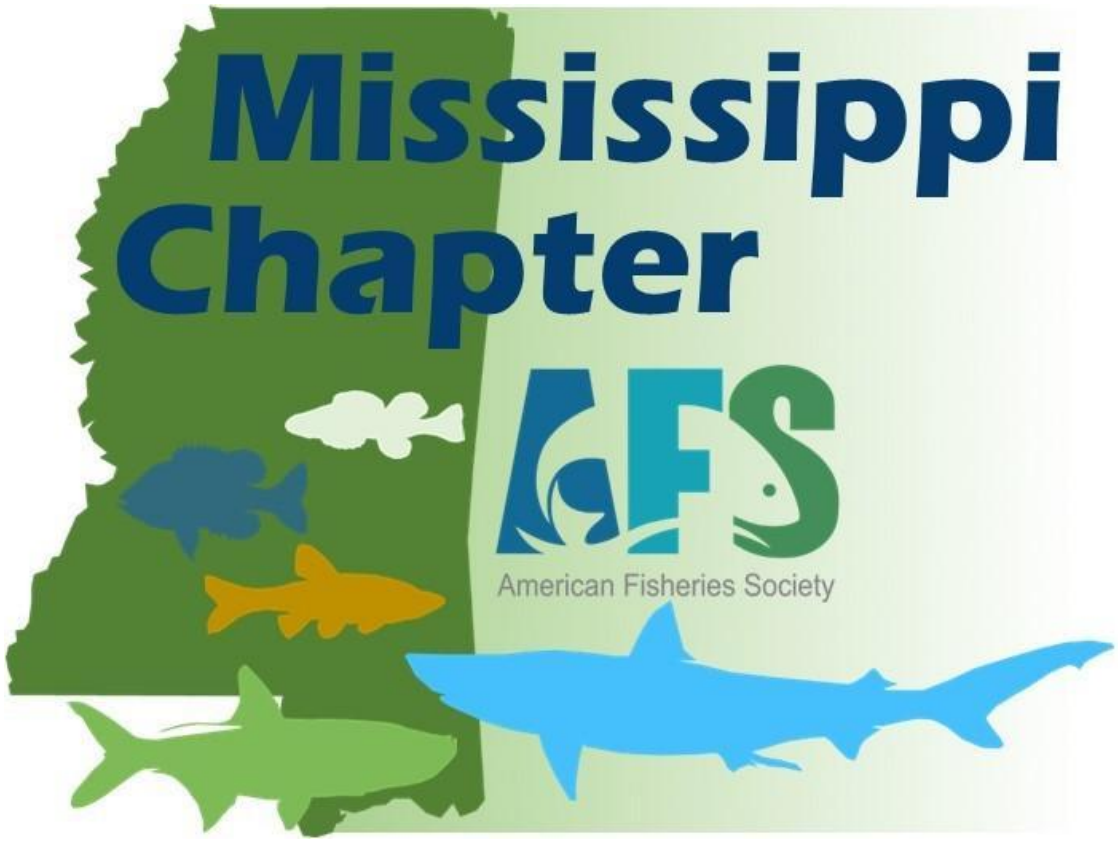
51st Annual Meeting of the

Mississippi Chapter

of the American Fisheries Society



Starkville, MS

26–28 February 2025

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We also thank the Mississippi Department of Wildlife, Fisheries, & Parks for the printing of these programs.

Program-at-a-Glance

Date & Time	Event	Location
Wednesday, February 26		
9:00 am - 1:00 pm	**Student Workshop**	**Noxubee NWR**
2:00 – 5:00 pm	**Registration**	**Outside Roosevelt**
3:00 – 3:15 pm	**Opening Remarks**	**Roosevelt Gallery**
3:15 – 5:00 pm	**Presentations**	**Roosevelt Gallery**
6:00 – 10:00 pm	**Welcome Social/Poster Session**	**Roosevelt Gallery**
Thursday, February 27		
	Breakfast	**On your own**
7:30 – 9:00 am	**Registration**	**Outside Roosevelt**
8:00 – 9:45 am	**Presentations**	**Roosevelt Gallery**
9:45 – 10:00 am	**Break**	
10:00 am – 12:00 pm	**Presentations**	**Roosevelt Gallery**
12:00 – 2:00 pm	**Lunch ***	**On your own**
2:00 – 3:30 pm	**Presentations**	**Roosevelt Gallery**
3:30 – 3:45 pm	**Break**	
3:45 – 5:00 pm	**Presentations**	**Roosevelt Gallery**
5:00 – 5:10 pm	**Break**	
6:30 – 10:00 pm	**Banquet**	**Roosevelt Gallery**
Friday, February 28		
	Breakfast	**On your own**
9:00 – 11:00 am	**Business Meeting**	**Roosevelt Gallery**
11:00 am	**Adjourn**	

*Student/Mentor Lunch will be held at Two Brothers Smoked Meats at 621 University Drive.

President-Elect Candidates

Trevor Moncrief

Trevor Moncrief is the Finfish Bureau Director at the Mississippi Department of Marine Resources, where he oversees all research and monitoring projects while also serving as a fisheries manager for saltwater species in Mississippi. He plays a key role in Gulf-wide fisheries management, sitting on numerous committees and groups, including the Gulf Council SSC, where he contributes to the sustainable management of marine resources. An avid outdoorsman, he has a deep passion for fishing and spending time on the water whenever possible. However, his greatest joy comes from being with his wife, Laura, and their two young daughters, Lily and Regan, who are the heart of his world. As a student Trevor previously served as president for the USM MS AFS Sub-unit and has remained in tune to the proceedings of MS AFS since his employment with MDMR. As president, Trevor will do everything in his power to move the Mississippi AFS meeting to Tara Wildlife, a location well-known for its pristine natural environment and ability to provide a centralized meeting space that bolsters cross-entity discussion and collaboration.

Sandra Correa

Dr. Sandra B. Correa is an Associate Professor at the Department of Wildlife, Fisheries and Aquaculture at Mississippi State University. She is originally from Colombia, where she earned a B.S. in Biology from the University of Valle. Sandra graduated with a M.S. from the University of Florida and a Ph.D. from Texas A&M University. She leads the River Ecology Lab at Mississippi State University and studies large rivers, floodplain ecosystems, and fish ecology. Research in her lab investigates how environmental factors influence fish species diversity, fisheries productivity, and aquatic food webs. Findings from her research support river-floodplain restoration, fisheries management, climate change adaptation, and food security initiatives.

Presentation Schedule – Wednesday, February 26

Students competing for the best student presentation are designated with an asterisk.

Time	Presentation Title	First author
3:15 pm	Preliminary Insights into Gulf Sturgeon Habitat Use at Oyster Reef Sites in the Mississippi Sound	Eugin Bornman
3:30	Winter Storm-induced Fishkill in Mississippi: Impacts and Next Steps	James Klein
3:45	Darters in a Shifty Situation	Matthew Wagner
4:00	Comparison of different methods for understanding responses to stressors in fish	Peter Allen
4:15	Asymptotic and transient dynamics of historic walleye (Sander vitreus) populations from the Black Warrior--Tombigbee River system	Caleb Aldridge
4:30	Study Overview: Movements of Recreationally Important Freshwater Fishes in two Mississippi Coastal Rivers	Nicholas Stewart
4:45	Diversity and habitat selection among young fish in subtropical seasonally flooded forests of North America	Sandra B Correa

Presentation Schedule – Thursday (AM), February 27

Time	Presentation Title	First author
8:00 am	eDNA Surveillance and Population Genomics of the Invasive Pond Loach (Misgurnus anguillicaudatus) Introduced to the United States	Tobin Davidson*
8:15	Identifying early life habitat use and movement patterns in juvenile Gulf Sturgeon (Acipenser oxyrinchus desotoi) through analysis of geochemistry patterns	Matthew Olson*
8:30	If a paddlefish swims around but no one can catch it, was it even there?	Evelyn Pantelopoulos*
8:45	Examining seasonal movement patterns of Atlantic Tripletail (Lobotes surinamensis) within the Gulf of Mexico through the use of acoustic telemetry	Joshua Perry*
9:00	Exploring a novel method for evaluating body condition in juvenile fish	Camren Fraser*
9:15	Antibiotic Resistance In Microbial Communities From Catfish Culture Systems: A Cross-Sectional Analysis	Divya Rose*
9:30	Use of NIRS as a management tool to differentiate healthy and sick catfish infected with the pathogen Edwardsiella ictaluri	Ashmita Poudel*
9:45	Break	Break
10:00	Post-larval Piebalds Provide Positives for Protection	Robert Ellwanger
10:15	Identification of Potential Live-Attenuated Vaccine Candidate Against Edwardsiella piscicida in Channel Catfish (Ictalurus punctatus) × Blue Catfish (I. furcatus) Hybrids	Sujita Balami*
10:30	Projected future reservoir impairment in the conterminous United States following three climate change scenarios	Darren Shoemaker*

10:45	Effects of different accelerometer shapes on retention, and survival in Channel Catfish (Ictalurus punctatus)	Nicholas McNew*
11:00	Novel aquatic pathogen in Red Drum (Sciaenops ocellatus) in the Gulf of Mexico	Hannah Pye*
11:15	Acoustic Telemetry and Management Strategies for Mississippi Southern Flounder	Calvin Chee*
11:30	Assessing Species Status and Genetic Diversity in the Tombigbee Darter (Etheostoma lachneri)	Caroline Teal*
11:45	Assessing Site Fidelity and Inter-Subsystem Movements of Black Drum (Pogonias cromis) in the Mississippi Sound	Alyssa Pagel*
12:00	Lunch – on your own	Break

Presentation Schedule – Thursday (PM), February 27

Time	Presentation Title	First author
2:00 pm	Conservation of Southern Walleye (Sander sp. cf. vitreus): Insights from Nuclear Markers and Broodstock Management	Kayla Fast
2:15	Movement and Network Analysis of Lemon Sharks (Negaprion brevirostris) in Mississippi Coastal Waters	Lindsay Bomgardner*
2:30	Gulf Sturgeon Spawning Movement in the Bouie River System	Olivia St. Germain*
2:45	Determining the Status, and Distribution of Two Newly Described Burrowing Crayfish in Southeastern Mississippi	Calvin Rezac
3:00	Identifying the host fishes for at-risk mussel species in the Mississippi Alluvial Valley	Nicky Faucheux
3:15	Understanding the energy use of juvenile catfishes at low temperatures through metabolic scope, swimming performance, and blood metabolites	Abby McGregor
3:30	Break	Break
3:45	Seasonal trends of fish communities in oxbow lakes of the Mississippi River batture	David Ruppel
4:00	Avoidance Learning in Juvenile Bighead Carp Hypophthalmichthys nobilis	Mike Holliman
4:15	Movements and water-column use of imminently spawning Greater Amberjack Seriola dumerili (Risso 1810) in the northern Gulf of Mexico	Daryl Parkyn
4:30-6:30	Break	Break
6:30-10:00	Banquet Dinner - Keynote Speaker Larry Pugh	

Poster Presentations

Students competing for the best student presentation are designated with an asterisk.

Poster Number	Title	First author
1	Comparing host climate match of two biological control agents using ecological niche modes (ENMs)	Samuel Schmid*
2	The effects of hydrologic connectivity on bacterial dispersion in stream networks using eDNA detection	Tyler Redman*
3	Non-Specific Cytotoxic Cells in Fish: Key Players in Fish Immunity	Vitor Silva*
4	Impact of Microcystin-LR Exposure on Growth, Development and Reproductive Genes in Channel Catfish	Treva Billyard*
5	Reproductive biology of the Bull Shark (Carcharhinus leucas) in the north central Gulf of Mexico	Anna Millender*
6	Movement and Space Use of Cownose Rays (Rhinoptera bonasus and Rhinoptera brasiliensis) in Coastal Mississippi Waters	Kirsten Bauer*
7	Microplastic and Mesoplastic Quantification in Cartilaginous Fishes of the Northern Gulf of Mexico	Victoria Greene*
8	Comparing the abundance of aquatic macroinvertebrate communities above and below a low-head dam in the lower Bouie River, Mississippi	Natalie Santiago*
9	Is it hot enough for you? Temperatures experienced by Gulf Sturgeon (Acipenser desotoi) in the Pearl and Pascagoula rivers	Morgan Segrest*
10	Developing an eDNA Protocol for Gulf Coast Walleye	Kevin Jones*
11	Preliminary Investigation into the ecology of the Inshore Lizardfish (Synodus foetens) from the Northern Gulf of Mexico	Tyler Eye
12	Swimming abilities of the Bluntface Shiner (Cyprinella camura)	Mary Tingle
13	Population Genomic Assessment of the Gulf Strain of Striped Bass (Morone saxatilis)	Kyle Hubbard
14	Chemical Control of the Aquatic Plants Alligatorweed and Knotgrass	Gray Turnage
15	Pascagoula Pearls: Diving into Mussel Research	Marinee Humphries
16	The Ribbeting World of Crayfish: Examining Burrowing Crayfish Associated with New Occurrences of Crawfish Frogs in Central Mississippi	Zoë Mabry
17	Effects of Low Temperatures on Liver and Muscle Glycogen in Catfish	Tyler Wright

ABSTRACTS

ORAL PRESENTATIONS

Preliminary Insights into Gulf Sturgeon Habitat Use at Oyster Reef Sites in the Mississippi Sound

Eugin Bornman, Michael J. Andres

University of Southern Mississippi

The ecosystem benefits of oyster reef restoration projects are often difficult to quantify, especially for endangered species such as the Gulf Sturgeon (Acipenser oxyrinchus desotoi). Understanding how fishes use oyster reef habitats before, during, and after restoration efforts is crucial for assessing the success of these conservation interventions. This study utilized acoustic telemetry data collected prior to restoration efforts (2021–2022) from 141 Gulf Sturgeon to investigate daily area use (Kernel Density Estimates; KDE) at sites with and without oyster reefs at the mouths of the Pascagoula River and Bay St. Louis. Gulf Sturgeon exhibited the highest daily core use area (50% KDE) at Pascagoula sites lacking oyster reefs, with a mean of 0.13 km^2, compared to 0.07 km^2 at sites with existing reefs. This suggests that while sturgeon use both types of habitats, the oyster reef sites are used less, potentially reflecting differences in habitat quality and food availability. A Zero-inflated Generalized Linear Model found that daily core space use was positively correlated with daily averaged near-bottom water temperature (logged by receivers) and negatively correlated with daily average wind speed (recorded by NOAA weather buoys). Sturgeon primarily used these areas during fall and spring, aligning with their spawning migrations. This study underscores the need for ongoing monitoring to ensure that restoration activities are effective in enhancing habitat quality and supporting the recovery of endangered species like the Gulf Sturgeon. The data collected prior to reef restoration efforts provide a valuable baseline for understanding how Gulf Sturgeon interact with their habitats and will allow for future comparisons to assess the impact of the restoration activities.

ORAL PRESENTATIONS

Winter Storm-induced Fishkill in Mississippi: Impacts and Next Steps

James C. Klein, Trevor D. Moncrief, Eric M. Gigli

Mississippi Department of Marine Resources

An unprecedented winter storm impacted the Northern Gulf Coast on January 21st, 2025, delivering over 8 inches of snowfall across coastal Mississippi. A prolonged cold snap followed, with subfreezing air temperatures persisting for multiple days. The combination of snow accumulation, sustained low temperatures, and near-freezing snowmelt runoff into shallow estuarine waters contributed to extensive localized fish mortality. Fishkills, nearing 100% mortality, were documented in shallow estuaries and barrier islands in eastern Mississippi, while limited mortality events were observed in western coastal waters or the interior Mississippi Sound. Multiple recreational and commercially viable fish species, including Striped Mullet (Mugil cephalus), Spotted Seatrout (Cynoscion nebulosus), Red Drum (Sciaenops ocellatus), Black Drum (Pogonias cromis), and Sheepshead (Archosargus probatocephalus) were affected and displayed various levels of impact. Aerial imagery was taken at select sites to document the scope and extent of mortality, and a subset of Spotted Seatrout were measured to characterize the size, age, and sex distribution of impacted seatrout. Compared to the length composition of Spotted Seatrout from the previous ten years of recreational catch data, seatrout killed by the sever winter storm were generally larger. The ecological consequences of this event remain uncertain, but it presents a unique opportunity to study habitat recolonization by these species, particularly Red Drum and Spotted Seatrout. Continued monitoring is essential to understanding post-disturbance fish succession, population recovery, and any potential changes in population dynamics.

ORAL PRESENTATIONS

Darters in a Shifty Situation

Matthew D. Wagner[1], River A. Watson[2], Jake F. Schaefer[3]

[1]U.S. Fish and Wildlife Service
[2]The University of Southern Mississippi
[3]The University of Southern Mississippi

As habitat degradation is the leading cause for declines in fishes worldwide, understanding the habitat species are currently using, as well as their connectivity among these habitats, is essential to species conservation. The Bayou Darter, Nothonotus rubrus, is a federally threatened species endemic to the geomorphically active watershed of Bayou Pierre in southwestern Mississippi. Basin-wide increased erosional rates in Bayou Pierre have resulted in extensive habitat changes below the knickpoint such as widened channels with higher levels of fine sediments which select against riffle-associated species such as N. rubrus. Previous work has found a steep decline in the extant populations and number of N. rubrus across its range due to these habitat changes, but individuals have been captured exclusively by seine and not electrofishing, which has been shown to be more effective at detecting some rare benthic species. We aimed to assess population demography across the range by sampling sites known to previously house some of the highest populations, while conducting a comparison of catch-per-unit-effort of seining and electrofishing. Mesohabitat data was used to elucidate habitat types N. rubrus are using as refuge in the ever-changing environment. To assess connectivity of N. rubrus among dispersed habitats, all individuals were elastomer tagged at six to eight subreaches of a single site in April-June 2024 and were recaptured July-August 2024 to analyze movement of the species through degraded corridors. Habitat data, gear efficiency, and movement were also analyzed for the Brighteye Darter, Etheostoma lynceum, a species that is very common in the Bayou Pierre watershed and occupies similar habitats to N. rubrus, for comparisons between a threatened and non-threatened species.

ORAL PRESENTATIONS

COMPARISON OF DIFFERENT METHODS FOR UNDERSTANDING RESPONSES TO STRESSORS IN FISH

Peter J. Allen[1], Tibor Pechan, Olga Pechanova[2], Claudio A. Álvarez[3]

[1]Department of Wildlife, Fisheries and Aquaculture / Mississippi State University
[2]Institute for Genomics, Biocomputing and Biotechnology / Mississippi State University
[3]Centro de Estudios Avanzados en Zonas Aridas / Universidad Catolica del Norte

Environmental and handling stressors are common to fisheries and aquaculture practices and may affect various fish species differently. Understanding these diverse stress responses is crucial for optimizing sampling and holding practices. This study investigates the physiological responses to stressors of two fish species representative of diverse species groups in North America. The species selected, channel catfish (Ictalurus punctatus) and alligator gar (Atractosteus spatula), were hypothesized to differ greatly in magnitude of responses. We exposed both species to environmental and handling stressors and evaluated their physiological stress responses using a variety of methods, including analyses of blood and tissue metabolites and measurements of the classical stress hormone cortisol. Additionally, we compared skin mucus peptide profiles of both species following stress exposure. The results will provide a baseline for understanding physiological responses to stress in these species, be useful for comparing a range of stress levels and the techniques used to measure stress, and offer insights that can inform and improve field sampling and aquaculture practices.

ORAL PRESENTATIONS

Asymptotic and transient dynamics of historic walleye (Sander vitreus) populations from the Black Warrior--Tombigbee River system

Caleb A. Aldridge

U.S. Fish & Wildlife Service, Lower Mississippi River Fish & Wildlife Conservation Office

Historic walleye (Sander vitreus) populations from the Black Warrior–Tombigbee River system were analyzed using a population projection matrix approach to assess both their asymptotic (long-term) and transient (short-term) dynamics. This study combined age-structured data from multiple sources to parameterize a von Bertalanffy growth model using weighted nonlinear least squares. Growth parameters informed the construction of weight-at-age curves using sample size weighted weight–length coefficients, which were subsequently used to derive age-specific fecundity schedules. Natural mortality was estimated from multiple theoretical models, and the resulting survival rates were incorporated into the population projection matrix.

In addition to classical asymptotic indices—such as the growth rate, stable age distribution, and reproductive value—this study quantified transient properties including reactivity, maximum amplification/attenuation, and inertia. Model projections demonstrated that deviations from the stable age distribution led to transient dynamics that can temporarily amplify or attenuate population abundance by over 100–140%, highlighting the potential short-term consequences of perturbations. Additionally, the effects of an empirical harvest rate estimate were explored and compared by modifying survival rates according to age-specific capture and harvest vulnerabilities.

Integrated asymptotic and transient analyses provide an understanding of the demographic processes that govern walleye population resilience, offering insights that are essential for the development of informed fisheries management strategies in the Black Warrior–Tombigbee River system. Future analyses aim to incorporate density-dependence functions and model stochastic variation, and to estimate the effects of disturbance and management on populations while testing competing hypotheses of population functions.

ORAL PRESENTATIONS

Study Overview: Movements of Recreationally Important Freshwater Fishes in two MS Coastal Rivers

Nicholas Stewart, Stephen Brown

Mississippi Department of Wildlife, Fisheries, and Parks

How fish respond to different hydrologic events help resource managers develop strategies for different regions. The Pascagoula River drainage and its tributaries are unique in that they have limited impoundments throughout as well as a tidal influence towards the river mouth. This region also boasts several popular fisheries including black bass and catfish. Using acoustic telemetry, we will be tracking the movements of several target species of this fishery including Largemouth bass (Micropterus nigricans), Spotted bass (Micropterus punctulatus), Flathead catfish (Pylodictis olivaris), and Blue catfish (Ictalurus furcatus) to see how they respond to the tidal influx in the coastal reaches of this river system. Largemouth bass and Blue catfish are known to tolerate estuarine environments and may be able to better capitalize upon this region in comparison to other species. Our objectives for beginning this study are to see how these fish respond to a dynamic estuarine environment and to look at the connectedness of the lower Pascagoula River and its tributaries.

ORAL PRESENTATIONS

Diversity and habitat selection among young fish in subtropical seasonally flooded forests of North America

Sandra B. Correa, Grant Peterson, Autumn Carroll, Julia Null, Ke'Daja Freelon, Benjamin Chaffins, Ian Hurst, Peter Allen, Tony Arrick, Chuan-yu Hsu, Daniel G. Peterson

Mississippi State University

Monthly sampling in flooded forests along upper and lower reaches of the Pascagoula River used light traps and mini-fyke nets. Water quality (chlorophyll-a, pH, conductivity, ammonium, temperature) and depth were recorded. A total of 1,719 fish were collected, photographed, measured, and sorted into morphotypes. DNA sequencing compared against two reference databases (Barcode of Life Database-BOLD: based on the COI gene and National Institute of Health, Basic Local Alignment Search Tool-BLAST: based on the complete mitochondrial sequence) identified 34 species, with 68% sample and 71% species agreement between databases. Some species (e.g., Lepomis miniatus, Lepomis marginatus) lacked complete mitochondrial sequences, limiting BLAST identification.

Cyprinids and centrarchids dominated assemblages. Larval fish were more abundant during the peak flood (March-April), yet species diversity (Shannon Index) did not significantly differ between dry and flooded seasons (permutational t-test: $Z = -0.446$, $p = 0.80$) or between upper and lower reaches ($Z = -0.901$, $p = 0.476$). Similar patterns were observed when analyzing both larval and juvenile fish. Similarly, no statistical differences in species composition of young fish were detected across hydrological seasons (permutational anova: $F = 1.505$, $p = 0.115$) or reaches ($F = 0.546$, $p = 0.883$).

Our findings highlight the year-round importance of flooded forests for early-stage fish. The unaltered hydrology of the Pascagoula River facilitates connectivity across its floodplain, emphasizing the conservation value of intact floodplain ecosystems.

ORAL PRESENTATIONS

Student Presentation

eDNA Surveillance and Population Genomics of the Invasive Pond Loach (Misgurnus anguillicaudatus) Introduced to the United States

Tobin J. Davidson[1], Kayla M. Fast[1], Michael W. Sandel[2]

[1]Wildlife, Fisheries, and Aquaculture, Mississippi State University
[2]Forest and Wildlife Research Center, Mississippi State University

Invasive species represent a growing threat to the ecosystems and economies of the United States. The southeastern United States represents an aquatic biodiversity hotspot, and a rapidly growing number of nonindigenous freshwater fishes are attributed to the decline of multiple native species already facing extinction. Presidential order 13751 describes the need for rapid and cost-effective tools to detect invasive species during the earliest stages of introduction, when mitigation and control efforts are most effective. Misgurnus anguillicaudatus is an escaped species from the aquarium trade with native origins from East Asia. Introduced populations in the southeastern United States pose a large threat to the Cahaba River Watershed; exploitation of sediment, uprooting of aquatic vegetation, and competition with native ichthyofauna for food resources negatively impact ecosystems post-introduction, thus threatening the native populations in the region. This study includes development of noninvasive environmental DNA (eDNA) protocols designed for early detection of invasive freshwater fishes, specifically M. anguillicaudatus in the southeastern United States, and population genetics analyses to test the hypothesis that introduced populations in the United States are monophyletic. Alternatively, multiple populations may descend from distinct evolutionary lineages or species. Phylogenetic results indicate that there are three monophyletic populations of Misgurnus loaches in the United States. These results suggest multiple invasions of different loach species, providing additional complexity to the understanding and management of introduced habitats. Enhanced understanding in regard to the population genomics of this ecologically problematic species will contribute to the preservation of one of the world's most biodiverse temperate freshwater ecosystems.

ORAL PRESENTATIONS

Student Presentation

Identifying early life habitat use and movement patterns in juvenile Gulf Sturgeon (Acipenser oxyrinchus desotoi) through analysis of geochemistry patterns

Matthew G. Olson[1], Levi S. Lewis[2], Brenda M. Pracheil, Rinat I. Gabitov[3], J. Wes Neal[1], Peter J. Allen[1]

[1]Mississippi State University
[2]University of California-Davis
[3]Pacific Northwest Laboratory

The Gulf Sturgeon (Acipenser oxyrinchus desotoi) has been a species of conservation concern for the past few decades. Recovery efforts have been undertaken across their range, with a special focus on their western populations in the Pearl and Pascagoula Rivers due to smaller population sizes. Within these river systems, a better understanding of natal origin habitat, and movement patterns from hatch until initial entry into saline water, have promise for guiding conservation efforts, especially during sensitive early life stages. Pectoral fin spines, which record environmental water chemistry with growth, can be used to retrospectively analyze habitat use and movement patterns. Therefore, pectoral fin spines were collected from juvenile (age 1-4) Gulf Sturgeon in the Pearl and Pascagoula River systems and analyzed for trace element concentrations and isotopic ratios using laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS). Analyses quantified changes in the elements strontium (Sr), barium (Ba), and manganese (Mn), and 87Sr/86Sr isotopic ratios known to change from river headwaters to estuarine and coastal areas. Water samples were collected throughout these river systems and analyzed for these elements and Sr isotopes to develop watershed maps and for use in estimating habitat use and movement. In both river systems, results have shown a general pattern of juvenile sturgeon entering saline waters during deposition of their second and third growth zones (approx. age 1.5-2.5). Elemental concentrations in the water were consistent with predictions, with Sr having high concentrations in saline waters and low concentrations in freshwater, and Ba and Mn having the opposite pattern. Previous Sr isotope analysis of fin spines has shown patterns of natal origin and movement patterns. To further enhance assignment of habitat and movement, spatial modeling and machine learning techniques will be used. The findings from this project will inform conservation efforts through identification of riverine habitat important to juvenile Gulf Sturgeon.

ORAL PRESENTATIONS

Student Presentation

If a paddlefish swims around but no one can catch it, was it even there?

Evelyn Pantelopoulos, Kasea L. Price, Michael J. Andres

The University of Southern Mississippi

American Paddlefish (Polyodon spathula) are primitive fish species native to North America and the only surviving members of Polyodontidae. Once abundant and commercially harvested for meat and caviar throughout their range, paddlefish populations have experienced declines across parts of their range due to factors such as habitat degradation and overfishing. While Mississippi is reported to have stable paddlefish populations, the fishery has been closed and there is no systematic monitoring in place. Hence, there is a need for estimating paddlefish populations in Mississippi tributaries. We have been tagging and implanting acoustic transmitters paddlefish in the Pascagoula and Bouie rivers since 2022. However, catch per unit effort (CPUE) has been low across the Pascagoula tributaries (< 0.034 captures per gillnet). Therefore, we need to determine if the low CPUE is due to low density or gear inefficiency. The objective of this study was to estimate paddlefish catchability (p) using current capture methods and acoustic telemetry in the Bouie River. Low catchability values (< 0.125), based on the number of telemetered paddlefish present at a sampling event and the number of those telemetered fish recaptured, show that the species is difficult to capture. This may mean that current capture methods (anchored or drifting gillnet) are not efficient for the location or species and may not be an appropriate method for population estimation. Increased sampling effort, experimentation of capture methods, and use of different technology to increase catchability is needed for a reliable population estimate.

ORAL PRESENTATIONS

Student Presentation

Examining seasonal movement patterns of Atlantic Tripletail (Lobotes surinamensis) within the Gulf of Mexico through the use of acoustic telemetry

Joshua Perry[1], Steven Vanderkooy[2], Michael J. Andres[1]

[1]The University of Southern Mississippi
[2]Gulf States Marine Fisheries Commission

Atlantic Tripletail (Lobotes surinamensis) are considered a data limited species by both state and federal agencies in the Northern Gulf of Mexico. Over the past decade recreational angling efforts specifically targeting Atlantic Tripletail have been increasing as the species has shifted from being opportunistically targeted to actively targeted. This shift demonstrates a need to understand the annual migration patterns of the species in the Gulf of Mexico. Through the collaborative efforts of several state and federal agencies within the Gulf of Mexico, 162 Atlantic Tripletail were captured using hook-and-line angling methods and tagged with Innovasea V9, V13, and V16 acoustic transmitters between 2019 to 2024. We have divided the Gulf of Mexico and the western Atlantic Ocean into seven distinct regions based on longitudinal gradient, five of which are in the Gulf of Mexico. Network analysis was conducted to examine movement patterns of individuals between regions, and we found few individuals were detected outside of their region and most regions outside of the Mississippi Sound and northcentral Gulf of Mexico only had detections from single receivers. Therefore, we focused on movements of individuals within this region. Tagged tripletail form the regions ranged from 232–737mm total length, with an average length of 398mm. Based on previous age and growth data from the Northern Gulf of Mexico we believe that those individuals are aged 0–4 with most individuals being young-of-year. Age-based differences were minimal, but questions remain regarding where tripletail migrate once they leave the nearshore systems.

ORAL PRESENTATIONS

Student Presentation

Exploring a novel method for evaluating body condition in juvenile fish

Camren Fraser[1], Leandro E. Miranda[2], Sandra B. Correa[1], Michael Sandel[1]

[1]Department of Wildlife, Fisheries, and Aquaculture, Mississippi State University
[2]U.S. Geological Survey, Mississippi Cooperative Fish and Wildlife Research Unit

Assessing body condition in juvenile fish can be challenging for various reasons. Condition often requires measuring body weight. However, the weight of small fish is difficult to measure in the field since it requires precise and accurate instruments. This difficulty is compounded by rocking boats, wind, and other unsuitable conditions. Body fat-based metrics can be obtained using numerous instruments including the Distell fatmeter, bioelectrical impedance and Fourier transform near-infrared spectroscopy. These have proven to be effective on various species but are not likely to work as well on juvenile fish that typically have low fat content. An alternative way to measure body condition in fish is by using body morphometric measurements to describe the general shape of the fish. Deeper and more rotund fish are generally heavier and thus could be assumed to be in better condition. I plan to use image based morphometric techniques to estimate body weight and in turn condition in a variety of juvenile fishes across the Mississippi River Basin. This condition estimation technique will potentially serve as an alternative to traditional weight measurements that fisheries managers can apply to a wide range of species and needs. I review various methods for estimating condition and, as a pilot study, apply an image-based approach to a pre-existing dataset.

ORAL PRESENTATIONS

Student Presentation

Antibiotic Resistance In Microbial Communities From Catfish Culture Systems: A Cross-Sectional Analysis

Divya Rose[1], Caitlin E. Older[2], Bradley M. Richardson[2], Taylor I. Heckman[1], Cyndi C. Ware[1], Matt J. Griffin[1]

[1]Mississippi State University
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Disease-related losses in catfish aquaculture are majorly attributed to bacterial infections. While an effective Edwardsiella ictaluri vaccine exists, disease management of other pathogens relies heavily on three FDA-approved antibiotics (oxytetracycline, florfenicol, and sulfamethoxine/ormetoprim). Limited antibiotic options have led to antimicrobial resistance (AMR), with multi-drug resistance (MDR) documented in pathogens like Edwardsiella ictaluri, E. piscicida, and Plesiomonas shigelloides. However, these studies rely solely on diagnostic case reports and do not examine the role of environmental reservoirs in the persistence and spread of AMR. Based on diagnostic submissions, AMR disappears over winter, is generally absent during spring and early summer outbreaks, and re-emerges with renewed treatment, suggesting environmental reservoirs harbor these resistance elements. Many resistance elements are carried on conjugative mobilizable plasmids, along with other resistance elements, implying they may be sustained by alternative selective pressures such as heavy metals and minerals. This study examined the pond water microbiome, focusing on culturable bacteria with reduced susceptibility to oxytetracycline and florfenicol from two commercial farms—one using antibiotics and one not. Differences were observed between overall pond water communities and culturable bacteria across systems. Similar microbial groups harbored AMR in both treated and untreated ponds. The presence of MDR plasmids in non-pathogenic bacteria suggests resistance genes persist without direct antibiotic pressure. Findings highlight that antibiotic use alone does not explain AMR persistence, emphasizing the role of environmental reservoirs. These results highlight the need for proactive bacterial disease management strategies to ensure sustainable aquaculture.

ORAL PRESENTATIONS

Student Presentation

Use of NIRS as a management tool to differentiate healthy and sick catfish infected with the pathogen *Edwardsiella ictalurid*

Ashmita Poudel[1], Anita Nalamalapu[1], Sujita Balami[2], Matt J. Griffin[2], Michael Caprio[3], Li-Dunn Chen[3], Andy Kouba[1], Carrie Kouba[3]

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Near-infrared spectroscopy (NIRS) coupled with chemometric modeling and aquaphotomics is a non-invasive, rapid, and inexpensive technology with increasing potential to be used as a diagnostic tool for disease. In fish, bacterial disease is not discernable in early stages or asymptomatic animals and confirmation takes several days before prescribing antibiotic treatment. Unfortunately, this delay allows the infection to spread within individuals and across the population, increasing mortality and economic losses. Here we evaluated the feasibility of NIRS in distinguishing healthy from sick fish (absence of visible clinical signs) via Edwardsiella ictaluri challenge using channel catfish fingerlings. Barbal-tagged fingerlings(n=120) were sorted into treatment and control groups (5 fish/tank, 12tanks /group). The treatment group (sick) was exposed to S97-773 (~4.2×108 CFU per/ml in sterile broth), while sterile broth alone was added to the control group (healthy). Spectral scans from three different regions (head, region around lateral line, and vent) of each live fish as well as a sample of blood (100 µL) were collected. Blood cultures were spread on Muller-Hinton plates, bacterial colonies were enumerated and pathogenic infection due to E. ictaluri was confirmed by multiplex PCR. The disease challenge resulted in a mortality rate of 86.7%. NIR spectral scans from each region were analyzed using R, key features of the spectral data were selected with Boruta, and a classification model was built using the random forest algorithm. The vent region had the highest classification accuracy (86.8±0.03%) for distinguishing healthy from sick fish, followed by the lateral line (83.6±5.5%), with the head having the lowest accuracy (75.4±6.4%).The findings from the study provides a proof of concept that NIRS can differentiate between asymptomatic sick and healthy fish. A rapid diagnostic model such as this could be used in real-time as a management tool to screen and monitor fish for E. ictaluri without visible symptoms.

ORAL PRESENTATIONS

Post-larval Piebalds Provide Positives for Protection

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The Piebald Madtom, Noturus gladiator (Thomas and Burr 2004) is historically known from six tributaries of the Mississippi River in western Tennessee and Mississippi. It is currently petitioned for federal listing by the USFWS due to documented declines across its range, especially in Mississippi. Within Mississippi, N. gladiator is listed as State Endangered included on the 2025 State Wildlife Action Plan (SWAP) as Highest Priority for conservation (2025 MS SWAP). The Big Black River represents the southernmost known population of the species. Only five historical collections exist along the mainstem of Big Black River, with the most recent collection, a single individual, made in 2007 near Vaiden, Mississippi. Prior to this detection and post 2007, several targeted attempts were made to detect a Piebald Madtom population within the Big Black River by MDWFP and partners with no success in detecting the species. The lack of positive detections after repeated survey efforts for Piebald Madtom lead to the species being considered as extirpated in the system by both MDWFP and USFWS. A total of 20 individual localities were surveyed in the Big Black River in Mississippi utilizing a 20' seine with 3/16' mesh and a chain added to the lead line.
All sites were completed between May and October of 2024. 28 juvenile Piebald Madtom individuals were collected from May-June, with no individuals collected in October. We believe that our positive sites represent an accurate range for the species within the Big Black River and that historic sites outside of that range no longer hold suitable habitat for the species.

ORAL PRESENTATIONS

Student Presentation

Identification of Potential Live-Attenuated Vaccine Candidate Against Edwardsiella piscicida in Channel Catfish (Ictalurus punctatus) × Blue Catfish (I. furcatus) Hybrids

Sujita Balami[1], Cynthia C. Ware[1], David J. Wise[2], Bradley M. Richardson[3], Esteban Soto[4], Matt J. Griffin[1]

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In US catfish aquaculture, hybrid catfish have gained popularity as an alternative to channel catfish. It occupies >50% of the industry, owing to several favorable production traits, including improved growth and feed conversion, increased tolerance to low dissolved oxygen and reduced susceptibility to several channel catfish diseases. However, concurrent with the increased adoption of hybrid catfish has been the emergence of Edwardsiella piscicida in U.S. catfish aquaculture. Hybrid catfish account for >90% of E. piscicida diagnoses at the Aquatic Research and Diagnostic Laboratory in Stoneville, MS, and have caused significant losses in both hybrid and channel catfish production systems. A member of the Hafniaceae family, E. piscicida is recognized as a global fish pathogen, with reports from at least 30 different fish species worldwide. Despite its global impact, there are limited commercially viable vaccines for E. piscicida, particularly in catfish. In this study, representative isolates from five discrete phyletic E. piscicida lineages were passed on plates containing increasing concentrations of rifampicin (RIF), up to 360 µg/ml. A total of 17 RIF mutant strains were produced and tested for attenuation and protection in two different experimental trials. The first attenuation trial included 10 candidate isolates. Hybrid catfish were concurrently exposed to both the RIF mutant and the wild-type parent through IC injections (~1x104 CFU per g of fish). While low-level mortality (<20%) was observed in all wild-type treatments, mortality was negligible in fish inoculated with RIF-passed mutants. However, this reduced mortality was significant in only 3 of 10 tested RIF mutants. Subsequent rechallenge revealed significant protection against E. piscicida isolate S11-285 for 9 of 10 wild-type strains, but only four of 10 RIF mutants, possibly a result of low immunizing dose or excessive attenuation. The four successful mutants yielded relative percent survival (RPS) of ~ 74-76%. A second trial was conducted similarly, with a higher inoculating dose (~3-6×105 CFU per g of fish) using seven discrete RIF mutants and their wild-type parents. High mortality (>90%) was observed in all wild-type strains, however three RIF mutants showed significant attenuation compared to their wild-type counterparts, with nearly 2-3 fold reductions in mortality. Upon challenge with virulent S11-285 all three mutants showed RPS 75-82%. The low level of mortality and elevated level of protection conferred by RIF mutants suggests it is a suitable attenuated strain and should be investigated further as a vaccine.

ORAL PRESENTATIONS

Student Presentation

Projected future reservoir impairment in the conterminous United States following three climate change scenarios

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Anthropogenic climate change has been associated with reservoir aging and reduced ecosystem function. Communities throughout the world depend on reservoirs for services such as hydroelectric electricity, drinking water, flood mitigation, and recreational opportunities. Though reservoirs were typically constructed to meet human needs, they are now also acknowledged as supporting biodiverse aquatic communities. Reservoir managers are expected to maintain services demanded by diverse users despite uncertainty surrounding how climate will impact reservoirs over time. Additionally, data describing reservoir function at broad spatial extents is often either unavailable, incompatible between agencies, or prohibitively resource-intensive to obtain. Expert opinion surveys are one alternative to in situ data, leveraging the experience and knowledge of those working on reservoir systems to identify broad patterns of impairment. We integrated data from expert opinion surveys describing reservoir conditions for 1090 reservoirs across the conterminous United States with historical climate conditions using a machine learning algorithm called a support vector machine. The support vector machine was used to project impairment scores for 35 metrics of reservoir impairment across four time intervals (2021-2040, 2041-2060, 2061-2080, and 2081-2100) and three future shared socioeconomic pathways (SSP126, SSP370, and SSP585). We identified spatially distinct clusters of reservoirs facing similar climate conditions using a cluster analysis. Future impairment is summarized by total an aggregated index of total impairment and for each impairment metric, across the conterminous United States, each climatic cluster, and individual reservoirs. We compiled these results in a web application developed in R-Shiny to facilitate communication of our results to decision makers, who can select the impairment metrics most relevant to their needs. Finally, we acknowledge the limitations of localized management which may not adequately address the impacts of climate at necessary spatial scales.

ORAL PRESENTATIONS

Student Presentation

Effects of different accelerometer shapes on retention, and survival in Channel Catfish (Ictalurus punctatus)

Nicholas McNew, Melanie R. Boudreau, Peter J. Allen

Department of Wildlife, Fisheries and Aquaculture, Mississippi State University

Accelerometers are useful for quantifying spatial movements and activity, and hold promise for understanding energy use of fish in turbid waters, such as in commercial catfish production. In order to use accelerometers, they must be surgically implanted, however, catfish in the family Ictaluridae can expel foreign objects from their body in approximately 2-4 weeks. To explore materials that might have longer retention times, different accelerometer tag materials and external coatings were evaluated in Channel Catfish (Ictalurus punctatus) over 12 weeks following surgical implantation. There were four tag types: polyactide (PLA), resin, resin with surgical mesh, and resin with surgical mesh and beeswax. Retention rate was low for all tag types. The surgical mesh tag had the highest retention rate, (<40% by 4 weeks) and the resin tag had the lowest retention rate (0% by 4 weeks). Fish survival differed among tag types, with only 35% of the fish with the surgical mesh tag surviving until 12 weeks compared to 50% survival at 12 weeks in fish with PLA tags . Differences in retention and survival may be due to material type and tag size. Results in this study indicate tag covering can influence retention duration, but experiments using accelerometer tags should occur 2-4 weeks following implantation for maximum data collection. Results also indicate while the surgical mesh tag does provide a longer retention time, because of the high mortality rate, this method is not recommended.

ORAL PRESENTATIONS

Student Presentation

Novel aquatic pathogen in Red Drum (Sciaenops ocellatus) in the Gulf of Mexico

Hannah M. Pye, Kayla M. Fast, Heather R. Jordan, Manuel Ruiz-Aravena, J. Marcus Drymon, Michael W. Sandel

Mississippi State University

Sciaenops ocellatus (Red Drum) is a popular sportfish native to the eastern coast of North America, with introduced populations in the Caribbean Sea and southeast Asia. Mycobacterium ulcerans is an ulcerative disease-causing bacterial species found in aquatic environments around the globe. In humans, M. ulcerans causes Buruli ulcer, but no cases have been reported in the southeastern United States. Lesions associated with M. ulcerans have been observed in Red Drum in southern Louisiana.To determine a baseline of M. ulcerans presence in fishes from the Gulf of Mexico, we swabbed the vents and gills of fish collected in Deep Sea Fishing Rodeos in Alabama (n = 238) and Mississippi (n = 151). These collections include 38 different species representing both bony and cartilaginous fish. Although the primary focus of this project was on Red Drum, we also analyzed Pogonias cromis (Black Drum) and Cynoscion nebulosus (Speckled Trout) due to their close taxonomic relationship within the Sciaenidae family. We noted that seven individuals had skin lesions, and plan to test whether these are correlated with M. ulcerans presence. We extracted microbial DNA from swabs and used polymerase chain reaction (PCR) to detect M. ulcerans. The molecular marker used targets the par A gene of the bacterial plasmid. M. ulcerans is present in 16.7% of Red Drum (8/48), 20% of Black Drum (3/15), and 0% of Speckled Trout (0/1). Phylogenetic analysis shows that the internal and external microbiomes of these individuals include two different ecovars of M. ulcerans. The ecovar isolated from the gills of one Red Drum is novel while ecovar Pseudoshottsii was isolated from nine gill samples and five vent samples. These data suggest that it will be important to monitor the presence of M. ulcerans and other pathogens in fish of economic and recreational importance.

ORAL PRESENTATIONS

Student Presentation

Acoustic Telemetry and Management Strategies for Mississippi Southern Flounder

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University of Southern Mississippi

Southern Flounder, Paralichthys lethostigma, is an important fish in the northern Gulf of Mexico and has declined throughout its range. In this work, we evaluate a spatially- and temporally-integrated per-recruit model by incorporating information on movement dynamics and spatial differences in fishing pressure. A total of n = 80 Southern Flounder were tagged in Saint Louis Bay, Mississippi with acoustic transmitters. We classified n = 11 individuals as migrators, these individuals exhibiting movement to offshore spawning locations, and n = 16 individuals as residents, these individuals overwintering in inshore habitats. Incorporating the total proportion of migrators, timing of egress from inshore habitats, and differences between inshore and offshore fishing pressure into the spatiotemporally integrated per-recruit model resulted in changes to reference points. In the traditional per-recruit model, at Mississippi's current minimum size limit of 305 mm, F0.4 = 0.41 y-1 and Fmax = 0.78 y-1; at a size limit of 381 mm, reference points increase to F0.4 = 0.64 y-1 and Fmax = 1.12 y-1. Under the current 305 mm size limit, F0.4 = 0.41 y-1 and Fmax = 0.78 y-1 in the traditional model, while F0.4 = 0.27 y-1 and Fmax = 0.52 y-1 in the integrated model. These contrasts indicate that the stock is more vulnerable when movement is explicitly considered in the model. The results of both traditional and spatiotemporally integrated per-recruit models indicate that changes to the current management regime could benefit the Southern Flounder stock.

ORAL PRESENTATIONS

Student Presentation

Assessing Species Status and Genetic Diversity in the Tombigbee Darter (Etheostoma lachneri)

Caroline N. Teal[1], Kayla M. Fast[1], Brian R. Kreiser[2], Kenneth A. Sterling[3], Michael W. Sandel[4]

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The Tombigbee Darter (Etheostoma lachneri) is the sole member of the snubnose subgenus Ulocentra endemic to the Tombigbee River Watershed of Mississippi and Alabama. Etheostoma lachneri is a species of greatest conservation need, due to suspected population decline since 1994 (Suttkus and Bailey). The Tennessee-Tombigbee Waterway (TTW), completed in 1984, resulted in headcut erosion that has drastically altered tributaries to the upper Tombigbee River. Although little habitat preference data are available for the Tombigbee Darter, other snubnose darter species require pools, runs, gravel/rocky debris; microhabitats that may have been destroyed by construction of the TTW. Habitat fragmentation has been shown to reduce population size, resulting in inbreeding among freshwater fishes. To assess the persistence and population genetic variability of E. lachneri in the Tombigbee River Watershed, we performed a population survey at 40 historical sites in Mississippi. Our results showed that 12 out of the 40 sites did not have E. lachneri present during the survey. Genomic analyses were conducted for populations across the species range using ddRADseq, which revealed three geographically contiguous clades with high bootstrap support. Isolation by distance (IBD) was evaluated using single-nucleotide polymorphisms (SNPs), which indicated that there is moderate correlation between distance and genetics. Species delimitation analysis (gdi) indicates that E. lachneri may represent a complex of three species. Results presented here will contribute to prioritization of E. lachneri in the Mississippi and Alabama statewide action plans.

ORAL PRESENTATIONS

Student Presentation

Assessing Site Fidelity and Inter-Subsystem Movements of Black Drum (Pogonias cromis) in the Mississippi Sound

Alyssa M. Pagel[1], Paul O. Grammer[1], Trevor Moncreif[2], Michael J. Andres[1]

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Black Drum (Pogonias cromis) are a commercially and recreationally important estuarine species found throughout the northern Gulf of Mexico. Despite their harvest pressure, limited information exists on their seasonal and spatial movement patterns within the Mississippi Sound. To address this gap, we analyzed the movements of Black Drum tagged in three subsystems of the Mississippi Sound: Barrier Islands (BI; n = 8), St. Louis Bay (SLB; n = 53), and the Pascagoula River Estuary (PRE; n = 41) between 2021 and 2024. We tracked the movements of Black Drum across subsystems of Mississippi coastal waters, including BI, SLB, and PRE, Back Bay of Biloxi, Pearl River, the western Mississippi Sound, and offshore using an array of passive acoustic receivers. We used this data to assess site fidelity, inter-subsystem movements, and seasonal habitat use. Our findings reveal strong site fidelity, with 84% of tagged Black Drum remaining within their subsystem of capture. However, a subset of individuals exhibited movement between subsystems. Of the individuals tagged in PRE, 12 moved to other systems. In BSL, 4 individuals transitioned to other systems. There were no individuals tagged in the BI that transitioned to other areas. These findings suggest that Black Drum exhibit high site fidelity with occasional subsystem connectivity. Although transitions between systems did not show a significant seasonal pattern, we observed more movements during spawning months, indicating that reproduction may influence inter-system movement. These insights provide a clearer understanding of Black Drum's spatial dynamics, which can inform management strategies aimed at conserving habitats and supporting sustainable fisheries in the Mississippi Sound.

ORAL PRESENTATIONS

Conservation of Southern Walleye (Sander sp. cf. vitreus): Insights from Nuclear Markers and Broodstock Management

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[2]Alabama Department of Conservation and Natural Resources

The Walleye (Sander vitreus) is a widespread freshwater sportfish valued for recreational and commercial purposes. Walleye have been introduced to non-native water bodies in 43 states via stocking as a food fish and for sportfishing. An undescribed species of Walleye (Sander sp. cf. vitreus) occupies the southernmost reaches of the Walleye native range in the Mobile Basin and is referred to as Southern Walleye. Southern Walleye is considered a species of conservation priority, due in part to competition or genomic homogenization with non-native Northern Walleye. Mitochondrial markers have traditionally been used by managers for stock identification and have been shown to be inadequate for Walleye in regions that have received less attention. We used nuclear markers to quantify the degree and geographic distribution of natural Southern Walleye reproduction in the Mobile Basin. We compiled a genomic dataset of over 400 specimens of wild-caught Southern (S. sp. cf. vitreus), Highlands (Perca salmonea), and Northern Walleye (S. vitreus); congeners within the Sander genus; and Southern Walleye broodstock used for stocking within the Tombigbee River Watershed. Walleye in the Tombigbee River Watershed are pure Southern Walleye with the exception of the Black Warrior River which shows admixture with Northern Walleye. Specimens from the upper Coosa River include pure Northern Walleye and admixed individuals, though the Hatchet Creek population represents a native pure Southern Walleye population. We found that broodstock recently supplied from Alabama and Mississippi hatcheries were pure Southern Walleye and nuclear data do not indicate admixture with non-native strains. Our data suggest that while admixture of Southern Walleye with non-native strains does occur, positive assortative mating may select for native genotypes. Current efforts to collect pure Southern Walleye for broodstock have been successful and continued stocking of native fish may aid in maintaining the genetic integrity of Southern Walleye.

ORAL PRESENTATIONS

Student Presentation

Movement and Network Analysis of Lemon Sharks (Negaprion brevirostris) in Mississippi Coastal Waters

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[2]Center for Fisheries Research and Development
[3]University of Southern Mississippi

The Lemon Shark (Negapion brevirostris) is a member of the large coastal shark complex found throughout the Atlantic Ocean and Gulf of Mexico, as well as the Gulf of California. The species is well studied in a portion of their range, but not throughout. Their population is currently listed as vulnerable under the IUCN due to an apparent population decrease across their range from fishing pressure and habitat loss. We aim to understand the extent of Lemon Shark use of Mississippi coastal waters as potential nursery habitat and identify their movement patterns in this region. We used catch data from long-term gillnet monitoring in conjunction with a focused gillnet study in shallow water habitat around Cat Island, MS. Captured elasmobranch species were identified, sexed, measured, weighed, and surgically implanted with acoustic transmitters. In total, 29 Lemon sharks were implanted with acoustic transmitters between July 2023 and September 2024. Individuals were monitored through an acoustic array surrounding the tagging location and throughout the barrier island region. Individuals were given an age designation based on size at time of capture with individuals below 70.0 cm fork length assigned to age-0 and those above assigned to age-1. We found multiple individuals over-wintered at or adjacent to the Mississippi barrier islands, but none were detected along the Mississippi mainland. This tendency to remain close to the barrier islands supports the notion of this region as nursery habitat. Network analyses demonstrate significantly higher median network diameter in age-1 vs age-0 sharks, suggesting older, larger individuals made more use of the islands. Our findings demonstrate that habitat used by the species is more variable than previously thought, and there is potential that more suitable nursery habitat may be available throughout the extent of their range outside of previously designated areas.

ORAL PRESENTATIONS

Student Presentation

Gulf Sturgeon Spawning Movement in the Bouie River System

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The anadromous Gulf Sturgeon are federally listed as “threatened” and are natal to seven rivers from Louisiana to Florida. The Bouie River, an upper tributary of the Pascagoula River, is the only spawning site verified by egg/larval collection for the Gulf Sturgeon natal to the Pearl and Pascagoula rivers. This population is genetically distinct from populations east of Mobile Bay, AL, and has not reached their pre-fishing holding capacity. The Bouie River has been impacted by anthropogenic aggregate mining operations and a low-head dam upstream of the verified spawning reach. As such, it is critical to understand Gulf Sturgeon movement in this system to inform recovery efforts. The objectives of this study were to describe the timing and duration of Gulf Sturgeon presence in the Bouie River, describe the extent of upriver migration, and identify environmental factors that influence downstream migration. Sex was determined genotypically or ascribed from movement patterns. We found no difference in sex determined by genetics vs movement. Gulf Sturgeon arrived in the Bouie River in mid-March, with males arriving significantly earlier than females ($p < 0.001$). We found that Gulf Sturgeon passed the low-headed dam when the river height exceeded 5 meters, migrating upriver in the Bouie River and Okatoma Creek. Departure from the spawning area was correlated with river discharge rates; the probability of departure increased when discharge rates fell below 40 m3/Gulf Sturgeon also frequented aggregate-mined formations below the spawning reach, with some individuals remaining present until fall. These findings underscore sustained protections for the Bouie River.

ORAL PRESENTATIONS

Determining the Status, and Distribution of Two Newly Described Burrowing Crayfish in Southeastern Mississippi

Calvin R. Rezac, Robert J. Ellwanger, Marinee L. Humphries, Haley N. Wagner, Emily K. Field-Rezac, and Nicholas I. Stewart

Mississippi Department of Wildlife, Fisheries, and Parks

In 2020, a genetic and morphological evaluation of the Rusty Gravedigger (Lacunicambarus miltus) by Glon et al. supported the elevation of two new species, the Banded Mudbug (L. freudensteini) and the Lonesome Gravedigger (L. mobilensis). Based on the published study by Glon et al., both species occur only in Mississippi and Alabama and were thought to be confined between the Pascagoula and Mobile Rivers. The reported range of both species is currently less than 1,000 km2 and are among the most-narrow ranged species within the state of Mississippi. With only 5 known localities for each species in the state, further efforts to determine the status and complete distribution were needed. Herein, we report on the results from a burrowing crayfish survey at novel sites within and outside the known range of both focal species in Southeastern Mississippi. Surveys took place between January-August 2024, and at each site we collected crayfish using hand excavation, slurp guns, and dip nets. Additional notes on habitat, burrow abundance, and soil composition were also recorded. In total, 104 sites (22 via boat) were surveyed and 21 species were captured including both target species. Banded Mudbug was capture at 11 sites within the known range of the species; however, we failed to expand the species into notable areas outside its range. Lonesome Gravedigger was found at 16 sites, but was notably found in areas more north and west than previously reported. The results of the survey help to improve the understanding of Mississippi burrowing crayfish distribution and status in the state. Notes on other newsworthy crayfish research at the Mississippi Museum of Natural Science may also be discussed.

ORAL PRESENTATIONS

Identifying the host fishes for at-risk mussel species in the Mississippi Alluvial Valley

Nicky Faucheux[1], David Ruppel[1], Ashley Ruppel[2], Mary Tingle[1], Todd Slack[1]

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Threats to federally listed and at-risk (hereafter: at-risk) mussel species (e.g., Rabbitsfoot Theliderma cylindrica, Sheepnose Plethobasus cyphyus, Round Hickorynut Obovaria subrotunda) in the lower Mississippi River Alluvial Valley (MAV) include stream alteration and water quality issues often attributed to conversion of the landscape for largescale agriculture. With continued management of these waterways and the potential future construction of river training structures, one way to minimize the negative effects of these alterations to existing mussel communities is to develop structures that improve passage of host fish species. This project will benefit remnant populations of at-risk mussel species by providing information about swimming abilities of host fishes to resource agencies that develop and manage water control structures. The goals of this project are to identify host fish species native to the Mississippi Alluvial Valley for at-risk mussels and conduct swimming performance trials on the host fish species that will provide critical response thresholds that can be used to guide future water control structures in the MAV. To date, we have completed a thorough literature search for known host fish and identified potential hosts in the MAV based on similar ecology and phylogeny to the known hosts. We have identified mussel populations in the MAV that may serve as sources for glochidia for later testing.

ORAL PRESENTATIONS

Understanding the energy use of juvenile catfishes at low temperatures through metabolic scope, swimming performance, and blood metabolites

Abby McGregor[1], Manuel Coffill-Rivera[2], Charles Mischke[1], Peter Allen[1]

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[2]University of South Alabama

Catfishes are widely cultured due to their rapid growth, high disease resistance, tolerance to extreme environmental conditions, and consumer acceptance. Catfish aquaculture rapidly expanded with the production of channel catfish (Ictalurus punctatus) in the 1960s and grew to become the largest finfish aquaculture industry in the U.S. More recent efforts have focused on the hybridization of female channel catfish and male blue catfish (Ictalurus furcatus), as their hybrids possess favorable characteristics (a phenomenon called "heterosis"). Even though catfish aquaculture primarily occurs in the southeastern U.S., cultured catfishes are still subjected to cold temperatures during the winter, as aquaculture ponds are relatively shallow (<1.5 meters) and experience seasonal thermal fluctuations. Cold temperatures reduce metabolic processes; however, little is known regarding differences in metabolic rates, swimming performance, and blood metabolites at different temperatures among the principal types of cultured catfishes. Therefore, a swim flume was used to measure maximum metabolic rate, metabolic scope, and critical swimming speed (Ucrit) and intermittent respirometry was used to measure standard metabolic rate in juvenile channel, blue, and hybrid catfishes at 10 and 20℃. Additionally, blood metabolites were analyzed in fatigued and non-fatigued catfishes at 10 and 20℃. It was hypothesized that hybrid catfish would have greater metabolic and swimming performance than channel and blue catfishes due to heterosis. However, metabolic scope and swimming performance did not vary among channel, blue, and hybrid catfishes. Notably, swimming performance was significantly reduced among all catfishes at 10℃. Lactate and glucose concentrations were higher and blood pH was lower in fatigued catfishes, with channel catfish generally differing in blood metabolites from blue and hybrid catfishes. Results indicate that prolonged exposure of catfishes to cold temperatures limits metabolic processes and swimming capacity, ultimately requiring catfishes to allocate energetic resources to the maintenance of metabolic requirements.

ORAL PRESENTATIONS

Seasonal trends of fish communities in oxbow lakes of the Mississippi River batture

David Ruppel, Nicky Faucheux, Steven George, Bradley Lewis, Jay Collins, Jack Killgore, and Todd Slack

US Army Engineer Research and Development Center

Since the flood of 1927, the US Corps of Engineers (USACE) was tasked with managing flood control and navigation along the Mississippi River and its tributaries. In order to accomplish this process, the USACE initiated a cutoff program between 1929 and 1942 to create a self scouring channel, completed levee construction to minimize flooding, and armored the banks to prevent lateral river movement. These actions have resulted in far-reaching consequences including narrowing the Mississippi River active floodplain to the area within the levees (batture) and the cessation of oxbow lake creation within the alluvial valley. Therefore, understanding the roles of finite habitats withing the Mississippi Alluvial Valley such as oxbow lakes is important for the present and future conservation of the aquatic biota that rely on these floodplain habitats. The purpose of this study was to document seasonal habitat components that influence fish communities of two oxbow lakes connected to the Mississippi River in close proximity to Vicksburg, MS. We sampled seasonally (spring, summer, fall, winter), and collected fish using a variety to gear types to provide a robust assessment of the fish community found in various habitats in these oxbow lakes. The results of this study will help guide future management of these types of lakes.

ORAL PRESENTATIONS

Avoidance Learning in Juvenile Bighead Carp Hypophthalmichthys nobilis

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The purpose of this study was to investigate avoidance learning in Bighead Carp Hypophthalmichthys nobilis. This study was conducted in the context of deterrence and control of this highly-invasive, schooling fish through manipulation of behavior, movement, and usage of space. Groups of Bighead Carp were tested in a 20 ft x 5 ft fully automated, computer-based, apparatus that included light-and-shadows and flowing water as motivators for occupancy of a clearly demarked arena on the upstream end. In almost daily sessions, each of which began with a 15 minute acclimation period, 48 trials were conducted, where a visual stimulus (VS) followed a short time later by mild electrical stimulation (ES) were applied for a brief period within the demarked arena. The VS and the ES terminated simultaneously. Trials in the sessions were separated by 3 minutes. The almost daily sessions were conducted with three groups of fish for up to 20 days, with naïve fish added to the groups of experienced fish periodically, as the experiment progressed. Avoidance of, and escape from, the demarked arena during applications of the VS and ES in the trials were quantified. The experiment demonstrated avoidance learning in Bighead Carp, increased rates of avoidance and escape over the course of the study, and density-influenced rates of avoidance learning. The experiment outcomes indicate social and/or imitative learning in this highly-invasive fish with implications for deterrence of this and other invasive fishes and also for protection of managed and imperiled fishes. Outcomes have implications for the application of existing systems and for the development of synergistic technologies and approaches for deterrence of invasive fishes and protection of managed fishes.

ORAL PRESENTATIONS

Movements and water-column use of imminently spawning Greater Amberjack Seriola dumerili (Risso 1810) in the northern Gulf of Mexico

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Pop-up archival satellite tags (X-Tag PSATs) were used to help identify potential spawning areas of Greater Amberjack, Seriola dumerili (GAJ) in the northern Gulf of Mexico, Southeast of Venice, Louisiana. Short-duration (30 day) deployments of PSATs were used to examine if spawning-capable, reproductively mature fish remained in the northern Gulf during spawning or possibly undertook long migrations to known spawning areas in the Florida Keys. This spawning migration to the Islamorada Humps in the Keys has been observed in GAJ along the Eastern Seaboard from Virginia to Miami. Fish were captured by vertical line fishing and gender was determined externally. In situ biopsies of female ovaries, and the presence of flowing milt identified imminently reproductive fish that were tagged. Three female and two male GAJ were tagged (71.1-86.4 cm FL). Following tagging, GAJ displayed highly variable changes in the depths they occupied for the first 3 -5 days. Subsequently their vertical movements became less variable. Two fish primarily occupied depths of around 10-13 m, while the three fish held at around 50 m depth. Temperatures were well-mixed, and fish were mostly occupying water between 16 and 18 C. GAJ did not move far from the tagging area: average movement distance was 7.46 ± 7.05 km. It is likely that the tagged GAJ remained and spawned near the tagging site. This provides support to genetic observations that GAJ in the northern Gulf is a weakly differentiated stock that likely diverged from spawning stocks in the Florida Keys or Southern Gulf since the proliferation of Oil and Gas Platforms in the late 1940’s.

POSTER PRESENTATIONS

Student Presentation

Comparing host climate match of two biological control agents using ecological niche modes (ENMs)

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Alligatorweed (Alternanthera philoxeroides) is an aquatic plant native to South America and invasive in the Southeast. This species has a long history of biological control, namely with the alligatorweed flea beetle (Agasicles hygrophila) which effectively defoliates alligatorweed. However, the cold intolerance of the flea beetle limits its biological control utility, as large portions of the alligatorweed invaded range cannot support overwintering populations of this agent. Another natural enemy, the alligatorweed thrips (Amynothrips andersoni) has shown better cold tolerance in laboratory experiments, but there have been no efforts to model the ecological niche of this agent. This study seeks to construct ecological niche models (ENMs) for alligatorweed and these two biological control agents and compare their niche overlaps. These ENMs were developed using Maxent and predictions were made for present climate and two future climate scenarios. Under future climate scenarios, the total niche area of alligatorweed is predicted to decrease by up to 10% whereas the predicted niche areas of the two agents is expected to increase by up to 10%. Despite the expanding niche of both agents, the predicted niches of the thrips showed much greater overlap with alligatorweed than the niches of the flea beetle in all three scenarios. These findings suggest the thrips is much better suited as an alligatorweed control agent, particularly in regions where the flea beetle cannot overwinter.

POSTER PRESENTATIONS

Student Presentation

The effects of hydrologic connectivity on bacterial dispersion in stream networks using eDNA detection

Tyler Redman, Michael Sandel, Kayla Fast

Mississippi State University

Waterborne infectious diseases represent an ongoing challenge to human and animal health. With the current lack of effective predictors of microbial dispersal in freshwater ecosystems, partly due to the unique, dendritic geometric complexity of stream networks, further insight into this phenomenon is required. This study investigates the effects of hydrologic connectivity on bacterial dissemination within stream networks using a hierarchical analysis of bacterial community composition within the Noxubee River watershed of Mississippi. By employing environmental DNA (eDNA) detection methods, we will develop a comprehensive stream network model to assess the relative abundance of bacterial communities in conjunction with the National Water Model (NWM). Thereby, the inclusion of hydrologic data will be leveraged alongside bacterial relative abundances to determine the spatio-temporal factors contributing to microbial dispersion. This study encompasses 54 sampling sites within a 200 km^2 area, representing a stratified survey of the Noxubee Watershed. eDNA metabarcoding will facilitate the analysis of alpha and beta diversity to identify trends along the Noxubee Watershed. Leveraging the fractal geometry of stream networks will enhance the understanding of self-similar patterns and their influence on the movement and coalescence of microbial communities across varying spatial scales. The possibility of the broad application of these predictive mechanisms will subsequently be tested through the comparison between the Noxubee River model and the Wind River Watershed, Wyoming. Thus, the deliverables of this study represent an enhanced understanding of microbial dynamics within freshwater ecosystems and the improvement of management strategies for mitigating the impacts of waterborne pathogens.

POSTER PRESENTATIONS

Student Presentation

Non-Specific Cytotoxic Cells in Fish: Key Players in Fish Immunity

Vitor Silva, Treva Billyard, Sterling Bailey, Lora Petrie-Hanson

Mississippi State University

Cytotoxic cells play critical roles in fish survival, protecting fish from infections and environmental stressors. Cytotoxic cell mechanisms are well defined in mammals, but not in fish. Cytotoxic innate immune cells in fish include T cytotoxic cells, Natural Killer (NK) cells and Non-specific cytotoxic cells (NCCs). NCCs are a cell unique to fish, amphibians and reptiles, are not found in mammals, and evolutionarily, may represent the first vertebrate cytotoxic cells. Nccrp-1 is a receptor involved in the activation of these cytotoxic cells and mediates the recognition of targets. These experiments evaluated Nccrp-1+ cell populations in different tissues. Briefly, tissues were surgically removed and isolated following routine procedures in our lab. Cells were labeled with FITC conjugated anti-nccrp-1 monoclonal antibody. Flow cytometric analysis involved forward scatter, side scatter and mean fluorescence intensity determinations on a Novocyte Acea Novosampler and analyzed by Novoexpress software. Spleen leukocyte populations included two gates which were 37% and 78% nccrp-1+, respectively. Kidney hematopoietic tissue leukocytes included two populations in which 85% and 24% labeled positive for nccrp-1. Gut-associated leukocytes demonstrated two distinct small cell populations, one that was more granular than the other, and in both populations, 90% of the cells were nccrp-1+. In all tissues examined, two additional NCC subpopulations had very small numbers of cells. A total of four NCC subpopulations were observed. Four NCC subpopulations were morphologically described in zebrafish, and single cell sequencing identified four NCC subpopulations in Nile tilapia. Together, these studies provide strong evidence that NCCs in fish are heterogenous and functionally specialized. When environmental stressors affect fish, and pathogens increase in the environment, more adaptable NCC populations can influence fish survival. Water temperature changes and salinity fluctuations may also suppress or enhance NCC functions. Identifying and describing NCC subpopulations in different fish is important in understanding how different fish respond to infectious diseases.

POSTER PRESENTATIONS

Student Presentation

Impact of Microcystin-LR Exposure on Growth, Development and Reproductive Genes in Channel Catfish.

Treva Billyard, Larry Hanson, Lora Petrie-Hanson, Lorelei Ford

Department of Comparative Biomedical Sciences

Microcystin-LR (MC-LR) is a hepatotoxin produced by cyanobacterial (blue-green algae) blooms. Biological toxins impact commercial aquaculture systems and wild fish with increasing frequency. These toxins have been reported to kill fish and may pre-dispose them to disease. Many of the effects of biotoxins are immune related. There are also effects to overall growth, development and reproduction of fish. The purpose of this study was to determine the effects of MC-LR on gene expression. Channel catfish were anesthetized, and IP injected with a single 500ng/g body weight dose of MC-LR. After injection, the fish were sampled at 6- and 24-hour post exposure. Spleen and liver were processed for RNA-sequencing. Following microcystin exposure, gene expression analysis revealed significant alterations in biological processes, cellular components, and molecular functions. For the 6-hour post exposure in the spleen, there were 445 differentially expressed genes; in the liver, there were 139 differentially expressed genes for the MC-LR exposed fish when compared to saline injected controls. For the 24-hour post exposure in the spleen, there were 119 differentially expressed genes; in the liver, there were 91 differently expressed genes. Microcystin and other endocrine disruptors are known to adversely affect cellular function. In the spleen the reproductive genes were largely upregulated suggesting immune-endocrine crosstalk. In the cellular components and molecular functions categories, most of the differentially expressed genes were upregulated. Differential gene expressions in the liver suggest cellular and tissue repair processes. Some of the complex interactions between endocrine and immune system in fish will be discussed.

POSTER PRESENTATIONS

Student Presentation

Reproductive biology of the Bull Shark (Carcharhinus leucas) in the north central Gulf of Mexico

Anna Millender, Angie Hoover, Jill Hendon, Jeremy Higgs

Center for Fisheries and Development-The University of Southern Mississippi,

Bull sharks (Carcharhinus leucas) are a euryhaline species that inhabit the coastal waters of the western North Atlantic Ocean including the northern Gulf of Mexico. Within their U.S. range, very limited life history data exists for this commercially sought after species. This ongoing study is investigating the age, growth, and reproduction of Bull Sharks in the Gulf of Mexico and South Atlantic Bight through collaborative efforts with the commercial fishing industry, management agencies, and academic partners. From 2009-2024, a total of 160 Bull Sharks have been collected of which 79 were female (55.0 – 230.7 cm FL) and 68 were male (49.5 – 212.5 cm FL). Results from the preliminary maturity assessment indicate that males mature at a similar size (175.7 cm) to females (174.0 cm). Consistent with prior studies, females exhibit biennial periodicity, based on the simultaneous presence of near-term embryos and absence of vitellogenic ovarian follicles. Mating likely occurs from May – June based on the monthly examination of male and female reproductive structures. Further, examination of embryonic growth indicates parturition occurs in July following an 11 – 12 month gestation period. Embryos from examined broods ranged in size from 57.7 – 79.5 cm stretched total length and brood size was estimated to be 8 – 10 embryos. The data generated from this project will be included in the upcoming SouthEast Data Assessment and Review benchmark stock assessment, for Bull Sharks in the western North Atlantic Ocean and will aid in the continued management and sustainability of this species.

POSTER PRESENTATIONS

Student Presentation

Movement and Space Use of Cownose Rays (Rhinoptera bonasus and Rhinoptera brasiliensis) in Coastal Mississippi Waters

Kirsten R. Bauer, Jeremey Higgs, Jill Hendon, Michael J. Andres

The University of Southern Mississippi

Cownose rays (Rhinoptera spp.) are a benthopelagic elasmobranch with slow life history traits, such as low fecundity and late age at maturity. These characteristics combined with schooling behaviors leave them susceptible to bycatch and overexploitation, highlighting a need for current information on the ecology and behaviors of this species complex. Despite an abundance of information on the ecology and movement of Rhinoptera bonasus in the northwestern Atlantic Ocean, R. bonasus and their conspecifics R. brasiliensis within the Gulf of Mexico remain poorly understood. To address this, we are conducting an acoustic telemetry study within coastal Mississippi waters with the objective of examining Rhinoptera spp. space use and movement. Here, we present the preliminary results from this ongoing study. From September 2024 to January 2025, 13 V13 acoustic transmitters were deployed in Rhinoptera spp. (11 males, 2 females) ranging in size from 61.0 – 104.2 cm. disc width. Detections to date depict the movement of 10 individuals (9 males, 1 female) and show use of nearshore waters surrounding the Mississippi barrier islands. Seven of the cownose detected were tagged in the central portion of the Mississippi Sound (MSS) off Round Island with six individuals showing subsequent detections near barrier islands west of the tagging location. The remaining three detected cownose were tagged in late November of 2024 off the westernmost island, Cat Island, and currently have only been detected within the western MSS. Three individuals have been detected in the MSS during December with one being detected into January, providing preliminary evidence of overwintering in the area. With the goal of tagging 40 individuals and collecting movement data over the span of several years, we hope to capture information regarding seasonal space use and environmental drivers of Rhinoptera spp. movement in this region of the northern Gulf of Mexico.

POSTER PRESENTATIONS

Student Presentation

Microplastic and Mesoplastic Quantification in Cartilaginous Fishes of the Northern Gulf of Mexico

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Humans produce 400 million metric tons of plastic waste per year. It is estimated that every year 8 million metric tons of plastic enter our oceans. Microplastics are plastics <5 mm in diameter and mesoplastics are larger particles ranging 5 mm to 2.5 cm in diameter. Microplastics and mesoplastics are becoming a greater concern because they can be found virtually everywhere including food, air, plants, and corals. These plastics have a high affinity to heavy metals and may absorb them. Since they are unmoving, microplastics are easy targets for consumers. This sparks the question of how these microplastics affect organisms and how microplastics move through the trophic levels. To understand the complex relationships between trophic levels and microplastics, we collected the lower intestines of cartilaginous fishes caught at Deep Sea Fishing Rodeos in the northern Gulf of Mexico. Collections included rays (n = 5) and sharks (n = 15). Microplastics and mesoplastics were extracted from tissues using KOH organic digestion and isolated via filtration. The amount of microplastics in the lower intestines of cartilaginous fishes was quantified using a light microscope. From the samples that have been analyzed, numerous microplastics have been found in each sample. There is one category of microplastics that is most abundant in each sample, which are microfibers. This could be because of ingesting fishing line during capture times (fishing).

POSTER PRESENTATIONS

Student Presentation

Comparing the abundance of aquatic macroinvertebrate communities above and below a low-head dam in the lower Bouie River, Mississippi

Natalie Santiago[1], Cecillia Quesada[1], Eric Haffey[2], Michael J. Andres[1]

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Located in southern Mississippi, the Bouie River is a tributary of the Leaf River and belongs to the Pascagoula River watershed. This tributary has been heavily altered in the lower 10 kilometers (rkm) from aggregate mining (creating a series of deep gravel pits) and the presence of an earthen and concrete sill (low-head dam) located 6rKm from the mouth of the river. However, despite these alterations the immediate stretch of river below the sill is known spawning habitat for diadromous fish species, including the protected Gulf Sturgeon. The purpose of this study was to determine the impact of a low-head dam on aquatic macroinvertebrates communities to infer ecosystem health by comparing the abundance of Ephemeroptera, Plecoptera, and Trichoptera above and below the sill. From April to June of 2021, 2022, and 2023, a sequence of drift nets were set above and below the sill. Net contents were preserved in formalin and all macroinvertebrates were sorted and identified to the lowest taxonomic level possible. Macroinvertebrates from fourteen samples were identified with seven samples from below and seven samples from above. Mann-Whitney U tests were performed to determine if there were variations in taxa abundance above and below the sill. Non-metric MultiDimensional Scaling plots were also conducted to determine any dissimilarities. Initial analysis suggests there were minimal differences between the macroinvertebrate communities of Ephemeroptera, Plecoptera, and Trichoptera above and below the sill, suggesting this structure has minimal influence on the macroinvertebrates in this stretch of the Bouie River. Our data will provide baseline information on the macroinvertebrate communities of this tributary which may assist in conservation measures for species of concern in this region such as the protected Gulf Sturgeon and Pearl Darter.

POSTER PRESENTATIONS

Student Presentation

Is it hot enough for you? Temperatures experienced by Gulf Sturgeon (Acipenser desotoi) in the Pearl and Pascagoula rivers

Morgan K. Segrest[1], Mark S. Peterson[1], W. Todd Slack[2], Paul O. Grammer[3], Michael J. Andres[1]

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[3]Center for Fisheries Research and Development

Gulf Sturgeon (GS; Acipenser desotoi) are a federally threatened, anadromous fish found in seven river systems along the northern Gulf of Mexico. As the southernmost distributed sturgeon species, latitudinal constraints seemingly require GS to rely on cooler waters to sustain optimal functions. With increasing climate instability, it is becoming especially important for resource managers to obtain a clearer understanding of the thermal regimes GS are experiencing, especially for those within the Pearl (PE) and Pascagoula (PR) river systems. A total of 46 GS were implanted with acoustic transmitters containing temperature sensors between October 2021–November 2024, including 13 adult (>1250 mm fork length; FL) and six subadult (891–1249 mm FL) from the PE and 17 adult and 10 subadult from the PR. Ambient water temperatures were collected during this time from VR2Tx receivers, HOBO temperature data loggers, and available USGS monitoring stations throughout both rivers and adjacent estuarine and marine environments. Internal temperatures ranged from 5.2C to 33.9C with 95% of values being ±1.6C of water temperatures. Temperatures recorded above 150 river kilometers (rkm) during months of presumed spawning (March–May) ranged from 6.6C to 34.1C with an average of 19.58C. Temperatures reached the presumed upper threshold for egg (20C), embryo (23C), and larval (26C) survivability as early as April and remained at these thresholds until August across all years. Temperatures recorded in summer holding (March–October) areas between 20 and 70 rkm ranged from 12.7C to 33.9C with an average of 25.1C. In holding areas, GS internal transmitters had slightly lower temps than those recorded by sondes perhaps indicative of cooler bottom temperatures in those areas. This study provides further understanding of current temperature regimes GS experience at different key regions, especially given the lack of such data in these systems.

POSTER PRESENTATIONS

Student Presentation

Developing an eDNA Protocol for Gulf Coast Walleye

Kevin W. Jones, J. Wesley Neal, Peter J. Allen, Mark A. Arick, II, Chuan-Yu Hsu, Mark Welch

Mississippi State University

The Gulf Coast strain of Walleye (Sander vitreus) is a genetically isolated population endemic to the Mobile River Basin in Mississippi and Alabama. This population is threatened by habitat loss, poor water quality, and introgression with non-native Northern and Central Highlands Walleye. An environmental DNA (eDNA) survey is currently underway to assess the Walleye population in the upper Tombigbee River watershed in northeastern Mississippi. As part of this study, we are working to develop a quantitative PCR (qPCR) protocol to effectively detect Walleye DNA at low concentrations. The objective of this phase of the project is to select qPCR primers that 1) amplify Walleye DNA at the lowest possible limit of detection, and 2) do not cross-amplify DNA from any other species found in the study area. We will test a qPCR assay developed to target Northern Walleye against a modified version designed to account for genetic variability among different Walleye populations. Both assays were evaluated for species specificity using the Basic Local Alignment Search Tool (BLAST) software. Our results indicate that neither assay should amplify non-target species. Limit of detection analysis is currently underway using DNA extracted from Gulf Coast Walleye tissue samples. This poster will present preliminary results as available.

POSTER PRESENTATIONS

Preliminary Investigation into the ecology of the Inshore Lizardfish (Synodus foetens) from the Northern Gulf of Mexico

Tyler Eye, Lillian Collins, Gary Gray, Alexis Bryan, Tiffany Weidner, Daryl Parkyn, Jeremy Higgs

The University of Southern Mississippi, Center for Research and Development

Inshore Lizardfish (Synodus foetens) are an abundant, demersal species found within the Gulf of Mexico and western Atlantic Ocean. This species is frequently encountered as bycatch in commercial shrimp trawls throughout their geographical range. Despite their prevalence, very few studies have examined the species' life history and its role within the habitats they preside. As such, a total of 125 Inshore Lizardfish were collected from a SEAMAP bottom trawl groundfish survey in the northern Gulf of Mexico off the western coast of Florida in the summer of 2024. Sex composition consisted of 57 females, 56 males, and 12 unknowns. Individuals ranged from 124 to510 mm total length (Female 155-510; Male 190-349 mm), with the majority being of the 200 and 299 mm size class. There were 103 sexually mature specimens collected. The reproductive stage of mature specimens was classified as 55% developing, 45% spawning capable, and 1% regressing, suggesting reproduction occurred during summer months. Stomach content was also examined with 52% of specimens containing prey items. Stomach fullness does not appear to be dependent on sex or maturity. The most observed identifiable prey items were cephalopods (49%), followed by teleosts (46%), and crustaceans (5%). This work aims to continue the analysis of the Inshore Lizardfish life history in the northern Gulf of Mexico.

POSTER PRESENTATIONS

Swimming abilities of the Bluntface Shiner (Cyprinella camura)

Mary E. Tingle, David S. Ruppel, and Nicky M. Faucheux

U.S. Army Engineer Research and Development Center

Understanding the swimming capabilities of native fish allows for the design of fish-friendly water management structures. As societal needs for surface water increase, the installation of water management structures are likely to increase in the future. The goal of this project is to determine the three critical thresholds that define a fish's swimming performance: burst speed, prolonged speed, and sustained speed. Sustained speed represents the maximum current velocity that a fish can maintain station in indefinitely (> 200 min), while prolonged speed represents the maximum velocity between sustained and burst speeds at which the fish can swim for a period of time (> 1 minute) before becoming fatigued. Burst speed represents the maximum current velocity that a fish can maintain position in for a period <5 secs. These are preliminary results of a multi-year, multi-species project that is incorporating approximately 50 fish species that occur in the Mississippi Alluvial Valley (MAV), which are likely to impacted by future implementation of water management structures. The species identified here are also potential host fish species for three at-risk mussel species, Rabbitsfoot Theliderma cylindrica, Sheepnose Plethobasus cyphyus, and Round Hickorynut Obovaria subrotunda found in the MAV. A known Rabbitsfoot host, Bluntface Shiner Cyprinella camura, was chosen as the pilot species because of its high abundance and ease of capture.

POSTER PRESENTATIONS

Population Genomic Assessment of the Gulf Strain of Striped Bass (Morone saxatilis)

Kyle F. Hubbard[1], Kayla M. Fast[1], Steven J. Rider[2], Michael W. Sandel[3]

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The Striped Bass (Morone saxatilis) is an anadromous fish native to the eastern United States with an economically important recreational fishery. Historical records indicate large populations existed along the Atlantic and Gulf drainages from Maine to Texas. A decline in Striped Bass populations began due to factors such as recreational overharvest, depletion of prey species (e.g. Brevoortia spp.), dam construction, and pollution. This has led to major concern and conservation efforts in an attempt to recover the populations. To meet recreational and commercial demands, Striped Bass are captive-bred in hatcheries for stocking purposes. Furthermore, 80% of wild-caught Striped Bass show genetic signatures similar to hatchery-reared Striped Bass. Naturally reproducing populations of Gulf Striped Bass, native to Gulf drainages, exist in limited portions of the historical range. We used nuclear markers to quantify the degree and geographic distribution of natural Gulf Striped Bass reproduction. DNA was extracted from more than 600 Morone tissues. Approximately 300 of the highest-quality DNA samples have been outsourced for ddRADSeq. Our dataset includes fishes from stocked lakes, Gulf Striped Bass historical localities, Atlantic Striped Bass, Striped Bass hybrids, and sister species. These areas will act as our main source for comparison due to the drastic difference in populations. Our data will give us a percentage of how many Striped Bass originated from a hatchery vs. which ones are native. We can then determine if there is a correlation between struggling populations and hatchery-originated Striped Bass.

POSTER PRESENTATIONS

Chemical Control of the Aquatic Plants Alligatorweed and Knotgrass

Gray Turnage

Mississippi State University

Alligatorweed (Alternanthera philoxeroides) and knotgrass (Paspalum distichum) are two widespread aquatic weeds in Mississippi. Both can survive stressors such as drawdown or drought and biocontrol agents provide varying levels (alligatorweed) or no reduction (knotgrass) depending on species and geographic location. Some data exist regarding chemical control of each species, but newer herbicides are commercially available that have not been evaluated against either species. In 2022, initial foliar herbicide screening for operational control of alligatorweed found that imazapyr, bispyribac-sodium, topramezone, and florpyrauxifen-benzyl reduced plant biomass 74 to 84% one year after treatment. A second trial initiated in 2023, found that tank mixtures generally provided greater alligatorweed reduction (>90% biomass reduction) than single herbicide applications. Initial knotgrass treatments found that glyphosate, imazamox, imazapyr, and penoxsulam all reduced knotgrass one year after treatment when applied at the maximum label rate. A second knotgrass trial (2023) found that all year 1 herbicides except imazamox could be reduced 50% and still provide greater than 77% biomass reduction one year after treatment. All herbicide applications included a 0.5% v:v MSO surfactant and were applied at a 467.7 L/ha (50 gal/ac) diluent rate. This work provides multiple control techniques for each species so that resource managers have a multitude of treatment options to select among for budgeting and herbicide stewardship purposes.

POSTER PRESENTATIONS

Pascagoula Pearls: Diving into Mussel Research

Marinee L. Humphries, Robert J. Ellwanger, Calvin R. Rezac, Zoe C. Mabry, Quentin N. Fairchild, Haley N. Wagner, Emily K. Rezac

Mississippi Department of Wildlife, Fisheries, and Parks, Museum of Natural Science

The Pascagoula River Drainage is the second largest river drainage in Mississippi spanning approximately 8,676 mi2. Our objective was to determine the status of four target species of federal conservation concern within the drainage: Pascagoula Creekshell (Strophitus pascagoulaensis), Alabama Spike (Elliptio arca), Alabama Hickorynut (Obovaria unicolor), and Delicate Spike (Elliptio arctata). We sampled 140 sites throughout the drainage and encountered 9,246 live mussels consisting of 28 species. We also documented the first live Alabama Hickorynut individuals outside of the mainstem Pascagaoula River in 20 years as well as the first live Delicate Spike in Mississippi since 2004. We plan to complete this project in 2025 with a focus on the Black Creek and Red Creek systems. Although our project is incomplete, we hope that our preliminary results will be utilized for upcoming listing and management decisions regarding several of our targeted species.

POSTER PRESENTATIONS

The Ribbeting World of Crayfish: Examining Burrowing Crayfish Associated with New Occurrences of Crawfish Frogs in Central Mississippi

Zoë C. Mabry, Marinee L. Humphries, Emily K. Field-Rezac, Will Selman, Calvin R. Rezac

Mississippi Department of Wildlife, Fisheries, and Parks, Museum of Natural Science

The Crawfish Frog, Lithobates areolatus, is a species of anuran indigenous to the grasslands of the Central and Southern United States. Except for short, seasonal migrations to breeding ponds (< 1-km), the species spends 10-11 months of the year associated with an abandoned crayfish burrow. The loss or conversion of upland grassland habitat and loss of ephemeral (or fishless) breeding ponds has led to a decline of the Crawfish Frog throughout much of its' range. Crawfish Frogs have not been documented in central Mississippi since the early 1990s, but recent auditory surveys confirmed their persistence in the region. Because of their elusive behavior and dwindling habitat, little is known about the interactions between L. areolatus and burrowing crayfish in the state. Our project aims to further investigate the relationship between frog and crayfish by: 1) locating potential burrowing crayfish colonies proximate to new occurrences of Crawfish Frogs in Central Mississippi and 2) identifying which crayfish species may be responsible for providing burrow habitat. In December 2024, we surveyed within a ~1,000-m radius of 12 known or purported Crawfish Frog breeding ponds to determine if upland crayfish burrows were present. Crayfish burrows were found at all 12 sites and on average, were found to be 87.5-m from the ponds, a much closer distance than previously reported. Of the 6 burrowing crayfish likely to be in the area, we documented 3 species based on exoskeletons alone. The results are preliminary so we hesitate to make any conclusions until sampling has been completed; however, we hypothesize that Digger Crayfish (Creaserinus fodiens) may be influential to Crawfish Frogs due to the numerous burrows they tend to construct.

POSTER PRESENTATIONS

Effects of Low Temperatures on Liver and Muscle Glycogen in Catfish

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Department of Wildlife, Fisheries and Aquaculture, Mississippi State University

During the latter portion of the growing season, temperate fishes have adapted to store accumulated energy to aid in survival through periods of food scarcity during winter. Despite the economic importance of commercial catfish, little is known about energy storage during cold conditions. Therefore, this study focused on the function of liver and muscle tissue for storing energy in low temperatures. The effects of cold (10°C) versus temperate (20°C) temperatures were evaluated on channel (Ictalurus punctatus), blue (Ictalurus furcatus), and hybrid (I. punctatus × I. furcatus) catfish over a17-week period. Eighteen tanks were stocked with 50 fish each in separate recirculating aquaculture systems with three replicate tanks per treatment combination (2 temperatures x 3 catfish). Sampling included three fish per tank in which liver and muscle tissue were collected and analyzed for lipid and glycogen content. Greater mean liver weights were observed in channel catfish in both temperature treatments. Additionally, there were stark differences in hepatosomatic index (HSI) at 10°C with channel catfish having a higher HSI than blue and hybrid catfish. In contrast, HSI between each catfish type in the 20°C treatment was relatively consistent. Increased liver and muscle glycogen storage at low temperatures could be a physiological adaptation of channel catfish to survive winter conditions. Additionally, greater size of channel catfish livers, relative to blue and hybrid catfish, may enhance the ability of energy storage for winter survival. These data suggest channel catfish are better adapted for winter conditions than blue or hybrid catfish, meaning they may be a better choice for commercial catfish culture for facilities located in cooler regions.

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