2020 Annual Meeting of the

Mississippi Chapter

of the American Fisheries Society

Gulfport, MS

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12 – 14 February 2020

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Sponsors

The organizers from the Mississippi Chapter would like to recognize the f ollowing groups for financial support of the meeting.

Engineer Research and Development Center US Army Corps of Engineers	ERDC Engineer Research and Development Center
Gulf Coast Research Laboratory, The University of Southern Mississippi	The University of Southern Mississippi Gulf Coast Research Laboratory
Center For Fisheries Research and Development	Center for Fisheries Research and Development GCRL Fisheries
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Mississippi Department of Marine Resources	Mississippi Department of Marine Resources Enhance • Protect • Conserve
Coastal Conservation Association of Mississippi	Coastal Conservation Association Mississippi

We also thank the Mississippi Department of Wildlife, Fisheries, & Parks for the in-kind donation of printing these programs

Program-at-a-Glance

All activities will be held on the first floor of the Marriott Hotel

in the Costal Ballroom.

Date & Time	Event	Location
Wednesday, February 12		
2:30 – 5:00 pm	**Registration**	**Outside Coastal Ballroom**
6:00 – 9:00 pm	**Social & Fish Quiz**	**Coastal Ballroom**
Thursday, February 13		
	Breakfast	**On your own**
7:30 – 10:00 am	**Registration**	**Outside Coastal Ballroom**
8:00 --10:00 am	**Presentations**	**Coastal Ballroom**
10:00--10:15 pm	**Break**	**Coastal Ballroom**
10:15 -- 12:00 pm	**Presentations**	**Coastal Ballroom**
12:00 – 1:30 pm	**Lunch**	**On your own**
1:30 -- 3:30 pm	**Presentations**	**Coastal Ballroom**
3:30 -- 3:45 pm	**Break**	**Coastal Ballroom**
3:45 – 5:00 pm	**Presentations**	**Coastal Ballroom**
5:00 – 5:15 pm	**Break**	**Coastal Ballroom**
5:15 – 5:45 pm	**Keynote Speaker**	**Coastal Ballroom**
5:45 – 6:30 pm	**Poster Session**	**Coastal Ballroom**
6:30 – 8:30 pm	**Banquet**	**Coastal Ballroom**
6:30 – 8:30 pm	**Student Raffle**	**Coastal Ballroom**
Friday, February 14		
	Breakfast	**On your own**
8:00 --9:15 am	**Presentations**	**Coastal Ballroom**
9:15 -- 9:30 am	**Break**	**Coastal Ballroom**
9:30 -- 11:00 am	**Chapter Business Meeting**	**Coastal Ballroom**
11:00 am	**Adjourn**	

Keynote Speaker

Jan Jeffrey Hoover

Inspirational Ichthyology: Lessons Learned from Past Naturalists

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Jan Jeffrey Hoover is a Research Fisheries Biologist at the Environmental Laboratory, US Army Engineer Research and Development Center (ERDC), Vicksburg, MS. He worked on the ERDC Fish Ecology Team first as a student in 1986, then as a visiting scientist from the University of Maryland in 1989, and subsequently as a federal employee from 1991 to present. Jan grew up in St. Petersburg Florida, studied at Florida Atlantic University (BS, 1976), University of South Florida (MA, 1981), and the University of Oklahoma (PhD, 1988). He has authored or co-authored 48 journal articles, 15 non-technical papers, and 6 book chapters. Much of Jan's work deals with endangered and invasive fishes. His research interests include fish-habitat relationships, swimming performance, life history, functional morphology, and historical ichthyology. Currently, he is working with an interdisciplinary team of scientists and engineers on materials and structures bio-inspired by Paddlefish. He spends his personal time with amphibians, reptiles, prairie dogs, horses, a pig, and rescued dogs.

President-elect Candidates

Mike Andres

Mike Andres is currently a Research Scientist in the Division of Coastal Sciences at the University of Southern Mississippi. His research is largely focused around diadromous fish conservation, ecology, and their parasites. Mike received his PhD from the University of Southern Mississippi in 2015 and has since worked on various aspects of the ecology of marine and estuarine fish. He currently teaches Marine Ichthyology at USM and has also taught Marine Fisheries Field and Lab Techniques. His current research focusses on Gulf Sturgeon conservation and management, using parasites as biological tags for trophic interactions and movements of migratory fish, and the ecology of estuarine fish. Mike has been a national AFS member since 2011 and has helped with various aspects of MSAFS meeting activities since that time.

Rick Burris

Rick Burris is the Deputy Director of the Office of Marine Fisheries for the Mississippi Department of Marine Resources' (MDMR) where he assists in the overall management of both the commercial and recreational marine fisheries for the State of Mississippi. He began his career with the MDMR in 2007 as a Fisheries Scientist, acting as the USFWS Sport Fish Restoration Coordinator for Coastal Mississippi. From 2014 to 2019 he served as Director of the Shrimp and Crab Bureau, where he guided the Mississippi Derelict Crab Trap Removal Program to the EPA's Gulf Guardian Award and the MS Chapter of the American Fisheries Society's Fishery Conservation Award. He has previously represented the MDMR on the Gulf and South Atlantic Panel on Aquatic Invasive Species, the Mississippi Crab Task Force, and as Chairman of the Gulf States Marine Fisheries Commission TCC Crab Subcommittee. Rick currently provides representation as the Region 5 Regulatory Alternate on the Interstate Shellfish Sanitation Conference Executive Board, the Gulf of Mexico Fishery Management Council Special Shrimp Scientific & Statistical Committee, and the Mississippi Gear Type Task Force, where he presides as Chairman. He received a BS in Marine Biology and MS in Biology from the University of Southern Mississippi. He is a member of both the National and Mississippi Chapter of the American Fisheries Society. Rick is an outdoor enthusiast who enjoys hunting and fishing and sharing those experiences with his three children.

Secretary-Treasurer Candidate

Angie Hoover

Educational Background

Angie received a B.S. in Biology in 2015 from Southwestern Oklahoma State University, and a M.S. in Coastal Sciences in 2018 from The University of Southern Mississippi.

Professional Background

Angie has worked for The University of Southern Mississippi Gulf Coast Research Lab's (USM-GCRL) Center for Fisheries Research and Development (CFRD) throughout her time as a graduate assistant (2015-2018), assisting with the field work and lab processing duties of several long-term monitoring projects including Southeast Area Monitoring and Assessment Program (SEAMAP) plankton, groundfish and bottom long line surveys, Sport Fish Tag and Release, and National Fish and Wildlife Foundation reef fish surveys. After graduating, she continued working with her adviser, Dr. Frank Hernandez, in his Fisheries Oceanography and Ecology lab as a technician. Her duties included identifying, processing various tissues, and analyzing gut content of various sargassum-associated juvenile fishes, and sorting plankton samples for larval fishes, eggs, and plastics (January 2019 to May 2019). Currently (June 2019 to present), Angie is a Research Associate with USM-GCRL's CFRD where she has continued the work she did as a graduate assistant, as well as assisting with the Center's Bonnet Carré Spillway response effort, and developing potential future-project ideas for the Center.

She has coauthored one published manuscript of her undergraduate research project from Southwestern Oklahoma State University (O'Neal and Hoover 2018), and is a coauthor of a manuscript in preparation from the consortium (Consortium for Coastal River Dominated Ecosystems – CONCORDE) she was a part of as a graduate assistant. She is also currently preparing manuscripts of her thesis work.

Professional Involvement

Angie was a member of the Marine and Estuarine Graduate Student Association from 2015-2018, during which time she served as the secretary/treasurer in 2016, and the vice president in 2017. She was also an active member of GCRL's student subunit of the American Fisheries Society (AFS) from 2015-2018. Furthermore, she was a member of the Early Life History Section of AFS. She attended, and presented at, the Early Life History Section conferences in 2016 and 2017. At the 2017 conference she co-organized and lead an Early Career Mentoring Workshop.

Awards

During her time as a graduate assistant Angie received several travel awards from USM-GCRL including the MEGSA Travel Award (2017), the Graduate Competitive Travel Award (2017), and the Lytle Scholarship (2018). She also received the Grace Klein-MacPhee Graduate Student Travel Award (2016, 2017) from the Early Life History Section of AFS and was named a Gulf of Mexico Research Initiative (GoMRI) Scholar in 2017.

Presentation Schedule – Thursday, February 12

Students competing for the best student presentation are designated with a superscript numeral. The oral abstracts are arranged alphabetically by the last name of the first author.

Time	Presentation Title	First author
8:00 am	Collaborative agency efforts to contain and eradicate Giant Salvinia, *Salvinia molesta*, in the Pelahatchie Bay of Ross Barnett Reservoir in central Mississippi: Part 2.	Ryan Jones
8:15 am	Investigation of reduced herbicide rates and tank mixes applied via submersed injection for the selective control of Cuban Bulrush, *Oxycaryum cubense*.	Gray Turnage[1]
8:30 am	To plant or not to plant? A decision support tool to minimize risk associated with uncertainty in reservoir habitat management.	David M. Norris[1]
8:45 am	Defying expectations: tributary fish assemblages are similar above and below impoundments.	Nicky Faucheux[1]
9:00 am	Freshwater fish recovery at a USACE reservoir.	Todd Slack
9:15 am	Reforesting a river: restoration efforts and anticipated benefits of creating wood traps in the Mississippi River	Audrey B. Harrison
9:30 am	A comparison of Mississippi River borrow pit fish communities over several decades	Amanda J. M. Oliver
9:45 am	Under a dissecting microscope: range expansion of an invasive water flea, *Daphnia lumholtzi*, in Mississippi and new state records of a water flea, L*eptodora kindtii*, in an oxbow lake.	Steven G. George
10:00 am	Break	
10:15 am	Using boat-mounted radio frequency identification to estimate stocking exploitation and estimate efficiency of passive integrated transponders	Bayley M. Wilmoth[1]
10:30 am	Species abundance and richness of Mississippi artificial reefs according to reef composition.	Emily Satterfield
10:45 am	Rapid spatial expansion and population increase of invasive Lionfish, *Pterois spp.*, observed on natural habitats in the northern Gulf of Mexico.	Matthew D Campbell
11:00 am	Pop-up satellite tagging of Atlantic Tripletail, *Lobotes surinamensis*, in the northern Gulf of Mexico for winter migratory pattern research	Eric Gigli
11:15 am	Assessing the use of fyke nets for Southern Flounder, *Paralichthys lethostigma*, in the Mississippi Sound.	Joshua Waters
11:30 am	Investigation of Bull Shark, *Carcharhinus leucas*, response to the Bonnet Carré Spillway opening and associated effects from increased freshwater input into the western MS Sound using acoustic telemetry	Jennifer L. Green
11:45 am	A new species of Kitefin Shark (Squaliformes: Dalatiidae: *Mollisquama mississippiensis*) from the Gulf of Mexico.	Mark A. Grace
12:00 pm	Lunch – on your own	
1:30 pm	Remotely operated vehicle surveys document rare and obscure chondrichthyans in deep waters of the northern Gulf of Mexico	Christian M. Jones

Presentation Schedule – Thursday, February 12

Students competing for the best student presentation are designated with a superscript numeral. The oral abstracts are arranged alphabetically by the last name of the first author.

Time	Presentation Title	First author
1:45 pm	Observations of the reproduction of two species of cownose ray, *Rhinoptera bonasus and Rhinoptera brasiliensis*, in the northern Gulf of Mexico	Anna K. Millender[1]
2:00 pm	Recruitment limitation of the eastern oyster, *Crassostrea virginica*, in Mississippi Sound.	Chet F. Rakocinski
2:15 pm	Variability in sperm to egg ratios influence hatching success of Channel x Blue hybrid catfish eggs in hatcheries	Nagaraj Chatakondi
2:30 pm	*Bolbophorus damnificus* pond prevalence and parasite induced mortality in channel and hybrid catfish	Mackenzie A. Gunn[1],
2:45 pm	Investigation of the epiepidemiology Blue Catfish Alloherpesvirus (BCAHV)	Vandana Dharan[1]
3:00 pm	Characterization of *Edwardsiella ictaluri* isolates from channel and hybrid catfish, and ornamental l fish species.	Divya Johnson[1]
3:15 pm	They are the same, but different: comparative genomics of two atypical, *Aeromonas hydrophila.* pathotypes found in catfish aquaculture of the southeast	Bradley M. Richardson[1]
3:30 pm	Break	
3:45 pm	Stable Isotope Analysis of Blood Components to Determine Feeding Habitat of Gulf Sturgeon ,*Acipenser oxyrinchus desotoi.*	Alfonso Cohuo
4:00 pm	Coupling hydrodynamic, spawning, and larval settling models with a pallid sturgeon, *Scaphirhynchus albus*, population model to evaluate alternative management operations	Sara A. Reynolds
4:15 pm	Same profession different jobs — fisheries goals across the US	Caleb A. Aldridge[1]
4:30 pm	Hybrids, freaks, mutants, and zombies: a collection of unusual freshwater fishes	Keith Meals
4:45 pm	The not-so-serious side of science: *Dopeia*	Joyce M. Shaw

Presentation Schedule – Friday, February 13

Students competing for the best student presentation are designated with a superscript numeral. The oral abstracts are arranged alphabetically by the last name of the first author.

Time	Presentation Title	First author
8:00 m	Overview of Mississippi's exempted fishing permit for state management of Red Snapper	Courtney Walker
8:15 am	Collecting stakeholder interests based on a survey of Mississippi's Red Snapper fishery	Katya Jagolta
8:30 am	Female Red Snapper reproductive parameters: Is depth or artificial structure more important?	Nancy J. Brown-Peterson
8:45 am	Age and growth comparison of White Bass, *Morone chrysops,* in multiple systems in Mississippi, USA	Thomas P. Miles
9:00 am	Results from a 2019 status survey for Frecklebelly Madtom, *Noturus munitus,* in the Tombigbee River Drainage	Matthew D. Wagner

Poster Presentations

Students competing for the best student poster are designated with a superscript numeral. The poster abstracts are arranged alphabetically by the last name of the first author

Poster Number	Title	First author
1	For management plans, consult a computer?	Caleb A. Aldridge[1]
2	Brush piles: Understanding structural dynamics to help plan habitat management.	Caleb A. Aldridge[1]
3	Stock-recruitment dynamics of a freshwater clupeid.	Nicky Faucheux
4	The future role of Mississippi Aquarium in aquatic research on the Gulf Coast.	Lauren Fuller
5	Adult Largemouth Bass (*Micropterus salmoides*) aerobic metabolic rate in response to temperature.	Brandon Gerhart[1]
6	Diet of Red Snapper, Lutjanus campechanus, collected at artificial reefs and petroleum platforms in the northern Gulf of Mexico off Mississippi during 2016-2018	Dyan Gibson
7	Larval Atlantic Bumper (*Chloroscombrus chrysurus*) diet, growth, and condition under normoxic and hypoxia-influenced conditions.	Angie Hoover
8	Trophic ecology of Atlantic Sailfish larvae in the Gulf of Mexico: An analysis of diet and prey availability and prey quality, and influences on predator growth and condition.	April Hugi[1]
9	Collect once, re-use multiple times: Data archiving at NOAA's National Centers for Environmental Information.	Lauren A. Jackson
10	Physiological vs. functional maturity: how maturity is defined can affect the significance of results.	Andrea J. Leontiou
11	Development of an affordable autonomous four-dimensional water quality monitoring network.	Victoria R. Starnes[1]
12	A prototype decision support tool for evaluating water level management to achieve competing objectives in a multiple use reservoir .	Victoria R. Starnes[1]
13	Evaluating accuracy of inexpensive acoustic water level sensors.	Bayley M. Wilmoth[1]

ABSTRACTS

ORAL PRESENTATIONS

Caleb A. Aldridge, caa134@msstate.edu, (205) 495-6483, Student Paper

Same profession different jobs — fisheries goals across the US

Caleb A. Aldridge[1], Leandro E. Miranda[2], and Michael E. Colvin[1]

[1]Department of Wildlife, Fisheries & Aquaculture, Mississippi State University, Mississippi State, MS 39762–9690
[2]U.S. Geological Survey, Mississippi Cooperative Fish & Wildlife Research Unit, Mississippi State, MS 39762–9691

Goals translate vision statements and stakeholder desires into an imperative by which state fisheries agencies steward public resources. Goals vary considerably in wording and scope, but core themes maintain stability from state to state. An understanding of goal themes and the geographic variation in goal themes can be useful for agency personnel seeking to define or refine their own goals. We gathered and screened publicly available agency documents and made notes on the characteristics of shared and unique agency-wide management goals for 31 contiguous state inland fisheries agencies. We identified nine goal themes, then reviewed each set of documents by state and assigned an ordinal quality of representation score for each goal theme. In a 1970s study spatial groupings were evident but, in our study, we were unable to clearly distinguish a spatial component to goal theme groupings. We cannot be certain to the exact mechanism in goal theme patterns but believe that advances in communication and information exchange has been influential in blurring geographical lines. Our findings suggest that agency personnel are likely to find shared goals beyond the borders of neighboring states.

ORAL PRESENTATIONS

Nancy J. Brown-Peterson, nancy.brown-peterson@usm.edu, 228-872-4288

Female Red Snapper Reproductive Parameters: Is Depth or Artificial Structure More Important?

Nancy J. Brown-Peterson[1], Robert T. Leaf[2] and Andrea J. Leontiou[1]

[1]Center for Fisheries Research and Development, School of Ocean Science and Engineering, The University of Southern Mississippi, Ocean Springs, MS 39564
[2]Division of Coastal Science, School of Ocean Science and Engineering, The University of Southern Mississippi, Ocean Springs, MS 39564

Red Snapper, *Lutjanus campecheanus*, is a structure-associated species occurring across a wide depth range in the northern Gulf of Mexico. We used a random forest machine learning algorithm to examine reproductive parameters of female Red Snapper captured from 2016-2018 on three artificial reef types with various structure heights at depths ≤ 100 m. Overall, the type (artificial reef, oil platform, and "rigs-to-reefs") and height of artificial structures are not good predictors of spawning seasonality, ovarian development, spawning indicators or fecundity. However, depth does help predict some reproductive parameters. Spawning seasonality (measured as GSI) is correctly classified 59.5% of the time when using histology reproductive phase, fork length (FL), month and depth. Reproductively active or inactive females can be correctly classified 89.3% of the time using GSI, month, FL and depth, while females in the developing vs. spawning capable phases were correctly classified 82.2% of the time using the same predictors. Histological indicators that show potential spawning over a 36-h period were correctly classified 61.5% of the time, with the best predictors FL, GSI, depth and month; depth was a stronger predictor than month for this reproductive parameter. Stepwise regression using AIC found that only month significantly predicted differences in relative batch fecundity, with significantly higher values in August compared to all other months. Our results suggest that female Red Snapper reproductive effort is not related to artificial structure types or heights, but that a combination of fish size, month and depth can accurately predict spawning in female Red Snapper. Furthermore, Random Forest analysis shows promise for using multiple variables from unbalanced sampling studies to predict reproductive parameters.

ORAL PRESENTATIONS

Matthew D Campbell, matthew.d.campbell@noaa.gov, (228) 549-1690

Rapid spatial expansion and population increase of invasive Lionfish (*Pterois spp.*) observed on natural habitats in the northern Gulf of Mexico.

Matthew D. Campbell[1], Adam G. Pollack[2], Kevin Thompson[3], Ted Switzer[3], Eric R. Hoffmayer[1], William B. Driggers[1], Sean Keenan[3], Chris Gardner[2], Adam Kemberling[2], David Hanisko[1], Kevin R. Rademacher[1], Kate Overly[2]

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2 - Riverside Technology, Inc., National Marine Fisheries Service ,Southeast Fisheries Science Center ,Mississippi Laboratories ,Pascagoula, MS 39567

3 - Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute St Petersburg, FL 33701

The spatio-temporal properties of lionfish (*Pterois sp.*) invasion into the Gulf of Mexico has been well documented but analysis of abundance trends is lacking. Therefore, in this study we used a combination of SEAMAP Trawl and Reef Fish Video surveys to estimate relative abundance trends through time. Each time series showed a rapid increase of lionfish beginning in 2010 in south Florida with the population continuing to grow in size and occupy increasing amounts of space across the northern Gulf and in multiple natural habitat types, including trawlable hard bottom. Abundance trends indicate faster growth for the inshore trawl and video surveys as compared to the offshore video survey. There is some evidence that population growth is beginning to equilibrate in offshore habitats, but inshore surveys indicate continued population growth. Sponge catch in the trawls was a significant variable explaining lionfish catch and was overwhelmingly observed in the eastern Gulf. Interestingly, the trawl survey data has few captures in the western Gulf indicating low-relief soft-bottom habitat in that region is unsuitable. It is important to consider artificial habitats in the western Gulf are likely providing suitable hard-bottom habitat and the set of surveys analyzed here cannot provide inference for them. Importantly, recruitment into low relief trawlable habitats containing sponge is likely hampering removal programs thus population growth continues in inshore areas. Careful consideration must be taken when implementing removal programs and artificial reefing given the unintended consequences of increased population growth under harvest and high lionfish densities observed on artificial structures in most studies. Close monitoring of community level effects will be needed as lionfish are known to prey on young snappers and groupers. Similarly, indirect resource competition will likely continue to increase and displace native species.

ORAL PRESENTATIONS

Nagaraj Chatakondi nagaraj.chatakondi@usda.gov (662) 686-3566

Variability in sperm to egg ratios influence hatching success of Channel x Blue hybrid catfish eggs in hatcheries

Nagaraj Chatakondi[1], Jaelen Myers[2], Ian Butts[3], Dakoda Chisolm[1] and Michael Dallas[1]
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Hybrid catfish fingerlings are preferentially raised by US farm-raised catfish producers in ponds. Hybrid catfish fry are reliably produced by hormone-induced spawning of channel catfish followed by fertilizing stripped channel catfish eggs with pooled blue catfish sperm. Even though, hybrid catfish fry production has been increasing over the years, variability and inconsistent production are commonly observed because hatchery protocols and procedures were not optimized. Hence, there is a need to optimize protocols and procedures to produce consistent, reliable and efficient hatchery production.

Sperm to egg ratio is an essential factor to standardize and optimize in vitro fertilization of stripped channel catfish eggs to fertilize with blue catfish sperm. Presently, 15,000-100,000 sperm per egg ratios are provided for routine hybrid catfish fry production in commercial hatcheries. Appropriate number of sperm per oocyte need to be determined to enhance the reproductive efficiency under hatchery conditions. The goal of the proposed study is to: 1) rational use of gametes, 2) limit number of blue catfish male broodfish and 3) reducing the production cost in hatcheries. In the present study, ten sperm to egg ratios were evaluated in multiple hatching trials. Stripped eggs from 5 channel catfish females and pooled sperm from 3 blue catfish males was used in each trial. Optimal sperm to egg was determined to be 10,000 sperm per egg and any increase beyond this number yielded no increase in hatch. Maternal variability also varied with percent hatching success, portraying the importance of egg quality of female for fry production.

Optimal sperm to egg ratio will maximize hatching success of hybrid catfish eggs by using the least quantity of sperm. Minimizing the amount of sperm to fertilize eggs in the hatchery will help reduce the number of mature blue catfish males sacrificed for hatchery production to lower the cost of hatchery production.

ORAL PRESENTATIONS

Alfonso Cohuo, Alfonso.Cohuo@usm.edu, 972-922-4190, Student Paper

Stable Isotope Analysis of Blood Components to Determine Feeding Habitat of Gulf Sturgeon (*Acipenser oxyrinchus desotoi*)

Cohuo, A[1], K. Dillon[1], M. Andres[1], M. Peterson[1]

[1]University of Southern Mississippi, School of Ocean Science and Engineering, Division of Coastal Sciences, Ocean Springs, MS 39564

Gulf Sturgeon (GS), *Acipenser oxyrinchus desotoi*, are a federally threatened, anadromous species in the northern Gulf of Mexico. They exhibit a ratcheting feeding behavior, where individuals feed in estuaries and marine waters while overwintering and fast in rivers from the spring–fall. The species is divided into three size classes based on feeding behaviors, sexual maturity, and length. Methods to confirm GS feeding behavior are limited since gut content analysis is not often practical. Stable isotope analysis provides a non-lethal, minimally invasive method to determine feeding habitats for GS. The project occurred in the Pascagoula River during 2018– 2019 with samples from April-October. Fish were captured with gill nets, fork lengths were measured, and blood was collected from the caudal vein. The blood samples were then separated into red blood cells (RBC) and plasma for stable isotope analysis. Stable isotope turnover varies by tissue type, the slower turnover of RBC means that the values most likely reflect diet from further in the past, while quick plasma turnover will inform on more immediate diet. The project's goal is to determine feeding habitat of GS size classes in the Pascagoula River. We document that adult and subadult GS have $\delta^{13}C$ values in line with estuarine and marine waters for both RBC and plasma. In contrast, juveniles are the only size class that have values in riverine ranges (<-26.3 ‰). Plasma and RBC values for all size classes are concentrated between -22.5‰ and -17‰. The ratcheting feeding behavior is reflected in $\delta^{13}C$ values for a majority of GS. Plasma values for some subadults are depleted compared to their RBC counterparts which may represent variable use of carbon sources within the estuary or riverine feeding. Juvenile values in the riverine range are consistent with past literature and is likely a result of intraspecific variation.

ORAL PRESENTATIONS

Vandana Dharan, vd302@msstate.edu, (662-588- 0420), (Student - Oral presentation)

Investigation of the epidemiology of Blue Catfish Alloherpesvirus (BCAHV)

[1]Vandana Dharan, [2]Nicholas Phelps, [3]Lester Khoo, [1]Ganesh Kumar and Suja Aarattuthodiyil[1]

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Intensive aquaculture production systems often encounter infectious viral disease outbreaks, causing substantial fish mortalities and associated economic losses. Blue catfish alloherpesvirus (BCAHV), belonging to Alloherpesviridae, is a novel strain of Ictalurid herpes virus 1 and was first reported from blue catfish fingerlings. The genome of BCAHV has 94% homology with that of channel catfish virus (CCV). They also show similar clinical signs of infection. In order to determine the host-specificity of BCAHV, the virus was inoculated onto various established fish cell lines of families Ictaluridae, Cyprinidae, and Clariidae. Results indicated that the virus growth and exhibition of cytopathic effects (CPEs) were restricted to cell lines from family Ictaluridae (ATCC® CRL- 2772™ and ATCC® CL59™). The CPEs primarily involved rounding of cells, syncytia formation, and dissociation from culture surface. Subsequently, a viral challenge was conducted involving channel, blue, and hybrid (♀ channel x ♂ blue) catfish fingerlings (avg. wt. 2.3±1.1 g). Fish acclimated in flow through systems for two weeks were exposed to a virus dose of $10^{3.5}$ $TCID_{50}$ for 2 hrs at ~25°C. Water flow remained static throughout the virus exposure and resumed afterwards. Fish mortalities in treatment and control groups were recorded for 3 weeks. Percentage mortality was significantly higher in blue catfish when compared to hybrid and channel catfish. Since, BCAHV is a herpesvirus similar to CCV which exhibits latency, environmental stress factors could trigger the latent virus resulting in viral disease outbreaks. In another challenge study with different stocking densities, the percent mortality was found to be significantly higher in high density tanks, indicating that crowding stress affects BCAHV-associated mortality in catfish fingerlings. The pathogenicity of BCAHV towards blue catfish as observed in this study reveals the potential of this virus to emerge as a significant threat compromising hybrid catfish production and impacting the viability of farm operations.

ORAL PRESENTATIONS

Nicky Faucheux, nmh94@msstate.edu, (601) 831-1047, Student Paper

Defying expectations: tributary fish assemblages are similar above and below impoundments

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[3] U.S. Department of Agriculture, Agricultural Research Service, National Sedimentation Laboratory, Water Quality and Ecology Research Unit, Oxford, MS, USA
[4] Biological Sciences, Arkansas State University, State University, AR 72467

Impoundments can drastically change the physical and biological characteristics of fluvial systems. Changes in the physical characteristics, such as reductions in flow, increased sediment deposition, and increased surface area often influence the system's biological components including plant, macroinvertebrate, and fish assemblages. In addition to direct effects on impounded waterbodies, impoundments can also have wide-ranging effects at the watershed scale, particularly on upstream tributary streams. For example, changes in stream fish assemblages have been attributed to colonization by lacustrine species, as well as the prevention of recolonization by fluvial species due to discontinuities in stream networks created by reservoirs. The purpose of this study was to assess the magnitude of these effects. We analyzed historical data from 26 streams distributed across five sub-basins in the bluff hills region of the Yazoo Basin. All four major tributary rivers in this region are impounded by large (11,240 - 26,143 hectares) reservoirs for flood control. We compared fish assemblages in streams located upstream and downstream of the four reservoirs using PERMANOVA and contrary to expectations, found no significant differences between the upstream and downstream assemblages. We explore several possible explanations for this discrepancy.

ORAL PRESENTATIONS

Steven G. George Steven.G.George@usace.army.mil (601) 634-2897

Under a dissecting microscope: range expansion of an invasive water flea, *Daphnia lumholtzi*, in Mississippi and new state records of a water flea, *Leptodora kindtii*, in an oxbow lake.

Steven G. George[1], W. Todd Slack[1] and K. Jack Killgore[1]

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Daphnia lumholtzi, a native Cladoceran to Africa, Australia and parts of Asia was introduced in the USA probably from fish stocking through the international commercial trade. Since its uncertain introduction it has spread through North American reservoirs, including Mississippi with three locations noted in the Tennessee-Tombigbee Waterway in 1990 and 2004. While conducting a larval fish study using ichthyoplankton tows from March-November 2017 in Desoto Lake, an oxbow of the Mississippi River (Coahoma Co.), we collected the exotic water flea, *Daphnia lumholtzi*. Of the 252 ichthyoplankton tows taken during our study, *Daphnia lumholtzi* occurred in only 18 tows with 75 tows containing either one or more native Cladoceran representatives(Sididae, Daphniidae and Chydoridae). Native Cladocerans we re present in samples from March to June, however *Daphnia lumholtzi* was only present in April (N=1) with the remaining specimens occurring in May. Numerically dominant Cladocerans were: *Daphnia lumholtzi* (N=569), Sididae (N=568), Daphniidae (N=66) and Chydoridae (N=2). Recent collections (August 2019) using bongo nets in Steele Bayou and Paw Paw Chute, tributaries of the Yazoo and Mississippi rivers (Issaquena and Warren Co.) yielded 84 additional specimens of *Daphnia lumholtzi*. It is apparent this exotic species has either been under-sampled or is expanding its range.

Leptodora kindti, a large predaceous Cladoceran, was collected for the first time in Mississippi from Mellwood Lake, an oxbow of the Mississippi River (Phillips Co., AR/Coahoma Co., MS). Fourteen individuals were collected in June 2015, during a larval fish survey using larval fish traps baited with chemical light sticks. *Leptodora kindti* is indigenous to the Laurentian Great Lakes but has been collected elsewhere in neighboring states that borders the Mississippi River. This first record for Mississippi suggests this species may be expanding its range or under-sampled as well.

ORAL PRESENTATIONS

Eric Gigli, eric.gigli@dmr.ms.gov, (228) 523-4136

Pop-up satellite tagging of Atlantic Tripletail (*Lobotes surinamensis*) in the northern Gulf of Mexico for winter migratory pattern research

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Atlantic Tripletail are a coastal migratory pelagic fish found nearshore worldwide. Little is known about the spawning, population dynamics, and associated movements of the species. In the Gulf of Mexico, Atlantic Tripletail are a highly sought-after species, with average annual landings of approximately 380,000 pounds (NMFS 2020). Most of the fishing efforts in the northern Gulf of Mexico occur during warmer months when the species is found nearshore, and efforts decrease in the cooler months when they are hypothesized to migrate offshore. It is not clear to what geographical extent the species migrates throughout the Gulf of Mexico outside of the species seasonal, nearshore occurrences.

To better understand the migratory patterns of the species, the Mississippi Department of Marine Resources attached pop-up satellite tags to Atlantic Tripletail captured in the Mississippi Sound. Prior to implementation of the project, two methods of attachment (titanium plate and monofilament saddle) were tested using captive aquaculture brood-stock at The University of Southern Mississippi's Thad Cochran Marine Aquaculture Center. Findings from this testing period resulted in the implementation of an improved design of the saddle method of attachment. Tagging of wild-caught individuals occurred immediately prior to the expected migration of the fish during cooler months. Ten tags were deployed over the course of forty days. Data gathered will include depth, temperature, and light levels throughout the deployment while true GPS location will only be gathered after the conclusion of the tag's deployment. Modeling will derive "geo-location", representing greatest likelihood location/area through known solar timing and thermal satellite imagery of sea surface temperature. Two of the ten tags were deployed with settings allowing for situational release and early transmission of the archived data. One such tag released 53 days after deployment and has indicated movement to the continental shelf, potentially in relation to temperature decreases.

ORAL PRESENTATIONS

Mark A. Grace, Mark.A.Grace@noaa.gov, (228) 549-1629

A New Species of Kitefin Shark (Squaliformes: Dalatiidae: *Mollisquama mississippiensis*) from the Gulf of Mexico.

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A new Western North Atlantic Ocean species of kitefin shark, *Mollisquama mississippiensis* **sp. nov.**, was captured during a NOAA/NMFS midwater trawling survey to assess predator/prey trophodynamics for sperm whales (*Physeter microcephalus*). The new species designation is based on five diagnostic features not found on the only other known pocket shark specimen — *Mollisquama parini* Dolganov that was captured in the eastern South Pacific Ocean. Diagnostic features include a putative pit organ, photophores irregularly distributed along many areas of the body, 16 distinct ventral-abdominal photophore aggregations, and two differences associated with the dentition. Other potential diagnostic features are 10 fewer vertebrae than *Mollisquama parini* and six morphometric proportional differences that exceeded +/- 20%. The unique pocket gland that produces and expels luminous fluid was examined with high-resolution synchrotron scans and by histological analysis.

ORAL PRESENTATIONS

Jennifer L. Green, jennifer.l.green@usm.edu, (228) 818-8820

Investigation of Bull Shark, *Carcharhinus leucas,* response to the Bonnet Carré Spillway opening and associated effects from increased freshwater input into the western MS Sound using acoustic telemetry

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In 2019 the Bonnet Carré Spillway (BCS) was opened twice within the same year for the first time in history. During the second opening, the spillway remained open for an unprecedented 79 consecutive days (May through July), and the persistent input of freshwater resulted in major abiotic changes throughout the Mississippi Sound. Water quality parameters were measured weekly at fixed stations throughout the Mississippi Sound to characterize these changes. Concurrently, an established array of Vemco VR2W passive acoustic receivers was moored throughout the western Mississippi Sound to monitor the movements of telemetered Bull Shark, *Carcharhinus leucas* (n=11; tagged in 2017 and 2018). This allowed a unique opportunity to determine response of these Bull Sharks to the freshwater influx into Mississippi Sound from the BCS opening. Bull Sharks were active within the array beginning in March. The total number of sharks detected, and the spatial extent of the array used peaked in early June. From July through early August there was a marked decline in the total number of sharks detected and total number of detections. A negative binomial general linear model (GLM) was used to examine differences in the number of detections within the array in relation to weekly monitored water quality parameters (temperature, salinity, and dissolved oxygen). The negative binomial GLM coefficients indicated that Bull Shark detections throughout the array increased with a decrease in bottom water temperature ($p<0.01$) and an increase in bottom salinity ($p<0.001$). Our data supports previous studies in Gulf of Mexico estuaries and further highlights the importance of continuous long-term monitoring of the Mississippi Sound using passive acoustic telemetry.

ORAL PRESENTATIONS

Mackenzie A. Gunn, mag795@msstate.edu, 802-310-3525, Student Paper

Bolbophorus damnificus pond prevalence and parasite induced mortality in channel and hybrid catfish

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The trematode *Bolbophorus damnificus* has deleterious effects on production efficiency in farm-raised channel (*Ictalurus punctatus)* and hybrid (*I. punctatus x I. furcatus*) catfish. Treatment of infection involves breaking the parasitic lifecycle through elimination of the snail host, however because treatment is both costly to the producer and stressful for the fish it is typically implemented only when heavy infection is observed. The overall prevalence of *B. damnificus* infected snails within a pond is determined by observation of active shedding, however snails can shed cercariae in a cyclical manner and observation alone could underestimate the actual prevalence of infected snails within the pond. Ramshorn snails (n = 8,159) were observed for cercariae shedding from 14 ponds with known trematode infection. Of those snails, 1,403 that were not observed to be shedding, had DNA extracted from the whole snail to determine prevalence of *B. damnificus* or *Bolbophorus* sp. type II. Overall, there was a higher proportion of snails hosting, but not actively shedding *B. damnificus* and *Bolbophorus* sp. type II within the ponds, indicating that observation of shedding underestimates the actual prevalence of infection. Preliminary data suggest hybrid catfish experience lower mortality than channel catfish when exposed to similar numbers of cercariae. Mortality in juvenile channel and hybrid catfish was observed in two challenges (100 and 250 cercariae/L) for 15- and 60-days following exposure to *B. damnificus*. There was lower mortality in hybrid catfish in both challenges. In all challenges, infected fish presented clinical signs consistent with *B. damnificus* infection including visible metacercariae below the skin. The biological and economic implications of these findings on catfish production are unknown but suggest outbreaks of *B. damnificus* in hybrids may not result in the same reductions in productivity as observed in channel catfish.

ORAL PRESENTATIONS

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Reforesting a river: restoration efforts and anticipated benefits of creating wood traps in the Mississippi River.

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While we know that the Mississippi River Basin has undergone major deforestation in the last two centuries, studies of the effects of this habitat loss, and also its restoration, have been focused primarily on terrestrial habitats. While there is still a pronounced need for reforestation of floodplain forests throughout the Upper and Lower Mississippi Alluvial Plain, we know very little about the effects of loss of wood in rivers themselves. The first engineering feat in the Lower Mississippi River (LMR) was the removal of snags and wood jams in the 1820s to facilitate safer and more efficient steamboat navigation within the system. This was followed by monumental changes to the form and function of the LMR through the implementation of a wide variety of channel improvement features and "river training" structures, all of which are designed to move material out of the system, not retain it. Combined with the loss of wood input through large-scale land clearing and logging, there remains a largely deforested river. In an effort to reclaim this habitat feature in the Lower Mississippi River, an investigation into how and why has ensued. We are analyzing the habitat use of this and other natural and artificial substrates by riverine invertebrates and have plans to create large-scale wood traps in the LMR. Results of this study will inform future restoration efforts, and if successful, provide critical habitat for large river invertebrates and fishes.

ORAL PRESENTATIONS

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Collecting Stakeholder Interests Based on a Survey of Mississippi's Red Snapper Fishery

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The Mississippi Department of Marine Resources (MDMR) collected data on Mississippi's recreational Red Snapper fishery by surveying stakeholders after the 2019 season. The survey was designed to gain a better understanding of stakeholder participation and preferences in order to inform future management decisions regarding the fishery. All questions pertained to the 2018 and 2019 seasons to coincide with the period in which the fishery was managed through an Exempted Fishing Permit from NOAA. The questions related to the stakeholders' Red Snapper fishing habits, willingness to report on additional species, and preferences regarding season structure. The survey was emailed to all registered Tails n' Scales users (a total of 5,115 email addresses) and was posted on MDMR's Facebook account. Three versions of the survey were designed with customized questions in order to be most applicable to each user group: private recreational anglers, federally permitted for-hire captains, and state for-hire captains. A total of 1,032 responses were received, 1,009 of those being from private recreational anglers and the general public, 8 from federal for-hire captains, and 15 from state for-hire captains. Primary results showed various correlations between factors like vessel length, frequency of trips, and other species targeted. Twenty-five percent of anglers who took more trips (4+) targeted additional reef species, while only 11% of anglers who took fewer trips did the same. Fifty percent of those anglers who took more trips also targeted Cobia and/or Tripletail, while only 36% of those who took fewer did so. A large proportion (55.6%) of anglers fished from smaller vessels (<24') and those anglers were likely to fish less than 12 miles south of the barrier islands (60%), resulting in higher fishing pressure on nearshore reefs and structures. MDMR will continue to engage stakeholders for angler input regarding the management of Mississippi's Red Snapper fishery

ORAL PRESENTATIONS

Divya Johnson, dj1371@msstate.edu, (662-588 7139), (Student – Oral Presentation)

Characterization of *Edwardsiella ictaluri* isolates from channel and hybrid catfish, and ornamental fish species.

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Enteric Septicemia of Catfish (ESC) caused by the gram-negative bacterium, *Edwardsiella ictaluri*, results in significant economic losses to catfish aquaculture worldwide. Although previously reported host-specific to catfish, recently, *E. ictaluri* outbreaks have been reported in other aquacultured species. The expanding host and geographic range necessitate comprehensive characterization of *E. ictaluri* isolates derived from multiple fish hosts. In this study, *E. ictaluri* isolates from catfish and ornamental fish were characterized to determine genotypic and phenotypic homogeneity/ heterogeneity among isolates. Genotyping of *E. ictaluri* isolates by rep-PCR (Repetitive Extragenic Palindromic sequence PCR) using specific primers (ERIC I & II, BOX, and GTG5) indicated that the amplicons were mostly homogeneous except for few isolates. Extraction and separation of native plasmids from ornamental fish-derived *E. ictaluri* on agarose gels revealed a homogenous profile. The *E. ictaluri* isolates from ornamental fish carried two plasmids, similar to isolates from catfish, but of lower molecular weight. Susceptibility of *E. ictaluri* isolates against approved antibiotics (Aquaflor®, Terramycin® and Romet®) in catfish aquaculture by disc diffusion method indicated that the ornamental fish derived isolates were 'susceptible' to all three antibiotics. Antibiotic sensitivity of *E. ictaluri* isolates by determining the Minimal Inhibitory Concentration (MICs) of 18 antimicrobial agents indicated differential susceptibility of the isolates against the antimicrobial agents tested. The genotypic and phenotypic differences among *E. ictaluri* isolates from different fish hosts emphasize the need for further characterization via genome sequencing of the distinct isolates.

ORAL PRESENTATIONS

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Remotely operated vehicle surveys document rare and obscure chondrichthyans in deep waters of the northern Gulf of Mexico

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Surveys of deepwater habitats are rare and opportunities to make *in situ* observations of deepwater fauna are even rarer. As a result, our knowledge of deepwater chondrichthyan fauna is, in general, very limited. As human activities push farther into the deep ocean and potentially threaten deepwater ecosystems, data concerning the biology and habits of these species will become increasingly important. From March 2012 to April 2018, four expeditions were conducted aboard the National Oceanic and Atmospheric Administration's Research Vessel Okeanos Explorer utilizing a remotely operated vehicle to explore deepwater habitats in the United States waters of the northern Gulf of Mexico. Over the course of these expeditions, 71 dives were conducted to depths ranging from approximately 300 to 3000m. During 19 of these dives, 47 separate observations were recorded of 14 chondrichthyan species ranging in depth from 326 to 1918m. In several cases, distinct differences were noted between observed individuals and previous morphological descriptions. These observations will enable us to clarify several aspects of the biology and ecology of these poorly understood species.

ORAL PRESENTATIONS

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Collaborative agency efforts to contain and eradicate Giant Salvinia, *Salvinia molesta*, in the Pelahatchie Bay of Ross Barnett Reservoir in central Mississippi: Part 2.

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On June 26th, 2018 giant salvinia, *Salvinia molesta*, was identified on the north shore of Pelahatchie Bay in the Ross Barnett Reservoir located in Central Mississippi. Efforts to contain and eradicate the exotic, invasive plant species continue to present day. Management actions continue based on a collaboration of expertise from multi-agency professionals. Experts from the Mississippi Department of Wildlife, Fisheries, and Parks, United States Army Corps of Engineers, Louisiana Department of Wildlife and Fisheries, Pearl River Valley Water Supply District, and Mississippi State University have provided input. The resulting actions are believed to be the best effort to achieve the objective of eradication. These actions include: the closure of recreational boating within Pelahatchie Bay by Pearl River Valley Water Supply District, aggressive herbicide treatments of various chemical mixtures from airboat, helicopter, and on foot, floating containment barrier arrangement and monitoring, range surveys completed from boat, drone flight, and on foot, drawdown of the lake level to expose plants to desiccation and freezing temperatures, and prescribed fire. Objective completion will be determined when the reservoir reaches full pool and comprehensive surveys reveal no recolonization. Ross Barnett Reservoir is highly recreated by anglers and boaters from all over the state and the southeastern United States. Objective completion is imperative to remove what would be a giant salvinia vector to all other water bodies within the state of Mississippi and beyond.

ORAL PRESENTATIONS

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Hybrids, freaks, mutants, and zombies: a collection of unusual freshwater fishes

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Abnormal and unusual freshwater fishes are seen via field sampling or public contacts. Mississippi has several species at the fringes of their native ranges, as well as introduced or non-native species. Natural or cultivated hybrids should be recognized for proper species identification, rejection for hatchery broodstock or use in condition factor or length at age analyses, or prevention of mistakenly awarding state or world record status. Fish may exhibit unique physical characteristics caused by reaching advanced age or size, recessive genes, or spontaneous genetic mutations. Other growths, deformities, or abnormal behaviors are the result of injuries, parasites, or diseases. Professional fisheries personnel should be familiar with such irregularities to answer public questions and allay concerns, prevent confusion with record keeping entities, keep broodstock pure, and exclude non-standard fishes from standardized data sets.

ORAL PRESENTATIONS

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Age and Growth Comparison of White Bass (*Morone chrysops*) in multiple systems in Mississippi, USA

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The White Bass (*Morone chrysops*) is a predatory game fish inhabiting lakes and rivers across the United States. Despite its popularity as a game fish, the species is understudied. Further, management is generally restricted to liberal creel limits, and in Mississippi, there are no length or creel limits on harvest. Conversely, the Tennessee River has a 10 fish per day creel limit, which is one of the most restrictive within this species range. In this study, we will explore differences in age and growth between three unique regional waterbodies – (1) the Tennessee-Tombigbee Waterway within Mississippi, (2) flood control reservoirs (Grenada and Sardis Reservoir), and (3) the lower Tennessee River (below Pickwick Dam). Samples will be collected using electrofishing, angling, and gill netting. Fish will be measured for length (mm) and weight (g), gonads removed for determinations of sex, and otoliths removed for ageing. Otoliths will be sectioned using a low speed Isomet saw with diamond blades, mounted on slides with crystal bond, lightly sanded, and photographed using a stereomicroscope. Age at collection, radius at collection, and radii of each annulus will be determined for back-calculation of age and growth. These data will allow development of age-length keys and von Bertalanffy growth equations for each system. To date, we have collected 49 White Bass from the flood control reservoirs, 9 from the Tennessee-Tombigbee Waterway, and 10 from the Tennessee River. Fish collections continue and laboratory processing is underway. These data will inform management of this species by providing age and growth information under both restrictive and liberal management strategies.

ORAL PRESENTATIONS

Anna K. Millender, anna.millender@usm.edu, 662-266-1626, Student Paper

Observations of the reproduction of two species of cownose ray (*Rhinoptera bonasus and Rhinoptera brasiliensis*) in the northern Gulf of Mexico

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Historically, the Cownose Ray (*Rhinoptera bonasus)* was considered the only Rhinopterid residing in the northern Gulf of Mexico (GOM); however, recent studies have confirmed the presence of the Brazilian Cownose Ray (*R. brasiliensis*) throughout this region. As the two species are externally indistinguishable, the confirmation of *R. brasilisensis* confounds previous life history studies on GOM *R. bonasus* as they likely inadvertently assessed both species. Neither Rhinopterid is managed by state or federal fisheries programs; however, the new interest in sport fishing for cownose, and its frequent use as bait by recreational and commercial fishers, has put more pressure on their populations. To ensure the life history and population dynamics of this newly exploited species are fully understood, it is integral that we fully distinguish the characteristics of each species. To date, 129 *R. bonasus* (74 males and 55 females) ranging in size from 346 – 925 mm disc width and 61 *R. brasiliensis* (40 males and 21 females) ranging in size from 362 – 998 mm disc width have been collected. Here we show preliminary results for size-at-maturity, reproductive timing and seasonality, and gestation periods for both species. Initial analyses indicate a gestation period of 11-12 months with *R. bonasus* females pupping in June and *R. brasiliensis* females pupping in June and July. The smallest mature *R. bonasus* observed were: 659- and 678-mm disc width; while *R. brasiliensis* were 741- and 705-mm disc width, female and male respectively. Understanding the full life history characteristics for these two species is this first step to defining their status in our waters.

ORAL PRESENTATIONS

David M. Norris, davidnorris89@gmail.com, 601-529-7060, Student Paper

To Plant or Not to Plant? A decision support tool to minimize risk associated with uncertainty in Reservoir Habitat Management.

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Reservoir mudflats are undesirable because they limit development of healthy fish assemblages due to lack of plant cover. Seeding mudflats with agricultural plants may allow reservoir managers to cultivate cover which may mimic floodplain vegetation once inundated and provide fish habitat. However, planting is risky because success is affected by unpredictable water level fluctuations and plant growth characteristics. Decision support tools can help managers quantify uncertainty surrounding these physical and biological processes that influence decision outcomes, thus reducing risk in the decision-making process. We used Bayesian Decision Networks and sensitivity analyses to quantify uncertainty surrounding the efficacy of agricultural plantings as supplemental fish habitat on the mudflats of four northwest Mississippi flood control reservoirs. When averaged across all uncertainty, planting Marshall Ryegrass was the optimal decision only in Enid Lake, while not planting was the optimal decision in the other three reservoirs. One-way sensitivity analysis identified “elevation contour” as the most influential state which can be determined prior to making a planting decision. Response profiles identified specific contours within Enid, Sardis, and Grenada lakes at which planting Marshall Ryegrass was the optimal decision, while no such contours where identified in Arkabutla lake. These results provide a quantified basis for establishing best management practices and identifying key physical and biological processes that influence decision outcomes. Additionally, our study illustrates that best management practices for mudflat planting are context dependent and can vary among reservoirs.

ORAL PRESENTATIONS

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A comparison of Mississippi River borrow pit fish communities over several decades

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Borrow pits became part of the Mississippi floodplain habitat with the advent of levee construction in the early 1700s and have subsequently become ubiquitous along the entire Mississippi River. In the Lower Mississippi River (LMR), estimates suggest borrow pits make up 17 – 42 % of the available off-channel aquatic habitat. To inform borrow pit design and understand their contribution to the Mississippi River fish community, habitat, water quality and fisheries studies using rotenone (1981, n = 25 and 1996/97, n = 8) and gillnets and seining (1996/97, n = 5 and 2019, n = 6) have been conducted by the U.S. Army Corps of Engineers. These studies found that numerous native species utilize borrow pits: 57 in 1981, 62 by rotenone and 53 in gillnets and seines in 1996/97 and 52 in 2019. Both the 1981 and 1996/97 study collected an average fish biomass of around 600 lbs/acre. In 1981, approximately 10,300 individuals/per acre were collected compared to 8,800 individuals in 1996/97. Using a 1991 LMR borrow pit acreage of 42,000 and the lb/acre and individual/acre estimates suggests that LMR borrow pits support more than 370 million individuals and 25 million pounds of fish.

ORAL PRESENTATIONS

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Recruitment limitation of the eastern oyster (*Crassostrea virginica*) in Mississippi Sound.

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In addition to suitable substrate and physical conditions, successful oyster recruitment requires an adequate supply of planktonic larvae from local and remote source areas, followed by the subsequent survival and growth of early post-settlement stages. Recruitment limitation arises when the stock size is constrained below some threshold density by the supply of larvae. Above the threshold density, stock size should reflect post-settlement processes such as growth and predation more than larval supply rates. Low abundances of adult oysters in some areas of Mississippi Sound in the summer of 2018 were likely caused by the combined effects of multiple stressors. Thus in 2018, local recruitment was potentially limited within certain areas of Mississippi Sound. Despite low abundances of adults in some areas, spat settlement appeared sufficient to support oyster recruitment throughout western Mississippi Sound in 2018. However, subsequent sustained freshwater inflow for 122 d in 2019 extensively devastated adult oyster stocks, apparently even including remote sources of larval supply. Consequently, the recruitment limitation threshold was exceeded, as spat settlement was effectively eliminated in Mississippi Sound during the oyster spawning season of 2019. Thus, recruitment limitation now presents a major challenge to oyster restoration efforts in Mississippi.

ORAL PRESENTATIONS

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Coupling hydrodynamic, spawning, and larval settling models with a pallid sturgeon, *Scaphirhynchus albus*, population model to evaluate alternative management operations

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Long-lived pallid sturgeon, *Scaphirhynchus albus*, reside in the Missouri and Lower Mississippi Rivers and have been federally listed as endangered since 1990. River alterations have increased stream velocity and a system of dams fragments the habitat, limiting pallid sturgeon adult migration and free-embryo drift distances. In the Upper Missouri River (UMR) below Fort Peck Dam, MT, no documented recruitment to age-1 of natural origin pallid sturgeon has been observed for several decades. It is hypothesized that flows and water temperature, when combined with the length of free-flowing river below Fort Peck Dam, limit the likelihood that any naturally produced age-0 pallid sturgeon settle in lotic habitats. Instead, free embryos are thought to drift into the anoxic headwaters of Lake Sakakawea, ND, which is presumed lethal. Fort Peck flow releases under evaluation aim to promote spawning and increase free embryo retention; however, which flow scenario will be the most likely to pose the greatest benefit to the pallid sturgeon population is unknown and impractical to study through experimentation alone. The objectives of this study were to 1) develop a demographic population model of the pallid sturgeon residing in the UMR below Fort Peck Dam, 2) couple the population model to spawning and free embryo retention outcomes computed by hydrodynamic, spawning, and settling models, 3) examine the model's utility in evaluating the effects of alternative hydrographs on the pallid sturgeon population. An age-structured demographic model parameterized for UMR pallid sturgeon was constructed and linked to hydrodynamics through spawning model and drift and settling model outputs. Long-term population growth rates were sensitive to age-0 survival given free embryo retention, an uncertain parameter. However, in any given year, the best-performing flow alternative, i.e., the flow with the largest long-term population growth rate, was robust to changes in age-0 survival given retention.

ORAL PRESENTATIONS

Bradley M. Richardson, bmr380@msstate.edu, (618) 697-3178, Student Paper

They are the same, but different: comparative genomics of two atypical *Aeromonas hydrophila* pathotypes found in catfish aquaculture of the southeast

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Atypical *A. hydrophila* (aAh) has caused over $100 million dollars in catfish production losses since the first epizootic outbreaks began in western Alabama in 2009. The bacterial pathogen displays a rapid onset of disease and presents little or no early warning. Disease results in widespread internal hemorrhaging, reddening of the fins, iridial hemorrhage, and, ultimately, death. In 2014, a second strain of aAh was isolated from catfish in the Mississippi delta. The two strains display different outbreak characteristics that results in different levels of severity and loss. We aimed to compare the genomic make-up of these two strains to better understand the different outbreak characteristics. Over 250 clinical isolates were collected from different diagnostic labs in Mississippi and Alabama, which covered multiple years. The genomes were sequenced for a subset of these isolates and comparisons between the two pathotypes as well as genomes within the NCBI database were used to identify keep differences. Results showed the two genomes displayed >95% similarity. Key differences were present in the genes coding for toxins and their transport systems. The differing genomic make-ups of these pathotypes raise important questions about the spread, resilience, and epidemiology of each. The lack of specific genes and secretion systems may allow for one pathotype to evade the host immune system at different times of the infection cycle, thus allowing for the differing levels in severity and loss shown by the two strains. The information collected from these analyses provide information on potential methods for combatting the aAh disease.

ORAL PRESENTATIONS

Emily Satterfield, emily.satterfield@dmr.ms.gov, (228) 523-4090

Species abundance and richness of Mississippi artificial reefs according to reef composition.

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Currently there are 15 artificial reef zones covering approximately 16,000 acres of Mississippi's coastal waters and adjacent federal waters where natural bottom is featureless sand and mud substrate. The purpose of artificial reefs is to provide relief and contour that increases habitat for reef-dependent and associated fish and invertebrates. Until recently, exploitation of Mississippi's reefs by marine organisms has not been monitored in any quantifiable way. The objective of this project is to investigate finfish species abundance and richness on Mississippi's artificial reefs and determine if the reef type influences finfish assemblages. The artificial reefs are classified into three types, Materials of Opportunity, Materials of Design, and Steel Hull Vessels. Using a technique adapted from the Roving Diver Technique (RDT) developed by the Reef Environmental Education Foundation (REEF), divers survey one randomly selected reef of each type and one natural bottom control site each month. Each observed finfish species is assigned an abundance category based on approximate number individuals observed: "Single" (1), "Few" (2-10), "Some" (11-50), "Many" (51-100), and "Abundant" (>100). Finfish species abundance and richness for each reef type is then assessed and analyzed for potential differences using ANOVA. Preliminary results indicate that all three artificial reef types are preferred habitat of marine finfish compared to natural sand/mud bottom. The four most abundant species of interest observed by divers were Red Snapper (*Lutjanus campechanus)*, Sheepshead *(Archosargus probatocephalus)*, Mangrove Snapper *(Lutjanus griseus)*, and Grey Triggerfish *(Balistes capriscus)* respectively. Species abundance and richness are higher for the Materials of Opportunity reef type. Additionally, Red Snapper were the most abundant on each reef type, but preferred Materials of Opportunity reefs less than the other reef types. Further analyses are being conducted to determine if the observed differences may be influenced by surface area of the reefs and/or water visibility.

ORAL PRESENTATIONS

Joyce M. Shaw, joyce.shaw@usm.edu, 228-872-4213

The Not-So-Serious Side of Science: *Dopeia*

Joyce M. Shaw[1]

[1]Gunter Library, Gulf Coast Research Laboratory, The University of Southern Mississippi, Ocean Springs, MS

Dopeia was a humor and satire of science publication produced by members of the American Society of Ichthyologists and Herpetologists for about a 50-year period, 1940-1990. Contributions included “scholarly” works such as “Charles ‘d’Tuna” (1990) writing about a new species of fish from Charleston Harbor, South Carolina (the “fish” is actually a fishing lure shaped like a fish) and Ima Big Snoop’s (1966) article entitled “The sex-life of the soft-lipped gourami.” Other features included cartoons, poetry, minutes of meetings, keys, and tables of contents with titles of articles nowhere to be found in the issue in hand. Gunter Library (Gulf Coast Research Laboratory) is home to 17 issues of this classic humor work which shows an irreverent and not-so-serious side of science.

ORAL PRESENTATIONS

Todd Slack, todd.slack@usace.army.mil, (601)-634-4138

Freshwater fish recovery at a USACE reservoir.

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The ERDC Environmental Laboratory (EEA) Fish and Invertebrate Ecology Team conducted a fish recovery effort 11-14 February 2019, during the dewatering phase of the Somerville Lake control structure stilling and overflow basins. Routine inspections require a complete dewatering of structures to allow visual inspection of the structural integrity at each Project facility. Removal, census, and relocation of any fishes occurring within the project work area is necessary to comply with state requirements on disposition of live fishes and mussels. Somerville Lake is a USACE reservoir (11,456 acres) operated by the Fort Worth District near Somerville, TX, 80 miles NW of Houston. The reservoir was designed to provide flood control and water conservation and is managed in part by Texas Parks and Wildlife Department (TPWD). It is considered regionally important for its fishing opportunities. The ERDC team led the effort between USACE Fort Worth District, including a large suite of Park Rangers and volunteers, operators with the USACE Vicksburg District Maintenance Section and TPWD. We used a combination of electrofishing, blocknets, seines and dipnets to safely and effectively capture and relocate 38 species of fishes (> 2,000 lbs.) from the control structure stilling basin and 21 species of fishes and 4 other vertebrate taxa (1,282 individuals) from the overflow basin during the event. Captured fishes were quickly transferred to river reaches downstream from each work area. Our approach provided a quick, cost-effective means for safely removing recreationally, commercially and ecologically important fishes, amphibians and mammals from the project area prior to dewatering efforts. In addition, the unified coordinated efforts allowed USACE lake managers to minimize impacts to lake operations during these required inspections while reducing impacts to the state's natural resources resulting in a positive benefit to USACE operations.

ORAL PRESENTATIONS

Gray Turnage, Gturnage@gri.msstate.edu, 662-325-7527, Student Paper

Investigation of Reduced Herbicide Rates and Tank Mixes Applied Via Submersed Injection for the Selective Control of Cuban Bulrush (*Oxycaryum cubense*)

Gray Turnage[1]

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Cuban bulrush (*Oxycaryum cubense*) is a perennial invasive aquatic plant species native to South America that is spreading across the Southeastern US. Cuban bulrush can block boat launches, impede navigation along river channels, negatively affect drainage canals, and degrade fishery habitat by lowering dissolved oxygen under plant mats. Cuban bulrush is capable of outcompeting and displacing native and other invasive species for resources thereby disrupting ecosystem processes. Limited data exist concerning effective chemical control (herbicides) methods for controlling Cuban bulrush. This project was conducted over two years to 1) screen potential herbicides for selective control of Cuban bulrush (year 1) and 2) investigate tank mixtures of herbicides active on Cuban bulrush for selective control (year 2). In year 1, herbicides were identified that provided short-term selective control of Cuban bulrush. In year 2, reduced rates and tank mixtures of two systemic and two contact herbicides from year 1 were examined for control of Cuban bulrush and two native plant species. Emergent Cuban bulrush was reduced 92% by triclopyr, 88% by carfentrazone-ethyl, 100% by triclopyr+flumioxazin, and 100% by triclopyr+carfentrazone-ethyl at 8 weeks after treatment (WAT). At 44 WAT, all treatments deliver greater than 94% control of Cuban bulrush. Submersed Cuban bulrush was reduced 86% by triclopyr and 93% by triclopyr+flumioxazin at 8 WAT. At 44 WAT, all treatments delivered greater than 93% control of submersed Cuban bulrush. In year two, herbicides did not reduce biomass of native plants at 8 WAT. Hardstem bulrush was not affected by herbicide treatments at 44 WAT while cattail biomass was reduced by multiple treatments. These data suggest that triclopyr alone and in combination with flumioxazin can selectively control Cuban bulrush over the short and long-term. These treatments provided selective long-term control of Cuban bulrush when growing with American lotus and hardstem bulrush but not cattail.

ORAL PRESENTATIONS

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Results from a 2019 Status Survey for Frecklebelly Madtom (*Noturus munitus*) in the Tombigbee River Drainage

Matthew D. Wagner[1]

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The Frecklebelly Madtom, *Noturus munitus* (Suttkus and Taylor 1965), is found in the Pearl and Mobile River drainages and is currently petitioned by the Center for Biological Diversity for federal listing under the Endangered Species Act with a listing decision deadline of 2020. Recent surveys targeting *N. munitus* in the Pearl River drainage in Mississippi and Louisiana showed the species status is stable; however, no recent surveys have targeted the species in the Tombigbee River system in Mississippi. In order to provide the Fish and Wildlife Service with up to date data for the species status assessment we surveyed 46 localities throughout the East Fork Tombigbee River, Buttahatchie River, Luxapallila Creek, and Bull Mountain Creek. We completed our surveys by backpack electrofishing into a 10' seine with chain for a minimum of 60 minutes per locality. Survey results indicated the species status is stable in the tributaries to the Tombigbee River, except for Bull Mountain Creek upstream of the reservoir. Additionally, the lack of available habitat in the historic mainstem Tombigbee River due to the construction of the Tennessee-Tombigbee Waterway has greatly reduced the range of *N. munitus* in the system and potentially fragmented the remaining populations from each other.

ORAL PRESENTATIONS

Courtney Walker, courtney.walker@dmr.ms.gov, (228) 523-4019

Overview of Mississippi's Exempted Fishing Permit for State Management of Red Snapper

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[1]

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Harvest estimates and in-season quota monitoring for Red Snapper has increased in complexity due to increased fishing efforts, fluctuations in stock status, non-compliant state seasons, and inconsistent lengths of federal seasons. Due to uncertainty of recreational harvest estimates for this species, MDMR implemented a mandatory electronic reporting system, Tails N' Scales (TNS). The overall purpose of TNS is to gather data on fishing effort, develop accurate harvest estimates, and aid future management recommendations for the recreational sector. In 2018, Mississippi and other gulf states applied for Exempted Fishing Permits (EFP) which were ultimately approved by NOAA to allow individual gulf states to manage Red Snapper for two years in adjacent federal waters out to 200 nautical miles. The overall recreational annual catch limit (ACL) was divided amongst the gulf states, with Mississippi acquiring 3.55% of the gulf recreational ACL (~137,949 lbs.). In 2018, the private recreational season lasted 76 days and the state for-hire season lasted 17 days and resulted in a combined harvest of 135,149 lbs. In 2019, the Mississippi ACL was increased to 151,584 pounds which resulted in a 79-day season for the private recreational component and a 20-day season for the state for-hire component. In both the 2018 and 2019 EFP seasons, harvest totals were managed within five percent of the Mississippi allocated ACL while providing anglers with maximum opportunity and flexibility to harvest Red Snapper. The two-year EFP period provided fisheries managers increased knowledge of angler behavior and catch metrics throughout consistent seasons, which will result in more effective management moving forward. As a result of the resounding success of the two-year EFP period, the Gulf Council passed Amendment 50 in 2019, which allows for state management of Red Snapper through state-based allocations of the overall gulf recreational ACL.

ORAL PRESENTATIONS

Joshua Waters, joshua.waters@dmr.ms.gov, (228) 523-4172

Assessing the use of fyke nets for Southern Flounder (*Paralichthys lethostigma*) in the Mississippi Sound.

Joshua Waters[1], Trevor Moncrief[1], Matt Hill[1], and Carly Somerset[1]

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Southern Flounder (*Paralichthys lethostigma*) is a highly popular finfish for both recreational and commercial fishermen along the Mississippi coast. Unfortunately, this species is rarely and inconsistently sampled because of their selectivity to current fishery independent surveys. Due to the fish's popularity, discussion has been expressed to devise different sampling efforts that can estimate their relative abundance. The goals of this project have been to 1) evaluate the effectiveness of sampling for flounder with fyke nets compared to traditional independent surveys, 2) analyze and compare data collected across 2018 and 2019, and 3) identify possible environmental factors that could affect the relative abundance of Southern Flounder within the Mississippi Sound. A total of 102 Southern Flounder have been caught during 26 sampling events in 2018 and 2019. Sampling sites chosen were: Deer Island, Davis Bayou, and Belle Fontaine due to their ideal habitat and sampling accessibility. Sampling occurs every two weeks, with a 48-hour soak time, from May to November. To date, all Southern Flounder collected have been immature or developing females. The observed size distribution from the two years of sampling have ranged from 194 mm – 482 mm (TL). Observed catch rates for the month of June were lower in 2019 than in 2018. When comparing environmental factors, salinity levels were lower in 2019, due to a large influx of freshwater from multiples sources across the sound. Average salinity values across all three sites was approximately 7 ppt in 2019, and approximately 15 ppt in 2018. As the project progresses, environmental factors will continually be monitored to gain an understanding on how certain conditions may impact relative abundance. Results of this study will aid in informing future stock assessments and management recommendations for Southern Flounder in the Mississippi Sound.

ORAL PRESENTATIONS

Bayley M. Wilmoth, bw1524@msstate.edu, 228-219-3935, Student Paper

Using boat-mounted Radio Frequency Identification to estimate stocking exploitation and estimate efficiency of Passive Integrated Transponders

Bayley M. Wilmoth[1] and Michael E. Colvin[1]

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Stocking is a common management action used to achieve fisheries management objectives. Understanding exploitation rates of stocked fish will allow for more efficient stocking programs for state managed systems and minimize underutilized stocking events. Accurately estimating exploitation of stocked fish is difficult, commonly done with tag return studies. However, using telemetry approaches to estimate the number of fish remaining in the system post stocking can inform exploitation rates. The goal of this study was to evaluate the use of a boat mounted passive integrated transponder (PIT) reader to estimate exploitation of stocked fish within a closed system. Two ponds were stocked with fifty tagged channel catfish with 2 passive integrated transponder (PIT) tag sizes. Exploitation was then simulated over-night and the ponds were then scanned with the PIT reader four times. This process was repeated for four days. Exploitation rates were estimated using a Cormack Jolly Seber model and the capture probability for 23 and 32-mm PIT tags compared. Accurate estimates of exploitation can inform adaptive stocking strategies, for example if managers of a put and take fishery can estimate exploitation and be sure they are stocking into systems where exploitation is occurring.

POSTER PRESENTATIONS

Caleb A. Aldridge, caa134@msstate.edu, (205) 495-6483, Student Poster

For management plans, consult a computer?

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Organizing and planning are among the most demanding tasks of fisheries professionals. Often this process is overwhelming and clear linkages between agency-wide goals, management plan objectives and actions, and monitoring metrics are non-existent. We are developing an online computer application for the Mississippi Fisheries Bureau to support structuring and regimentation of management plans. The tool steers the user through a series of menus to build a management plan that outlines objectives, management actions, monitoring protocols, and outcome evaluation. This system uses existing monitoring data, conditional logic, and user input to provide the user with up-to-date, lake-specific information. While still in early development, the application is designed to link monitoring to agency-specified objectives and actions. This coordination can help fisheries professionals more efficiently and effectively organize and plan management activities and pave the way for management decision optimization.

POSTER PRESENTATIONS

Caleb A. Aldridge, caa134@msstate.edu, (205) 495-6483, Student Poster

Brush piles: Understanding structural dynamics to help plan habitat management

Caleb A. Aldridge[1], David M. Norris[1], Hunter R. Hatcher[2], Giancarlo Coppola[3], Michael E. Colvin[1], and Leandro E. Miranda[4]

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Brush piles are often installed in reservoirs to meet management objectives such as increased young-of-year survival or to attract sportfish. However, the consideration of brush pile structural persistence after placement is often overlooked. We evaluated brush pile persistence and structural changes (e.g., area and volume) in the Long Branch Creek embayment of Enid Lake, MS after three flood cycles. We calculated the percentage of brush piles that were no longer present at their GPS location (i.e., persistence) and the percentage of brush piles that decreased or increased in structural measures, reporting the magnitude of change for these groups. Twenty-one percent of the brush piles were lost. Seventy-eight percent of the remaining brush piles decreased in volume by an average of 41%; twenty-two percent increased in volume by an average of 19%. Spatial patterns of persistence and structural change coincided with topographic features in our study area. These results suggest brush pile persistence and structural changes are dynamic and managers should be aware of such dynamics when planning. For example, to maintain 100 brush piles at our study sight, one would need to initially deploy approximately 128 brush piles. Still, deeper investigation is needed to evaluate other changes in brush pile structure (e.g., interstitial space) and how these changes influence the fish assembly.

POSTER PRESENTATIONS

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Stock-recruitment dynamics of a freshwater clupeid

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The clupeid gizzard shad *Dorosoma cepedianum* is often the most abundant fish species in North American reservoirs, and this dominance can have cascading trophic effects on entire fish assemblages. Accordingly, a key aspect of managing reservoir fish assemblages involves controlling gizzard shad densities. We used a 33-year time series to evaluate the relative importance of parental stock density, winter temperature, and water regime on recruitment of age-0 gizzard shad in a large reservoir. Recruitment modeled with a Ricker-type curve increased with the size of the adult stock, peaked, and then decreased at high stock densities. This over-compensatory stock-recruitment relationship was made more dynamic by fluctuations in inflow, with recruitment increasing in years of high inflow; however, there was no temperature effect at the latitude of the study site. The influence of stock size on recruitment was roughly twice as high as the influence of inflow. This study is the first to report stock-recruitment relationships for a clupeid species in a reservoir and concurs with analyses of marine fishes that have shown that most clupeids exhibit compensatory or over-compensatory patterns in their stock-recruitment relationships.

POSTER PRESENTATIONS

Lauren Fuller, lfuller@msaquarium.org, 228-206-7061

The future role of Mississippi Aquarium in aquatic research on the Gulf Coast

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Mississippi Aquarium is a new 501(c)(3) institution in Gulfport, MS that will open to the public in the spring of 2020. The aquarium's mission of education, conservation and community highlights the active role it will play, not only for the state of Mississippi, but also in the Northern Gulf of Mexico. In addition to the main aquarium campus, plans are underway to open the off-site Aquatic Research Center (ARC) which will be a collaborative hub for researchers and partners of Mississippi Aquarium. Research will include studies at the ARC, the aquarium and in the field. Initially, research will focus on the incorporation of unmanned aerial vehicles (UAVs) in monitoring for sea turtle stranding as a part of the Sea Turtle Stranding and Salvage Network (STSSN). Collaboration with Mississippi State University will also allow for monitoring of great hammerhead sharks (*Sphyrna mokarran*) via satellite tagging and tracking. Other topics of interest include educational impact studies, welfare, behavior, reproduction, dolphin population and health assessments and fisheries primarily focusing on sea turtles, dolphins, and elasmobranchs. In the interest of collaboration, the aim is to develop relationships with local research institutions, such as federal organizations, academic institutions and zoos and aquariums accredited by the Association of Zoos and Aquariums. There will be an emphasis on providing opportunities for students through research internships and partnerships with graduate and undergraduate programs.

POSTER PRESENTATIONS

Brandon Gerhart, bjg287@msstate.edu, 662-325-4768 Student Poster

Adult Largemouth Bass (*Micropterus salmoides*) aerobic metabolic rate in response to temperature.

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A number of physiological processes are regulated by temperature. An understanding of the energetic costs related to water temperature is beneficial for guiding the management of recreationally angled fishes. Because little is known in this regard about adult black bass, the life stage typically pursued by anglers, we evaluated the effects of water temperature on resting routine aerobic metabolic rate in adult Largemouth Bass (*Micropterus salmoides*). Bass were acclimated to 18, 24, and 30˚C in separate tanks for ≥ 2 weeks. Aerobic metabolism (MO_2) was measured using intermittent respirometry. Bass from the 18˚C treatment exhibited the lowest aerobic metabolic rate (68.9 ± 6.5 mgO_2/kg/hr), followed by the 24˚C treatment (101.3 ± 7.4 mgO_2/kg/hr) and the 30˚C treatment (176.8 ± 13.4 mgO_2/kg/hr)-($P<0.05$). Furthermore, Q_{10} values were calculated and showed bass exhibited a higher temperature sensitivity over the 24˚C to 30˚C range (Q_{10} = 2.53) compared to the 18˚C to 24˚C range (Q_{10} = 1.90), indicating exacerbated aerobic demands at high temperatures. Therefore, management for adult Largemouth Bass should minimize handling and induced exercise when temperatures approach 30˚C or higher.

POSTER PRESENTATIONS

Dyan Gibson, dyan.gibson@usm.edu, 228-818-8818

Diet of Red Snapper (Lutjanus campechanus) collected at artificial reefs and petroleum platforms in the northern Gulf of Mexico off Mississippi during 2016-2018

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Red Snapper (Lutjanus campechanus) is a valuable recreational and commercial reef fish in US coastal waters. Red Snapper was the dominant finfish collected, numerically (>90%), during National Fish and Wildlife Federation (NFWF) funded reef fish sampling conducted monthly (March – October) in the northern Gulf of Mexico during 2016-2018. Stomach contents of Red Snapper (n = 1116, 140 – 779mm total length (TL)) collected from vertical longline gear deployed at two reef types (artificial reefs and petroleum platforms) in each of three depth strata (<20m, 20-49m, 50-100m) were identified using morphological and genetic barcoding procedures. Prey items were quantitatively assessed to describe their importance in the diet using several metrics, including percent weight (%W) contribution to the diet. Based on %W of prey consumed during years 2016 – 2018, the combination of decapods, stomatopods and fish (represent by multiple families and unidentified remains) represented >90% of the diet. The mean length and age of Red Snapper increased with increased depth of reef structure location, and specimens > 400mm TL (average 3 years of age) typically transitioned from a crustacean diet to one predominantly comprised of fish. Red Snapper diet varied seasonally among years and reef types, and stomach fullness was significantly higher at shallow depth strata than at mid or deep strata. Several families and genera of prey were unique to each reef type.

POSTER PRESENTATIONS

Angie Hoover, angie.hoover@usm.edu, (405) 248-8529

Larval Atlantic Bumper (*Chloroscombrus chrysurus*) diet, growth, and condition under normoxic and hypoxia-influenced conditions

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Hypoxia is a global, annual event that can have serious consequences for marine organisms. The northern Gulf of Mexico (GoM) experiences the second largest hypoxic region on the planet, and the largest in the western hemisphere. It is well known that hypoxia will occur every year; however, the spatial and temporal extent, as well as the biological implications it will have, are more difficult to predict. While more motile organisms (e.g. fishes) are capable of avoiding unsuitable habitat, organisms in earlier life stages (e.g. larval fishes) are not only less motile, but are generally more sensitive to environmental perturbations. Many studies have described the responses of fishery-related species to hypoxic events, but little is known about less economically-important species. Atlantic Bumper (*Chloroscombrus chrysurus*) are an extremely ecologically-important species which provide an efficient link between higher and lower trophic levels. Atlantic Bumper larvae may be at particular risk of exposure to hypoxia as they are spawned in the summer months, and have been shown to exhibit diel migration, utilizing the bottom portion of the water column during the day. The objectives of this study were to describe the diet, growth, and condition of larvae collected within a “fully normoxic” (no bottom hypoxia present), or “partially normoxic” (bottom hypoxia present) water column, in order to address hypoxia-induced habitat truncation on early life stage Atlantic Bumper.

POSTER PRESENTATIONS

April Hugi, april.hugi@usm.edu, (863) 398-2554, Student Poster

Trophic Ecology of Atlantic Sailfish Larvae in the Gulf of Mexico: An Analysis of Diet and Prey Availability and Prey Quality, and Influences on Predator Growth and Condition

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The Gulf of Mexico is an important spawning and early life habitat for Atlantic Sailfish (*Istiophorus platypterus*), whose larvae experience high growth rates despite residing in relatively oligotrophic offshore habitats. Larval sailfish also have highly specialized diets and relatively limited foraging abilities, making them more susceptible than generalists to growth limitation due to low quality food. The larval stages of marine fish represent vulnerable periods during which mortality is thought to have deterministic effects on recruitment. Therefore, information regarding the environmental drivers that influence larval fish trophic ecology, growth, and survivorship is critical to our understanding of recruitment dynamics. This study aims to: 1) examine the relationships between zooplankton prey abundance and quality with respect to larval sailfish condition and growth, and 2) identify the environmental drivers that influence larval sailfish trophic dynamics. Sailfish larvae and their zooplankton prey were collected in offshore, near-surface waters during four research cruises in the northern Gulf of Mexico (2017-2019). Larval growth rates will be determined using otolith microstructure analysis, and larval condition will be estimated using RNA:DNA ratios. Larval growth and condition will then be compared to diet (gut contents, gut fullness) and proxies of prey quality (e.g., zooplankton total lipid/dry weight). Preliminary results indicate that diet varies with ontogeny. *Farranula* spp. and *Evadne* spp. comprised over 96% of the diet for preflexion larvae. Dominant prey for postflexion larvae were more diverse, and included *Farranula* spp. (37.5%), larval fish (23%), *Evadne* spp. (21%), *Corycaeus* spp. (12.5%), and calanoid copepods (4%). Our analyses will provide valuable insights into the effects of environmental and trophic variability on the early development of this prized sport fish, as well as the functioning of offshore, pelagic food webs.

POSTER PRESENTATIONS

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Collect once, re-use multiple times: Data archiving at NOAA's National Centers for Environmental Information

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NOAA's National Centers for Environmental Information (NCEI) hosts and provides public access to one of the most significant archives for environmental data on Earth. Archiving and preserving environmental data, such as fisheries data collected by researchers, is paramount to scientists and data analysts, as such activities make valuable information accessible for inclusion in larger integrated datasets. Data submitted and archived contributes to NCEI's data holdings, integrated products, and also contributes to a single discovery point, through standardized metadata creation, for a diverse range of environmental observational data. Once archived, NCEI makes data publicly available for long- term scientific analysis and reuse. NCEI has Subject Matter Experts, including fisheries biologists, to help steward environmental oceanographic data into the NOAA archive. NCEI has developed an archival tool for small data sets (less than 20GB) called Send2NCEI (S2N). S2N can be used by NOAA and external entities such as academic, state, and federal scientists as a simple method to archive data at NCEI. This user-friendly tool simplifies data submission and metadata creation by walking the data provider through the entire submission process. This poster demonstrates the simplicity, comprehensiveness and effectiveness of S2N, considerations for submitting a complete data package, and how NCEI can assist scientists with their data management using S2N.

POSTER PRESENTATIONS

Andrea J. Leontiou, andrea.leontiou@usm.edu, 203.253.5512, Poster Presentation

Physiological vs. Functional Maturity: How Maturity is Defined can Affect the Significance of Results

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The age or size at which a fish reaches sexual maturity influences fitness, determines generation time and, as an extension, the inherent rate of population growth. Sexual maturity data are often used as a biological reference point to determine catch limits that allow female fish to spawn one or more times before being harvested. Additionally, size or age at maturity is an important component for estimating spawning stock biomass (SSB). Despite this, there is no standard for defining when a female fish reaches sexual maturity. This could influence fisheries policies between and across states and make it difficult for researchers to compare data. Physiological maturity is defined as entry into the reproductive cycle due to the presence of gonadotrophin and is identified histologically by the appearance of cortical alveolar oocytes. In contrast, functional maturity is defined by the appearance of vitellogenic oocytes. The purpose of this study is to take a preliminary look at differences in length at maturity (L_{50}) when using either functional or physiological maturity. Data from multiple sources were used to develop length at maturity graphs for eight marine fish species commonly caught in Mississippi using both the functional and physiological metric. We found no difference in L_{50} for Gulf Menhaden, White Trout, Red Lionfish, or Sheepshead between the two maturity metrics. In contrast, Southern Kingfish, Spotted Seatrout, Red Snapper and Yellowfin Tuna, showed a lower L_{50} for physiological vs. functional maturity. Additional analysis of Red Snapper found significant differences in habitat use depending on which type of maturity was used to define immature and mature fish. Raising awareness of these differences and developing a more standardized method for maturity analysis could help management efforts and facilitate comparison of research across borders.

POSTER PRESENTATIONS

Victoria R. Starnes, vrs93@msstate.edu, (417) 288-2763, Student Poster

Development of an Affordable Autonomous Four-dimensional Water Quality Monitoring Network

V. R. Starnes[1], M. E. Colvin[1], B. A. Jones[2], W. R. Whittington[3], B. A. Clarke[2], J. E. Coleman[3], J. T. Gandy[2], W. P. Johnson[2], W. R. Horne[3], R. J. Hurt[3], R. W. King[3], R. M. Savoie[3], B. C. Wilkinson[2]

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Dissolved oxygen and temperature serve as important indicators of water quality and habitat suitability for a variety of aquatic organisms and are among the most commonly recorded metrics in aquaculture and aquatic research. However, measurement of these metrics is often time consuming and requires repeated measures over a variety of spatial and temporal scales. The purpose of this project was to develop a suite of cost-effective measurement devices which could reduce the total effort needed to record spatio-temporal changes in environmental variables. The prototype which was developed can autonomously measure changes in basic water quality parameters including windspeed, dissolved oxygen, temperature, and pressure. Measurement of dissolved oxygen and temperature taken by these devices are comparable to those taken by common handheld dissolved oxygen meters. The buoyancy and power sources of this device have also been designed and tested for long term deployments with weekly check-ins. These devices can hold up to one week of data which can be offloaded from up to 1 km via LoRa data transmissions. Given the low cost and flexibility of measurement applications, this network of devices has the potential to meet the needs of a broad range of both researchers and aquaculturists.

POSTER PRESENTATIONS

Victoria R. Starnes, vrs93@msstate.edu, (417) 288-2763, Student Poster

A Prototype Decision Support Tool for Evaluating Water Level Management to Achieve Competing Objectives in a Multiple Use Reservoir

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Reservoirs and lakes are often used to meet a variety of objectives related to conservation, recreation, and commercial use. Often, these waterbodies are managed for a primary objective with minimal regard for the impacts on other water body uses. For example, water levels of Bluff Lake at Sam D. Hamilton Noxubee NWR are lowered annually to increase feeding opportunities for waterfowl and waterbirds. However, water resources are also used to achieve refuge management objectives related to the fish assemblage, Paddlefish *Polyodon spathula* population, and the fishery associated with Bluff Lake. As these objectives compete for finite water resources, a decision support tool for water level management is needed to evaluate the ability of alternative water releases to satisfy potentially conflicting objectives. First, we must define the functional relationships between water level management and objectives. Then, we can compare the consequences of alternative water management strategies and their ability to achieve the objectives given. Objectives will be weighted according to their relative importance. The optimal water level management strategy can then be selected. This study serves as an example application of a structured approach to evaluate water levels and account for multiple management objectives.

POSTER PRESENTATIONS

Bayley M. Wilmoth, bw1524@msstate.edu, 228-219-3935, Student Poster

Evaluating Accuracy of Inexpensive Acoustic Water Level Sensors

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Hydrological dynamics in streams and lake are important drivers of physical and biological processes of aquatic systems. Minimizing cost and person hours an important consideration for sensors used to collect time series of water level measurements. Recent developments in microcontroller technology and acoustic distance sensors allows researchers to cheaply build water level sensors, but the accuracy of water level measurements is uncertain. This study evaluated the accuracy of a prototype acoustic water level sensors (AWLS). We used an aquaculture tank to simulate the water level dynamics in an aquatic system and assess the accuracy of AWLS. Three AWLS were suspended above the tank. Two HOBO level loggers were placed in the tank with one logger outside the tank to adjust for atmospheric pressure. Water level was also measured manually. The tank was filled and drained repeatedly at different rates over three days to produce known water level dynamics. AWLS water level measurements were then visually and statistically compared to manual measurements and the HOBO level loggers. Water level measurements were not different among the measuring types. Battery life of the acoustic sensors was 5.5 days. AWLS were effective at measuring hydrological variation, but field implementation needs longer battery life.

POSTER PRESENTATIONS