

PROGRAM AND ABSTRACTS  
OF THE 39<sup>th</sup> ANNUAL MEETING OF THE  
MISSISSIPPI CHAPTER OF THE  
AMERICAN FISHERIES SOCIETY

PERCY QUIN STATE PARK  
MCCOMB, MISSISSIPPI  
20 – 22 FEBRUARY 2013



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**MISSISSIPPI CHAPTER OF THE AMERICAN FISHERIES SOCIETY  
PROGRAM OVERVIEW**

**WEDNESDAY – 20 FEBRUARY 2013**

**6:30 – 8:00 MEETING REGISTRATION Convention Center**

**7:00 – 10:00 SOCIAL Convention Center**

**THURSDAY – 21 FEBRUARY 2013**

**7:30-8:30 BREAKFAST Group Camp**

**8:00 – 9:15 MEETING REGISTRATION Convention Center**

**\* INDICATES STUDENTS COMPETING FOR STUDENT AWARD**

**9:00 – 10:15 SESSION I: MOVEMENTS AND DISTRIBUTION  
Convention Center**

Moderator: Jimmy Rayburn, URS

9:00 – 9:15 **SUMMARY OF MDWFP PALLID STURGEON SAMPLING ON TWO  
SITES IN THE LOWER MISSISSIPPI RIVER, 2010-2012** Nathan Aycock,  
Jerry Brown, Darrin Hardesty, Don Henke, Ryan Jones, Chad Washington

9:15 – 9:30 **INITIAL MOVEMENTS AND HABITAT USE OF PHASE II HATCHERY-  
RELEASED STRIPED BASS, *Morone saxatilis*, IN THE BILOXI RIVER,  
MISSISSIPPI** Jennifer Green<sup>\*</sup>, Paul Mickle, Mark S. Peterson and Larry  
Nicholson

9:30 – 9:45 **SATELLITE TRACKING OF HIGHLY MIGRATORY SHARK SPECIES  
IN THE GULF OF MEXICO: A PRELIMINARY ASSESSMENT** Eric  
Hoffmayer, Jennifer McKinney, William Driggers, Jill Hendon, Jim Franks

9:45 – 10:00 **PRELIMINARY MOVEMENT AND FIDELITY ASSESSMENT OF  
MISSISSIPPI SOUND SHARKS BY USE OF ACOUSTIC TELEMTRY**  
Jill Hendon, Sarah L. Ashworth, Jeremy M. Higgs, Jim S. Franks, Eric R.  
Hoffmayer

10:00 – 10:15 **DISTRIBUTION AND LENGTH FREQUENCY OF INVASIVE LIONFISH  
(*Pterois* sp.) IN THE NORTHERN GULF OF MEXICO** Alexander Q. Fogg,  
Eric R. Hoffmayer, William B. Driggers III, Matthew D. Campbell, Gilmore J.  
Pellegrin and William Stein

10:15 – 10:45 **BREAK**

**10:45 – 12:00 SESSION II: REPRODUCTION AND PHYSIOLOGY**

**Convention Center**

Moderator: Larry Pugh, MDWFP

10:45 – 11:00 **BLUEFIN TUNA (*Thynnus thunnus*) IN THE GULF OF MEXICO: WHERE DO THEY SPAWN?** James Franks, Donald Johnson, Dong-Shan Ko, Jason Tilley, Dyan Gibson, Bruce Comyns, Eric Hoffmayer, Paul Grammer

11:00 – 11:15 **VARIABILITY IN THE REPRODUCTIVE PERIODICITY OF FINETOOTH SHARKS (*Carcharhinus isodon*) IN THE NORTHERN GULF OF MEXICO** Jeremy M. Higgs\*, Jill M. Hendon, Eric R. Hoffmayer, William B. Driggers III, James A. Sulikowski

11:15 – 11:30 **REGULATION OF CORTICOSTEROIDOGENESIS AND CIRCULATING 1ALPHA-HYDROXYCORTICOSTERONE IN ELASMOBRANCHS BY STRESS AND OSMOREGULATORY FACTORS** Andrew Evans

11:30 – 11:45 **IMPACTS OF REDUCING PRODUCTION COSTS ON POND CULTURE OF BLUE CRABS (*Callinectes sapidus*)** Darcie Graham, Gregory Crochet, Harriet Perry, and David Rose

11:45 – 12:00 **EFFECTS OF CALCIUM AND MAGNESIUM HARDNESS ON THE FERTILIZATION AND HATCHING SUCCESS OF CHANNEL X BLUE F<sub>1</sub> HYBRID CATFISH EGGS** Nagaraj G. Chatakondi and Carl D. Jeffers

**12:00 – 1:30 LUNCH**

**Group Camp**

**1:30 – 3:00 SESSION III: HABITAT AND COMMUNITY STRUCTURE**

**Convention Center**

Moderator: Tom Holman, MDWFP

1:30 – 1:45 **HABITAT USE AND SELECTION BY ADULT PALLID STURGEON IN THE LOWER MISSISSIPPI RIVER** Jason R. Herrala, Nathan M. Kuntz, and Hal Schramm

1:45 – 2:00 **FISH ASSEMBLAGES IN CONNECTED AND ISOLATED FLOODPLAIN LAKES OF BEAR CREEK WATERSHED, MISSISSIPPI** Caroline Andrews\*, L.E. Miranda, and R. Kröger

- 2:00 – 2:15 **DISTRIBUTIONS OF A LARVAL FISH COMMUNITY IN A PUERTO RICO RESERVOIR** M. Clint Lloyd\* and J. Wesley Neal
- 2:15 – 2:30 **GULF-COAST STRAIN WALLEYE IN NORTHEAST MISSISSIPPI: WHERE WE ARE, AND WHERE WE ARE HEADED** Tyler J. Stubbs; Richard Campbell, Jason Olive, Justin Wilkens, Daniel Schwarz, Corey Gullet, Charles Watts, Nathan Martin
- 2:30 – 2:45 **USE OF ARTIFICIAL REEFS IN THE MISSISSIPPI SOUND BY JUVENILE GAG GROUPER (*Mycteroperca microlepis*) AND GREY SNAPPER (*Lutjanus griseus*) AS DETERMINED BY ACOUSTIC TELEMETRY: PRELIMINARY FINDINGS** Sarah L. Ashworth, James S. Franks, Jill M. Hendon, and Jeremy M. Higgs
- 2:45 – 3:00 **A DESCRIPTION OF THE ICHTHYOFAUNA COMPOSITION IN THE LOOP CURRENT IN THE GULF OF MEXICO** Stephanie Taylor\*, E. Hoffmayer, J.S. Franks and R. T. Leaf
- 3:00 – 3:30 BREAK**
- 3:30 – 5:00 SESSION IV: FISHERIES MANAGEMENT** **Convention Center**  
Moderator: Jill Hendon, University of Southern Mississippi
- 3:30 - 3:45 **CCA: CONSERVATION, COMMITTEES, ADVOCACY** F. J. Eicke
- 3:45 – 4:00 **REDUCING RED SNAPPER (*Lutjanus campechanus*) BYCATCH IN THE GULF OF MEXICO SHRIMP TRAWL FISHERY** Glenn R. Parsons, Kyle Rice, Matt Gaylord and Dan Foster
- 4:00 – 4:15 **POPULATION ASSESSMENT OF LONGSPINE PORGY, *Stenotomus caprinus*, FROM 1987 TO 2009: EVIDENCE OF SHRIMP TRAWLING BYCATCH IMPACTS?** Cher Newman\*, P.F. Mickle, G. W. Ingram, Jr. and M.S. Peterson.
- 4:15 – 4:30 **FALL BLOOM PHENOLOGY AND MAGNITUDE INFLUENCE HADDOCK RECRUITMENT ON GEORGES BANK** Robert T. Leaf and Kevin D. Friedland
- 4:30 – 4:45 **HANDS-ON FISH MANAGEMENT: USING MANUAL REMOVAL TO RESTRUCTURE A CROWDED LARGEMOUTH BASS POPULATION IN PUERTO RICO** Cynthia Fox\* and J. Wesley Neal

4:45 – 5:00 **A GUIDE TO FISHING THE LOWER MISSISSIPPI RIVER** Angeline Rodgers and Ron Nassar

**5:00 – 6:00 POSTER PRESENTATIONS** **Convention Center Lobby**

**HARVEST BY PERSONS WITH COMMERCIAL FISHING LICENSES FOR 2011** Garry Lucas

**A LOOK INTO SECONDARY PRODUCTION AND DIVERSITY OF BENTHIC BIOTA ON ARTIFICIAL REEFS IN THE MISSISSIPPI SOUND** Patrick Gillam and Chet Rakocinski

**7:00 – 10:00 BANQUET** **Convention Center**

**Speaker – Dr. Don Jackson – “Reconnecting People with Natural Resources”**

**Auction**

**Student Raffle**

**FRIDAY – 22 FEBRUARY 2013**

**8:00-9:00 BREAKFAST** **Group Camp**

**9:15 – 11:00 MSAFS BUSINESS MEETING** **Convention Center**

# ORAL PRESENTATIONS

*(Sorted Alphabetically by Presenter)*

## **Fish assemblages in connected and isolated floodplain lakes of Bear Creek watershed, Mississippi**

Caroline S. Andrews<sup>1</sup>, L.E. Miranda<sup>2</sup>, and R. Kröger<sup>1</sup>

<sup>1</sup> Department of Wildlife, Fisheries and Aquaculture, Mississippi State University, Mississippi State, MS 39762

<sup>2</sup> US Geological Survey, Mississippi Cooperative Fish and Wildlife Research Unit, Mississippi State University, Mississippi State, MS 39762

Oxbow lakes form isolated fragments on floodplains and retain differing degrees of connectivity to neighboring rivers. Maintenance of both lacustrine and rheophilic fish communities in oxbow lakes is inherently dependent on the hydrologic landscape. We explore how hydrologic connectivity shapes fish communities in the Bear Creek watershed in central Mississippi. Bear Creek includes an assemblage of six linked pools located in former channel of the ancient Mississippi-Ohio River. Additionally, numerous other oxbow lakes span the watershed ranging in age and connectivity to the creek. Fish collections made with electrofishing in 2006-2012 indicated that in-channel lakes had similar fish communities and were characterized by rheophilic species. Conversely, fish communities in off-channel lakes often exhibited strong dissimilarities among themselves and were distinguished from in-channel lakes by the dominance of lacustrine species. From a fishery management perspective, our survey suggests a diversity of fishing opportunities are provided by the diversity of fish assemblages, and that off-channel lakes offer the greatest potential for management involvement.

## **Use of artificial reefs in the Mississippi Sound by juvenile gag grouper (*Mycteroperca microlepis*) and grey snapper (*Lutjanus griseus*) as determined by acoustic telemetry: preliminary findings**

Sarah L. Ashworth, James S. Franks, Jill M. Hendon, and Jeremy M. Higgs

Center for Fisheries Research and Development, Gulf Coast Research Laboratory, The University of Southern Mississippi, 703 East Beach Drive, Ocean Springs, 39564

Gag grouper (*Mycteroperca microlepis*) and grey snapper (*Lutjanus griseus*) are valuable commercial and recreational species in the northern Gulf of Mexico. Both are estuarine dependent during the juvenile life stage and remain offshore as adults; however, little is known about the early life history of these species in the Mississippi Sound. Artificial reefs have been shown to be ideal habitat for many juvenile species. To assess juvenile gag grouper and grey snapper use of and fidelity to artificial reefs in the Mississippi Sound, acoustic arrays of Lotek

WHS 2000 and Vemco VR2W receivers were deployed at four reef sites. Fish caught at the reefs using rod and reel, were surgically implanted with Vemco v7 acoustic transmitters prior to release at the capture site. In 2011 and 2012, 23 fish were tagged: 6 gag grouper (22.0-38.7cm total length) and 17 grey snapper (20.7-27.7cm total length). Detections on the acoustic receivers through December 2012 accounted for 19 of the 23 fish tagged. The number of days at large ranged from 42-476 for gag grouper and 25-476 for grey snapper, while the range of days detected was 4-58 and 7-108, respectively. The artificial reef at Petit Bois Island, an unmaintained rubble pile, was the site with the most fish caught and the highest number of fish detections. These detections show gag grouper and grey snapper are concurrently present at the reef suggesting that they share use of the habitat. These findings indicate that artificial reef structures in the Mississippi Sound provide habitat for the large juvenile stages of both species and may function as transitional habitat during emigration from the near-shore nurseries to offshore adult habitats.

### **Summary of MDWFP pallid sturgeon sampling on two sites in the Lower Mississippi River, 2010-2012**

Nathan Aycock, Jerry Brown, Darrin Hardesty, Don Henke, Ryan Jones, Chad Washington

Mississippi Department of Wildlife, Fisheries, and Parks, Jackson, Mississippi, 39211

Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) has been sampling sturgeon on two stretches of the Lower Mississippi River in coordination with the US Fish and Wildlife Service and Mississippi State University personnel. Our objective was to collect fish for a *Scaphirhynchus* sp. identification study and for sonic tag implantation to determine effects of possible hydrokinetic generation and document habitat use and movement patterns. A total of 231 trotlines were fished near Tunica, MS, (RM 684-690) from 2010-2012, and 89 trotlines were fished near Vicksburg, MS, (RM 429-443) from 2011-2012. Shovelnose sturgeon were the most abundant species collected at both sites, composing 78% of the total catch at Tunica and 46% at Vicksburg. Pallid sturgeon were the fourth most abundant species at each site, with 43 pallids collected at Tunica and 16 at Vicksburg. Catch rates of pallid sturgeon averaged 0.2 fish per line at Tunica and 0.18 fish per line at Vicksburg, and mean length of pallid sturgeon was greater at Tunica (mean FL = 762 mm) than at Vicksburg (mean FL = 692 mm). Pallid to shovelnose ratio was 1:32 at Tunica and 1:19 at Vicksburg. Abundance, catch rates, mean lengths, and pallid to shovelnose ratios were similar to those found in previous studies in the Lower Mississippi River. Pallid and shovelnose fish collection and sonic tag implantation objectives were fully met at Tunica and partially completed at Vicksburg.



## **CCA: Conservation, Committees, Advocacy**

F. J. Eicke

Coastal Conservation Association, Chairman of Government Relations Committee

Coastal Conservation Association (CCA) came into existence in 1977 to address what had become known in Texas as "The Redfish Wars." From Texas, CCA spread to other Gulf States as the Gulf Coast Conservation Association (GCCA), then expanded to CCA with the addition of Atlantic states, and more recently became tri-coastal with the addition of the Pacific Northwest states of Oregon and Washington. CCA has, from its beginning, based advocacy on marine science as the foundation on which positions in support or dissent of resource management is based at all levels of government. Organizationally, CCA functions through committees, with the National Government Relations Committee addressing national and international policy, the Gulf Fisheries Subcommittee addressing GOM policy, and state committees focusing on state policy. CCA defines advocacy as formulating positions that rely on underlying science. CA does not back away from voicing support or dissent from positions emanating from governmental agencies at all levels. Examples at the international, national, GOM, and state levels will be briefly discussed. CCA specifically has avoided advocating for the benefit of anglers and considers this a tertiary position once issues of the resource and science are resolved.

## **Regulation of corticosteroidogenesis and circulating 1alpha-hydroxycorticosterone in elasmobranchs by stress and osmoregulatory factors**

Andrew Evans

The University of Southern Mississippi, Gulf Coast Research Laboratory, Ocean Springs, MS 39564

In terrestrial vertebrates, the physiological systems regulating hydromineral balance and the stress response are mediated by distinct corticosteroid hormones, i.e. mineralocorticoids (MCs; aldosterone) and glucocorticoids (GCs; cortisol/corticosterone), respectively. In contrast the elasmobranch fishes produce a single dominant corticosteroid hormone, 1alpha-hydroxycorticosterone (1alpha-B), and evidence suggests that 1alpha-B plays a key role in both stress and osmoregulation. Using the euryhaline Atlantic stingray (*Dasyatis sabina*) as a model species, the objectives of this study were to determine how interrenal steroidogenesis and circulating 1alpha-B are regulated by both stress and osmoregulatory factors. *Ex vivo* interrenal synthesis of 1alpha-B is increased by trophic hormones of both the hypothalamus-pituitary-interrenal (HPI) stress axis (adrenocorticotrophic hormone; ACTH) and the osmoregulatory renin-angiotensin system (angiotensin II; ANG II). Further, circulating titers of 1alpha-B are distinctly altered by hook-and-line stress vs. rapid acclimation to fresh water. These data strengthen evidence for a dual physiological role for 1alpha-B, and raise questions regarding how the synthesis and physiological actions of 1alpha-B may be differentially regulated in response to

stress vs. osmotic challenges. Deleterious effects of elevated GCs are well documented and include the suppression of 'non-essential' physiological systems such as growth, reproduction and immunity. Therefore examining potential mechanisms for minimizing the effects of stress-induced 1alpha-B on physiological homeostasis (e.g. hydromineral balance) is an important step in understanding the effects of both acute and chronic stressors on long-term survival and fitness. Preliminary evidence suggests that one such mechanism is differential regulation of steroidogenic mRNA expression by ACTH vs. ANG II; future research will more closely examine this mechanism as well as the potential for negative feedback regulation of the elasmobranch HPI axis.

### **Distribution and length frequency of invasive lionfish (*Pterois* sp.) in the northern Gulf of Mexico**

Alexander Q. Fogg<sup>1</sup>, Eric R. Hoffmayer<sup>1</sup>, William B. Driggers III<sup>1</sup>, Matthew D. Campbell<sup>1</sup>, Gilmore J. Pellegrin<sup>1</sup> and William Stein<sup>2</sup>

<sup>1</sup> National Marine Fisheries Service, Southeast Fisheries Science Center, Mississippi Laboratories, P.O. Drawer 1207, Pascagoula, MS 39567

<sup>2</sup> Nekton Research Laboratory, Pontchartrain Institute for Environmental Sciences, University of New Orleans, 2000 Lakeshore Dr., New Orleans, LA 70148

The first documented lionfish (*Pterois spp.*) in the northern Gulf of Mexico (GOM) was observed in 2006. Since that time, lionfishes have been observed in nearshore waters from Florida through Louisiana on various habitats including natural bottom, oil platforms, shipwrecks and other artificial structures. As part of a study examining the life history of lionfishes in the northern Gulf of Mexico, over 1,500 lionfishes were collected; and we provide the first information on the length frequency, length-mass relationships, sex ratio and depth distribution of this invasive species from the region. Updated information on the distribution of lionfishes in the northern GOM is also provided, including eight specimens collected off Texas representing the western most expansion of lionfishes into the northern GOM. In addition, the largest lionfish collected in this study had a back transformed age of 4.5 years, which places it in the northern GOM two years prior to the first reported sighting of a live lionfish in this region.

### **Hands-on fish management: Using manual removal to restructure a crowded largemouth bass population in Puerto Rico**

Cynthia Fox and J. Wesley Neal

Department of Wildlife, Fisheries, and Aquaculture, Mississippi State University, Box 9860, Mississippi State, MS 39762-9690

Cerrillos Reservoir is a relatively new impoundment (filled 1996) in Puerto Rico and is one of only two reservoirs that have been stocked exclusively with pure Florida largemouth bass

*Micropterus salmoides floridanus*. Largemouth bass were first stocked in Cerrillos Reservoir in 1997 and the population quickly expanded. Within three years, relative weight declined from above 100 to about 80 and the population displayed characteristics of overcrowding, with much of the population composed of fish  $\leq 350$  mm. This condition was most likely the result of limited harvest, as angling was not allowed during the first three years of the fishery. A protected slot limit (356-508 mm) was implemented in 2003 to encourage harvest of smaller bass, to protect the intermediate-sized bass, and allow for occasional harvest of a trophy bass. However, a combination of limited access, limited effort, and angler attitudes towards harvest of small bass maintained the bass crowded situation in the reservoir. The protected slot limit was removed early in 2011. Because overcrowding persisted, we proposed to conduct an experimental removal of fish from the crowded size classes (200-380 mm TL). In 2012, we removed 2,333 Largemouth Bass equaling 26% of the crowded biomass and 20% of the total biomass. Preliminary data suggest that largemouth bass condition has improved, with average relative weight increasing from 81 to 95 in the seven months following the removal. Population sampling in spring 2013 will provide data necessary to determine if the removal did restructure the size distribution of Largemouth Bass in Cerrillos Reservoir.

### **Bluefin tuna (*Thynnus thynnus*) in the Gulf of Mexico: where do they spawn?**

James Franks<sup>1</sup>, Donald Johnson<sup>1</sup>, Dong-Shan Ko<sup>3</sup>, Jason Tilley<sup>1</sup>, Dyan Gibson<sup>1</sup>, Bruce Comyns<sup>1</sup>, Eric Hoffmayer<sup>2</sup>, Paul Grammer<sup>8</sup>1

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<sup>2</sup>National Marine Fisheries Service, Southeast Fisheries Science Center, Mississippi Laboratories, P.O. Drawer 1207, Pascagoula, MS 39567

Atlantic bluefin tuna (*Thunnus thynnus*) spawning stocks are severely overfished and in decline. Atlantic bluefin presumably spawn in only two locations, Gulf of Mexico (GOM) (western stock, April-May) and Mediterranean Sea (eastern stock). Inferences of general locations and timing of bluefin tuna spawning in the GoM are currently based on findings by researchers investigating catch records, reproductive condition, behavior of adults while on the spring spawning grounds (via PSAT), and larval collections. Some research findings suggest that bluefin tuna spawn within a broad region of the northern GOM but may seek circulation features (eddies, current boundaries) within the region as preferred spawning habitat. There is a critical need to delineate discrete bluefin tuna spawning locations and thereby better characterize spawning habitat in support of bluefin tuna management decision-making. In response to that need, a sample (n=128) of bluefin tuna larvae from collections taken during Gulf Coast Research Laboratory (GCRL) ichthyoplankton cruises in the GOM during May 2000 - 2004, 2008 - 2010 was aged (5 - 15 days old) for data input into the Intra-Americas Sea Nowcast/Forecast System (IASNFS model, Naval Research Laboratory) to hindcast (back-track) pathways of larval transport from collection locations/dates to presumed spawning locations. Hindcast results indicated spawning locations were associated with definitive circulation features, primarily Loop Current-associated

mesoscale eddies and the Loop Current boundary shear region. Characteristics of the larval transport pathways (i.e., nursery habitat) and retrospectively identified spawning locations (spawning habitat) are examined.

### **Impacts of reducing production costs on pond culture of blue crabs (*Callinectes sapidus*)**

Darcie Graham<sup>1</sup>, Gregory Crochet<sup>1</sup>, Harriet Perry<sup>1</sup>, and David Rose<sup>2</sup>

<sup>1</sup> Center for Fisheries and Research Development, The University of Southern Mississippi, Gulf Coast Research Laboratory, 703 E. Beach Drive, Ocean Springs, MS 39564,

<sup>2</sup> Lyman Fish Hatchery, Mississippi Department of Marine Resources, 16193 Fish Hatchery Road, Gulfport, MS 39503.

Aquaculture research on the blue crab, *Callinectes sapidus*, has successfully demonstrated the feasibility of spawning females and rearing larvae to adulthood. Techniques used to culture larvae (zoeae) have been expanded and refined based on existing protocols (Zmora et al. 2005). When zoeae reach the megalopal stage they are harvested from larval tanks and transferred to intermediate grow-out raceways at the Gulf Coast Research Laboratory's Thad Cochran Marine Aquaculture Center for metamorphosis to juvenile crabs and acclimation to low salinity. Once acclimated, juvenile crabs are harvested and stocked in low salinity ponds at the Mississippi Department of Marine Resources' Lyman Fish Hatchery. The ability to reliably produce cultured crabs has great potential for a variety of aquaculture products and reduces pressure on wild stocks. In order to expand blue crab aquaculture to the commercial sector, continued development of techniques to increase survivorship and decrease production costs are necessary. Sea salts are one of the major expenses associated with blue crab pond aquaculture. For this study, a comparison between low and high cost salt mixes was conducted. In the low cost pond, a mixture of Fritz® Super Salt Concentrate and sodium chloride was added. Instant Ocean® Sea Salt, successfully used in previous pond experiments, was added to the high cost pond. Each pond was stocked with 3,500 juvenile crabs. Crabs were collected weekly to determine growth rates using a variety of traps (minnow, crawfish, and crab traps) to reduce size selectivity by gear. Mean harvest size was similar in both ponds, but survival rate was higher in the low cost pond. While additional research is needed, results indicate that blue crabs can be successfully cultured in ponds using an economical mixture of salt concentrates and sodium chloride.

## **Initial movements and habitat use of phase II hatchery-released striped bass, *Morone saxatilis*, in the Biloxi River, Mississippi**

Jennifer Green<sup>1\*</sup>, Paul Mickle<sup>1</sup>, Mark S. Peterson<sup>1</sup> and Larry Nicholson<sup>2</sup>

<sup>1</sup>Department of Coastal Sciences and <sup>2</sup>Center for Fisheries Research and Development, The University of Southern Mississippi, Ocean Springs, MS 39564

Striped bass, *Morone saxatilis*, were once abundant in northern Gulf of Mexico (nGoM) coastal drainages from Lake Pontchartrain, LA., to the Suwannee River, FL. However, by the late 1960s, extensive declines initiated stock enhancement to restore and maintain self-sustaining striped bass populations within their native coastal drainages. With such a significant investment, understanding the life history and movements of hatchery-released striped bass is crucial for establishing self-sustaining populations and reducing stocking costs. We conducted a telemetry experiment to assess initial acclimation movements of hatchery-reared phase II striped bass (195 – 266 mm TL) upon release into a riverine environment in relation to physiochemical conditions. During November 2012, phase II striped bass (n=17) were implanted with VEMCO acoustic tags and released into the Biloxi River. Manual tracking on 1, 4, and 15 days after release revealed both up and downstream movements from the acclimation site. We compared physiochemical characteristics of 40 random sites within the study area to conditions associated with tracked fish locations with Principal Components Analysis (PCA). The first two principal components accounted for 85.35% of the variance and showed temperature, depth, and salinity were the most influential variables driving presence of tagged striped bass. These data suggest that release locations near unique habitats that provide higher than mean temperatures (16.4 – 20.4 °C), depths (2.7 - 8.5 m), and salinity values (10.8 – 20.3 psu) may facilitate acclimation success to natural coastal systems. Continued biotelemetry research can provide a more robust understanding of habitat and physiochemical requirements necessary to support hatchery-reared striped bass survival within their native coastal drainages.

## **Preliminary movement and fidelity assessment of Mississippi Sound sharks by use of acoustic telemetry**

Jill M. Hendon<sup>1</sup>, Sarah L. Ashworth<sup>1</sup>, Jeremy M. Higgs<sup>1</sup>, Jim S. Franks<sup>1</sup>, Eric R. Hoffmayer<sup>2</sup>

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The Mississippi Sound is a well-known habitat for many species of shark. Although sharks are very mobile, regional preferences can often be identified. While general trends of shark movements have been documented, such as offshore/inshore migrations in winter/spring months, the finer scale patterns and fidelity have not been described. To begin to assess the movement patterns of sharks within the Mississippi Sound, acoustic arrays of Lotek WHS 2000 and Vemco VR2W receivers were deployed at four artificial reef sites. Sharks were caught by rod and reel,

surgically implanted with Vemco v13 transmitters, and released. Detection data were obtained from the arrays, as well as from colleagues with additional arrays in the northern Gulf of Mexico. To date, eight Atlantic sharpnose sharks, *Rhizoprionodon terraenovae* (7 males 69 – 90.5 cm, 1 female 80.5 cm total length), and 1 bonnethead shark, *Sphyrna tiburo* (female 80.5 cm total length), have been tagged. As of December 2012 the number of days at liberty ranged from 25 to 476. The reef north of Petit Bois Island had the highest number of detections. All tagged sharks appeared to follow the winter trend of migrating offshore, as there were no detections after November in both 2011 and 2012. Two of the sharpnose sharks were detected as far offshore as the Louisiana Chandeleur Island chain. Interestingly, one shark was detected back in the Mississippi Sound as early as January, while a second returning shark was not detected until June. Although these results are preliminary, this methodology is proving to be effective at elucidating the movement of sharks in the region.

### **Variability in the reproductive periodicity of finetooth sharks (*Carcharhinus isodon*) in the northern Gulf of Mexico**

Jeremy M. Higgs<sup>1</sup>, Jill M. Hendon<sup>2</sup>, Eric R. Hoffmayer<sup>3</sup>, William B. Driggers III<sup>3</sup>, James A. Sulikowski<sup>4</sup>

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Numerous ectothermic organisms, including amphibians, reptiles and teleost fishes, have been shown to exhibit differences or changes in reproductive periodicity. Factors such as temperature, migration energetics, and the availability of consumable energy have been suggested as influencing reproductive periodicity. Among sharks these reproductive variations are rare, especially within a discrete region. Finetooth sharks (*Carcharhinus isodon*) are reported to display a biennial reproductive period; however, from 2005 to 2007, 12 gravid female specimens from the Gulf of Mexico (GOM) region were examined and two were found to have large vitellogenic follicles, demonstrating they were capable of reproducing annually. The degree to which female finetooth sharks in the GOM are reproducing annually is presently unknown. The goal of this study was to assess the percentage of annually and biennially reproducing females within the GOM population and to investigate potential factors influencing this phenomenon. Adult female finetooth sharks were collected monthly in 2011 and 2012 by gillnet and longline in GOM coastal waters from Louisiana to the Florida panhandle. General biological parameters (total length, weight, liver weight) and reproductive parameters (ovarian follicle size/state, oviducal gland width, uterus/pregnancy state) were recorded from each individual. Gravid females with developing vitellogenic follicles were classified as exhibiting an annual cycle while biennial females were either gravid or had preovulatory vitellogenic follicles. To date 43 of the

62 assessed finetooth females have been identified as exhibiting an annual reproductive cycle, demonstrating that this strategy is not anomalous in the population. To our knowledge, northern GOM finetooth sharks are the only shark species in a discrete area within the western North Atlantic Ocean to exhibit such variability in reproductive periodicity. These results are significant, as current stock assessment models will have to be modified to account for the reproductive variability shown in this study.

### **Satellite tracking of highly migratory shark species in the Gulf of Mexico: a preliminary assessment**

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Despite strict management strategies, several large pelagic shark species, including dusky, scalloped hammerhead, and tiger sharks, continue to exhibit declines in population sizes in the western North Atlantic Ocean. Complicating management initiatives is the lack of information regarding movement patterns and habitat preferences of these shark species. The advent of satellite tag technology is now allowing scientists to gain further insight into the vertical and horizontal movement patterns of many highly migratory fishes. The goal of this study was to use satellite tag technology to determine seasonal movements, distribution and essential habitat requirements of several shark species in the Gulf of Mexico. During 2012, sharks were captured during a National Marine Fisheries Service bottom longline survey in the northern Gulf of Mexico and selected individuals were fitted with a dorsal fin mounted smart position tag (SPOT). These satellite tags report a GPS position when the shark is near the surface and the tag is out of the water. A total of 20 sharks were tagged including: tiger (5), great hammerhead (5), scalloped hammerhead (3), whale (2), silky (2), bull (1), spinner (1), and blacktip (1) sharks. The number of days with detections ranged from 19 (great hammerhead) to 125 (tiger), and the number of detections ranged from 3 (tiger) to >800 (scalloped hammerhead). Though we are in the very early stages of this project, data that have been collected thus far are providing insight into the habitat preferences and movements of these sharks.

## **Effects of calcium and magnesium hardness on the fertilization and hatching success of channel x blue F<sub>1</sub> hybrid catfish eggs**

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The aquifer used for hybrid catfish hatcheries is less than 10 mg/L of calcium hardness and 1- 25 mg/L of magnesium hardness. Embryonic development is deemed to be the most sensitive stage in the life cycle of a teleost. As egg development takes outside the fish's body, water hardness is one abiotic parameter, suggested to have a major effect on egg development and embryo survival. Ca<sup>2+</sup> and Mg<sup>2+</sup> contribute to water hardness, and are important for ionic regulation of freshwater fish. These ions influence the permeability of egg membranes, preventing diffusive flow and high ionic loss to surrounding water. Ca<sup>2+</sup> ions play an important role in the chain reaction of fertilization in fish eggs in terms of stimulation, reception of stimulation, fertilization and activation of enzymes. Hence, this study was conducted to ascertain whether varying levels of magnesium hardness (0, 6, 15 or 30 mg/L) with either fixed (60 mg/L of calcium hardness) or varying levels of calcium (60, 54, 45 or 30 mg/L of calcium hardness) in hatching waters affect fertilization and hatching success of hybrid catfish eggs. In the first study, strip spawned eggs from 6 females were fertilized with blue catfish sperm. Hybrid catfish eggs from each female were randomly assigned to two aquaria per (hardness level) rack systems. In the second study, strip spawned eggs from 4 females were fertilized with blue catfish sperm and randomly assigned to four aquaria per (hardness levels) rack system. In both the studies, percent fertilization, neurulation and percent hatch of hybrid catfish eggs incubated in various combinations of hardness waters did not differ ( $P > 0.05$ ). The results of the study suggest that magnesium hardness (up to 50% of the total hardness) with calcium hardness in hatching waters synergistically facilitates fertilization and hatching success of hybrid catfish eggs.

## **Fall bloom phenology and magnitude influence haddock recruitment on Georges Bank**

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The haddock stock on Georges Bank in the northwest Atlantic is characterized by the presence of punctuated events of extremely large recruitment relative to spawning stock biomass. Recent work has indicated that the dynamics of the preceding fall bloom may have exploratory power to describe these events. In this paper we re-examine the hypothesis that fall phytoplankton dynamics have explanatory power to describe the recruitment dynamics of haddock in the light of the extraordinary 2010 haddock year class. We examine the temporal and spatial characteristics of the fall phytoplankton bloom on Georges Bank and examine how the incorporation of these fall bloom dynamics increase the precision of the stock-recruit relationship. We use satellite ocean color data from 1997 to 2009 and published recruitment



estimates from the following year from published stock assessment estimates. Fall bloom characteristics vary considerably across Georges Bank with bloom start date occurring earlier and intensity, and magnitude greater on the northern flank of Georges Bank. On average fall blooms started on Julian day 273 approximately 50 days. There was a strong correspondence correlation between early start dates and large bloom magnitude and intensities with increased recruitment. The inclusion of bloom magnitude and a combination of bloom dynamics into the stock-recruit relationship resulted in significantly increased precision in estimates. The analysis of the fall bloom on Georges Bank provides a valuable “look-ahead” index for recruitment strength of haddock and we demonstrate how this will provide utility for stock assessment.

### **Distributions of a larval fish community in a Puerto Rico reservoir**

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Information regarding spatial and temporal trends in larval fish distributions gives managers insight into recruitment variability and ultimately adult population variability. In Puerto Rico, limited research has been conducted on larval fish distributions with no studies addressing reservoir systems. We conducted a study to compare efficacy of two larval sampling gears (larval light traps [passive] and bongo-style push nets [active]) and to assess spatial and temporal distributions of larval fish communities in a tropical reservoir. Preliminary results indicate larval light traps collected greater diversities and total numbers of larval fish than push nets for all species except *Dorosoma petenense*. Inshore light traps collected greatest total numbers and diversities of the larval fish community, with littoral species such as *Tilapia rendalli*, *Lepomis spp.*, and *Pterygoplichthys pardalis* composing the primary catch. Offshore light traps collected greater numbers of pelagic species such as *Dorosoma petenense* and *Ictalurus punctatus*, though diversities were lower than inshore light traps. Catch per unit effort differed between habitats and amongst sections of the reservoir as well as amongst seasons. Temporal trends indicate *T. rendalli* and Centrarchidae numbers peak earlier in the summer in littoral habitats, while peak numbers of *I. punctatus* increased during autumn in pelagic habitats. These results will allow managers to coordinate larval fish sampling efforts for specific species with periods of peak abundance and preferred habitat.

## **Population assessment of Longspine Porgy, *Stenotomus caprinus*, from 1987 to 2009: evidence of shrimp trawling bycatch impacts?**

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*Stenotomus caprinus* (longspine porgy) is one of the top five most abundant bycatch species caught in trawl fisheries in the northern Gulf of Mexico. Southeast Area Monitoring and Assessment Program (SEAMAP) surveys have collected data since 1987 on a variety of Gulf of Mexico species using groundfish trawl nets. Biological data collected on these surveys include lengths, weights, and abundance of all species, including longspine porgies. Length frequency histograms were developed using the length and abundance data from the SEAMAP surveys and compared to shrimping effort (days fished). Although longspine porgies are a r-selected species which reproduce at a young age in mass quantities, length frequency histograms indicate a population decline. We are currently working on aging longspine porgies via reading the sagittal otolith to assess their life span, age classes, mortality, and abundance from 1987 to 2011 in order to determine if a correlation exists between the mortality of this species and shrimping effort. A better understanding of the age and growth of this species may provide information to more effectively evaluate their-high rate of bycatch.

## **Reducing Red Snapper (*Lutjanus campechanus*) Bycatch in the Gulf of Mexico Shrimp Trawl Fishery**

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We examined the effectiveness of the nested cylinder bycatch reduction device (NCBRD, Parsons et al. 2012) for reducing bycatch of juvenile red snapper, *Lutjanus campechanus* during shrimp trawling in the northern Gulf of Mexico. Using leased, commercial fishing vessels, the catch of red snapper juveniles from trawls equipped with a NCBRD was compared against control trawls with no device. In 230 hours of trawling south of Galveston, Texas, control trawls captured 1237 snapper whereas the trawls equipped with an NCBRD captured 621 snapper, representing an overall reduction in snapper bycatch of 49.2%. When catch rates were compared, 2.93 ( $\pm$  0.53 s.e.) red snapper/hr/trawl were taken with an NCBRD and 5.94 ( $\pm$  0.82 s.e.) snapper/hr/trawl without an NCBRD, a highly significant (ANOVA, P=0.0032, F=9.39, d.f.=1, 64) effect. Additionally, we observed a significant (ANOVA, P=0.013, d.f.= 1, 1104) difference between the mean total lengths of snapper captured with and without an NCBRD with control trawls capturing larger red snapper. Finally, using only red snapper captured in control trawls,

we observed a significant effect of depth on red snapper capture with decreased numbers of red snapper captured with increasing depth. In waters south of Galveston shallower than about 55 meters, catch rates ranged from 4.5 to 23.4 snapper/hr/trawl and in deeper water ranged from 0.25 to 2.4 snapper/hr/trawl. We used an exponential regression to establish a highly significant relationship ( $P < 0.001$ ,  $R^2 = 0.685$ ) between red snapper catch and depth. We observed a similar relationship in catch rates south of Pascagoula, Mississippi. We estimate that use of the NCBRD would reduce juvenile red snapper bycatch in the northern Gulf of Mexico by about 50%. Limiting trawling to waters in excess of 55 meters could reduce snapper bycatch by even greater amounts.

## **A Guide to Fishing the Lower Mississippi River**

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The Lower Mississippi River Conservation Committee was established in 1994 in response to a 1990 resolution of the American Fisheries Society Mississippi Chapter to create “an interagency committee to facilitate communication towards developing a systems approach to managing the fisheries and recreational resources of the Lower Mississippi River”. The LMRCC is a coalition of 12 state natural resources conservation and environmental quality agencies representing Arkansas, Kentucky, Louisiana, Mississippi, Missouri and Tennessee. It provides the only regional forum dedicated to conserving the natural resources of the Lower Mississippi River floodplain and focuses on habitat restoration, landscape level conservation planning and natural resource-based economic development. In 2012, LMRCC published an online recreational fishing guide for the lower river, designed for the novice or experienced angler. An advisory group developed the content and text of the guide, which contains information on safety, boating and fishing regulations, river habitats, fish identification, and fishing tactics. In addition, the guide is linked to a series of 38 online maps showing river miles, dike fields, boat ramps, and other important features of the Lower Mississippi River.

## **Habitat use and selection by adult pallid sturgeon in the lower Mississippi River**

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The pallid sturgeon *Scaphirhynchus albus* is an endangered riverine sturgeon with historical distribution restricted to parts of the Yellowstone, Missouri, Mississippi, and Atchafalaya rivers. Although rare, pallid sturgeon in the lower Mississippi River appear to be naturally recruiting, and information about habitat use is important to conserve this species. Thirty-five adult pallid sturgeon (612-1,013 mm fork length) were tagged with acoustic transmitters and relocated in a 40-km reach of the lower Mississippi River from April 2009 through April 2011. Pallid sturgeon strongly selected island tip and natural bank habitats and, to a lesser degree, sandbar and secondary channel habitats. Although frequently used, pallid sturgeon exhibited negative selection for expansive main channel habitat. Fifty percent of pallid sturgeon detections were in relatively narrow ranges of depths (6.2-13.6 m) and surface current velocities (0.64-1.05 m s<sup>-1</sup>). Use of different habitats was related to river stage and water temperature, indicating use of some habitats was seasonal. Results suggest that maintaining diverse habitats, particularly secondary channel-island complexes, will benefit the conservation of this endangered species.

## **Gulf-Coast Strain Walleye in Northeast Mississippi: Where We Are, and Where We Are Headed**

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Gulf-Coast Strain (GCS) Walleye populations in Mississippi have been cooperatively evaluated by the Mississippi Department of Wildlife, Fisheries and Parks (MDWFP), the United States Fish and Wildlife Service's (USFWS) Pvt. John Allen Hatchery, and Mississippi State University (MSU) personnel. Previous research projects by MSU and MDWFP have been used as baseline data for current and future research projects regarding GCS walleye abundance, movement, range, life history and spawning procedures. Collectively, we have made great strides in our knowledge of GCS walleye populations, but still have much more to understand. GCS walleye are native to the Mobile drainage, which in Mississippi includes the Tombigbee, Buttahatchie, and Noxubee Rivers along with various streams and tributaries in Northeast

Mississippi. Current and future research on GCS walleye projects aim to focus on their overall status in these waters, as well as their critical habitat needs, and threats to their existence.

### **A description of the ichthyofauna composition in the Loop Current in the Gulf of Mexico**

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The Loop Current is an open ocean habitat that is characterized by warm, high density water surrounded by the boundary of cool, low density water. This ecotone acts to provide habitat for a suite of fish species especially larvae and juveniles including economically important ones such as billfish, dolphin fish, and tuna. Very little is known about these fish assemblages of the Loop Current habitats. In this project we used data collected in the summer of 2003 and 2004 with tucker and oblique trawls to determine the diversity and abundance of fish taxa in this habitat. We performed a community assessment of the composition of ichthyofauna using indices of diversity, evenness, and richness for both years, and over four different depths (1 m, 10 m, 20 m, 30 m). Samples were taken in three habitat types in the Loop Current system: inside the eastern boundary, edge habitat at the boundary lines, and outside the western boundary. The delineation of these boundaries was derived from sampling temperature and salinity of each habitat at 100 m. Members of the Scombridae and Carangidae have the greatest average abundances in the samples. Diversity did not vary in each habitat and depth and had a mean value of  $1.86 \pm 0.22$  (SD). The greatest diversity (2.22) was found at a depth of 20 m in 2004. Overall, mean taxonomic value was 36 ( $\pm 11$ , SD). The most taxonomically rich samples were found in 2003 for tucker trawl samples (52 species). Evenness varied little for all categories with an average of  $0.53 \pm 0.06$  (mean  $\pm$  SD). Although larval fish are generally patchily distributed in pelagic habitats, the physical dynamics of the Loop Current may act to aggregate fish in the Gulf of Mexico.

# POSTER PRESENTATIONS

*(Sorted Alphabetically by Presenter)*

## **A look into secondary production and diversity of benthic biota on artificial reefs in the Mississippi Sound**

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In recent years, the state of Mississippi (MS) has made a concerted effort to enhance its coastal fishery resources through the creation of artificial reefs. As part of this effort, the MS Department of Marine Resources has created and maintained 67 nearshore reefs across the MS coast in order to enhance the reef habitat for resident organisms. Various substrate types used for artificial reefs in this region have included oyster shell, cement rubble, and limestone rubble with two basic reef designs of high profile breakwater and low profile submerged structures. The primary objective of these reefs has been to increase the overall carrying capacity of fish and invertebrates for commercial and recreational fishing activities by providing a hard substrate in an otherwise relatively featureless and mud bottomed topography found in the Mississippi Sound. However, the debate of whether artificial reefs actually promote the production of fish or merely act as a fish attractant has yet to be fully addressed. Furthermore, it is also important to fully understand the effectiveness at which a reef is attracting and producing benthic fauna. The differences in the degree to which alternative hard substrata foster secondary production and species composition of these benthic organisms as a trophic base to support artificial reef systems is poorly known. This aspect will be illustrated in a comparative study of four artificial reefs representing high and low profile reefs within the eastern and western portions of the MS coast. Paired substrate baskets containing oyster shell or cement rubble were deployed for six weeks and subsequently processed to recover the colonized benthic biota. Several functional and community maturity related metrics will be used to characterize the fauna including estimates of production and biomass, Production:Biomass (P:B ratio), community turnover time, and a biodiversity index.

## **Harvest by Persons with Commercial Fishing Licenses for 2011**

Garry Lucas

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State law requires that persons with freshwater commercial fishing licenses report their harvest of nongame gross fish. The methodology used for the CY2011 harvest estimation was a diary where each month a portion of the persons with valid commercial fishing licenses were asked to report what gears they used, number of units fished, where they fished, and the number of fish, by species, that they harvested during a period of one month. 633 persons were sent 775

requests to report, of which 164 persons returned 189 surveys (26% and 24% return rate). The estimated harvest for CY2011 by persons with commercial fishing licenses was 860,000 fish; 305,000 buffalo (51% smallmouth, 44% bigmouth), 230,000 channel catfish, 87,000 blue catfish, 70,000 flathead, 30,000 drum, 30,000 common carp, 82,000 Asian carp (84% silver) and 14,900 gar (60% longnose). Gear use reported by survey respondents - 27% fished hoop nets, 22% fished gill nets, 17% trotlines, and 11% fished slat boxes: But, 54% of the respondents reported that they did not fish or harvest any fish during their month to report. The use of commercial gear to harvest fish for personal or family use was important to 71% of the respondents, with 37% listing that as their sole reason to have a license. Only 38% said they sold fish. Although some fishers recorded a harvest of over 1,000 fish in a month, the average annual catch for all fishers was over 1,300 fish, and that number seems high.