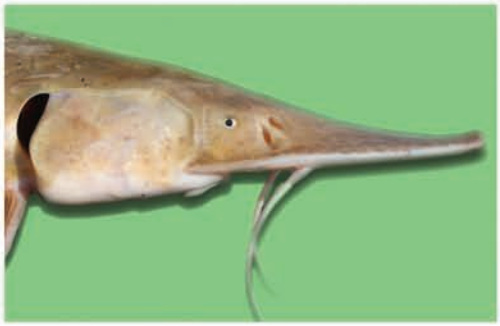
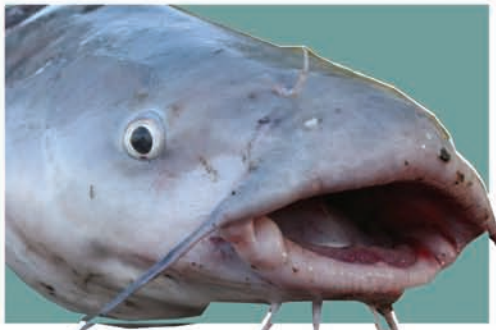


The Joint Annual Meeting of the

Arkansas & Mississippi Chapters American Fisheries Society

AFS

Sam's Town Casino

February 20-22, 2008



PROGRAM AND ABSTRACTS
OF
THE JOINT ANNUAL MEETING
OF THE
MISSISSIPPI AND ARKANSAS CHAPTERS OF THE AMERICAN FISHERIES SOCIETY

SAM'S TOWN CASINO
TUNICA, MISSISSIPPI
20 – 22 FEBRUARY 2008

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ACKNOWLEDGMENTS

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Billy Justus, U.S. Geological Survey, Arkansas Water Science Center, Schedule Organizer
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Distinguished Guest

Don Jackson, 1st Vice President, American Fisheries Society

Banquet Speaker

Paul Hartfield, U. S. Fish and Wildlife Service, Mississippi Field Office, 6578 Dogwood View Parkway, Suite A, Jackson, Mississippi 39214

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PROGRAM OVERVIEW

WEDNESDAY – 20 FEBRUARY 2008

ACTIVITY	TIME	ROOM
MEETING REGISTRATION	12:00 – 12:45	Lobby
SESSION I	1:00 – 3:00	Meeting Room A&B
BREAK	3:00 – 3:15	
SESSION II	3:15 – 5:00	Meeting Room A&B
MEETING REGISTRATION	5:00 – 5:30	Lobby
POSTER SESSION I	5:00 – 6:00	Meeting Room A&B
SOCIAL	7:30 – 11:30	

THURDAY – 21 FEBRUARY 2008

ACTIVITY	TIME	ROOM
MEETING REGISTRATION	7:30 – 8:00	Lobby
SESSION 3A	8:00 – 9:45	Meeting Room A
SESSION 3B	8:00 – 9:30	Meeting Room B
BREAK	9:45 – 10:00	
SESSION 4A	10:00 – 11:30	Meeting Room A
SESSION 4B	10:00 – 11:45	Meeting Room B
LUNCH	11:45 – 12:45	
SESSION 5A	12:45 – 2:00	Meeting Room A
SESSION 5B	12:45 – 2:00	Meeting Room B
BREAK	2:00 – 2:15	
SESSION 6A	2:15 - 3:30	Meeting Room A
SESSION 6B	2:15 - 3:30	Meeting Room B
BREAK	3:30 – 3:45	
SESSION 7	3:45 – 5:00	Meeting Room A&B
POSTER SESSION II	5:00 – 6:00	Meeting Room A&B
BANQUET	7:00 – 12:00	Tunica River Park Museum

FRIDAY – 22 FEBRUARY 2008

ACTIVITY	TIME	ROOM
MS BUSINESS MEETING	8:30 – 10:00	Meeting Room A
AR BUSINESS MEETING	8:30 – 10:00	Meeting Room B

MEETING AGENDA

WEDNESDAY – 20 FEBRUARY 2008

12:00 – 12:45 MEETING REGISTRATION

1:00 – 1:15 OPENING COMMENTS

FRESHWATER FISHERIES MANAGEMENT AND POPULATION DYNAMICS

An asterisk * denotes a student presenter.

SESSION 1: MODERATOR – Steve Lochmann, University of Arkansas at Pine Bluff.

1:15 – 1:30 **EXPERIMENTAL STOCKING OF FLORIDA LARGEMOUTH BASS TO ENHANCE SPORT FISH RECOVERY IN PASCAGOULA RIVER OXBOWS FOLLOWING HURRICANE KATRINA.** J. Brian Alford*, Daniel M. O'Keefe, Donald C. Jackson, James A. Rayburn, and N. Martin

1:30 – 1:45 **GENETIC STRUCTURE OF LARGEMOUTH BASS (MICROPTERUS SALMOIDES) IN SEVERAL ARKANSAS LAKES AS DETERMINED BY MICROSATELLITE ANALYSIS FOLLOWING THE STOCKING OF FLORIDA BASS (MICROPTERUS FLORIDANUS).** Ryan M. Allen*, Christopher B. Cato, Alan D. Christian, and Ronald L. Johnson

1:45 – 2:00 **LARGEMOUTH BASS AGE AND GROWTH IN BELLAVISTA VILLAGE LAKES FIVE YEARS POST FERTILIZATION.** Darrell W. Bowman

2:00 – 2:15 **POPULATION DYNAMICS OF BLACK BASS MICROPTERUS.SPP IN THE LOWER ARKANSAS RIVER.** Benjamin G. Batten*, Michael A. Eggleton, and Steve E. Lochmann

2:15 – 2:30 **THE EFFECTS OF LARGEMOUTH BASS VIRUS ON A QUALITY LARGEMOUTH BASS POPULATION IN ARKANSAS.** J. Wesley Neal, Michael A. Eggleton, and Andrew E. Goodwin

2:30 – 2:45 **ASSESSMENT OF EXPLOITATION PATTERNS OF LARGEMOUTH BASS MICROPTERUS SALMOIDES IN THE LOWER ARKANSAS RIVER.** Bradley V. Fontaine*, Clifford P. Hutt, Benjamin G. Batten, J. Wesley Neal, and Michael A. Eggleton

2:45 – 3:00 **EFFECTS OF A SUMMER HIGH WATER EVENT ON YOUNG OF THE YEAR LARGEMOUTH BASS IN THE ARKANSAS RIVER.** Jeff R. Horne* and Steve E. Lochmann

3:00 – 3:15	**BREAK**
SESSION 2:	MODERATOR **–** Garry Lucas, Mississippi Department of Wildlife, Fisheries and Parks.
3:15 – 3:30	**A COMPARISON OF CRAPPIE FISHING METHODS ON MISSISSIPPI FLOOD CONTROL RESERVOIRS: MANAGEMENT IMPLICATIONS.** Keith Meals, Arthur Dunn, and Steve Miranda
3:30 – 3:45	**AN EVALUATION OF THE FLATHEAD CATFISH POPULATION ON ROSS BARNETT RESERVOIR, WITH EMPHASIS ON HAND GRABBING.** Jerry L. Brown
3:45 – 4:00	**AN EVALUATION OF ANGLER SUPPORT FOR PROPOSED CRAPPIE REGULATIONS AT SARDIS LAKE, MISSISSIPPI.** Susan F. Baker*, Kevin M. Hunt, Stephen C. Grado, and Steve E. Miranda
4:00 – 4:15	**SPATIAL AND TEMPORAL IMPLICATIONS OF DAY VERSUS NIGHT ELECTROFISHING IN A LARGE FLOODPLAIN RIVER ECOSYSTEM.** Nicholas J. Carmean* and John Jackson
4:15 – 4:30	**LAKE NORFORK CREEL SURVEY - A NEW WAY TO OBTAIN PRESSURE ESTIMATES AT NIGHT.** Kenneth Shirley
4:30 – 4:45	**HOME RANGE, HORIZONTAL MIGRATION, AND SPATIAL PATTERNS OF THE FRESHWATER MUSSEL, VILLOSA IRIS.** Allison M. Asher* and Alan D. Christian
4:45 – 5:00	**STATUS AND DISTRIBUTION OF WILLIAMS' CRAYFISH, ORCONECTES WILLIAMSI, IN ARKANSAS.** Brian K. Wagner, Christopher A. Taylor, and Mark D. Kottmyer
5:00 – 5:30	**REGISTRATION**
5:00 – 6:00	**POSTER SESSION I**
7:30 – 11:30	**SOCIAL** **Musical Guest, Bill ”Howl-N-Madd” Perry.**

THURSDAY – 21 FEBRUARY 2008

7:30 – 8:00 **MEETING REGISTRATION**

BEHAVIOR CHARACTERISTICS OF FRESHWATER SPECIES

SESSION 3A: MODERATOR – Larry Pugh, Mississippi Department of Wildlife, Fisheries and Parks

8:00 – 8:30 **OPENING REMARKS AND GENERAL WELCOME: MEGAN ELLIS, MS AFS AND BILLY JUSTUS, AR AFS**

8:30 – 8:45 **FISH ASSEMBLAGES ON GRAVEL BARS IN THE ARKANSAS RIVER.** Lael A. Will* and Steve E. Lochmann

8:45 – 9:00 **FISH FEEDING IN CHANGING HABITATS: EFFECTS OF INVASIVE MACROPHYTE ERADICATION.** Katya Kovalenko*, Eric Dibble, and Rosemara Fugi

9:00 – 9:15 **MOVEMENT OF PALLID STURGEON IN THE ATCHAFALAYA RIVER SYSTEM, LOUISIANA.** Trey Dunn*, Paul Hartfield and Hal Schramm

9:15 – 9:30 **OBSERVATIONS OF SPAWNING AND NURSERY HABITAT OF THE ALLIGATOR GAR, ATRACTOSTEUS SPATULA, IN THE FOURCHE LAFAVE RIVER, ARKANSAS.** Tommy E. Inebnit*, Lindsey Lewis, and Reid Adams

9:30 – 9:45 **REPRODUCTIVE ECOLOGY AND LABORATORY SPAWNING OF THE WESTERN SAND DARTER, AMMOCRYPTA CLARA, WITH OBSERVATIONS OF PREVIOUSLY UNDOCUMENTED BEHAVIOR.** Lucas J. Driver* and Ginny Adams

9:45 – 10:00 **BREAK**

AQUACULTURE

SESSION 3B: MODERATOR – Ken Shirley, Arkansas Game and Fish.

8:00 – 8:30 **OPENING REMARKS AND GENERAL WELCOME: MEGAN ELLIS, MS AFS AND BILLY JUSTUS, AR AFS**

8:30 – 8:45 **HARVESTABLE HYBRID STRIPED BASS STOCKING IN AN URBAN FISHING PROGRAM: FISHING SUCCESS, ANGLER ACCEPTANCE, AND INFLUENCE ON POND PREY COMMUNITIES.** Clifford P. Hutt and J. Wesley Neal

8:45 – 9:00 **EFFECT OF FRY STOCKING DENSITY ON THE PRODUCTION OF ROSY RED FATHEAD MINNOWS IN POOLS.** Ashlee N. Paver* and Nathan Stone

9:00 – 9:15 **TANK PRODUCTI0N OF SUNSHINE BASS FINGERLINGS USING ARTEMIA FROM MICROCYSTS.** G.M. Ludwig, Harry K. Dupree, and Steve Lochmann

9:15 – 9:30 **FIELD MEASUREMENT OF CATFISH HATCHERY AND FRY POND pH AND THE IMPLICATIONS FOR FRY SURVIVAL.** Jim A. Steeby and Charles C. Mischke

9:45 – 10:00 **BREAK**

BEHAVIOR CHARACTERISTICS OF FRESHWATER SPECIES

SESSION 4A MODERATOR – Keith Whalen, USDA Forest Service.

10:00 – 10:15 **MORPHOLOGICAL VARIATION IN JUVENILE PADDLEFISH.** Steven George and Jan Jeffrey Hoover

10:15 – 10:30 **STANDARD METABOLIC RATE ESTIMATES OF BLACK CARP AT DIFFERENT TEMPERATURES AND RELATED SNAIL CONSUMPTION RATES.** Nathaniel C. Hodgins* and Harold L. Schramm Jr.

10:30 – 10:45 **TEMPORAL PATTERNS OF DEVELOPMENT IN SOUTHERN BROOK LAMPREY (ICHTHYOMYZON GAGEI) IN CADRON CREEK, ARKANSAS.** Sarah Pavan*, Ginny Adams, and Reid Adams

10:45 – 11:00 **HABITAT PREFERENCES OF THE STARGAZING DARTER PERCINA URANIDEA AND GENETIC COMPARISON OF DISJUNCT AND CONJUNCT POPULATIONS.** Jeremy M. Rigsby*, Joseph N. Stoeckel, and Tsunemi Yamashita

11:00 – 11:15 **FOOD HABITS OF SYMPATRIC SPOTTED (LEPISOSTEUS OCULATUS) AND SHORTNOSE (LEPISOSTEUS PLATOSTOMUS) GAR DURING FLOODING OF AN ARKANSAS RIVER TRIBUTARY.** Richard Walker*, Justin Benton, Tommy Inebnit, and Reid Adams

11:15 – 11:30 **DIETARY COMPOSITION OF BLUEGILL (LEPOMIS MACROCHIRUS) WITHIN CHANGING PLANT COMMUNITIES OF EURASIAN WATERMILFOIL (MYRIOPHYLLUM SPICATUM L.).** Krisan Webb* and Eric Dibble

COASTAL NON-GAME SPECIES

SESSION 4B MODERATOR- Glenn Parsons, Department of Biology, The University of Mississippi

10:00 – 10:15 **FECUNDITY AND EMBRYO DIAMETER OF PRIMIPAROUS AND MULTIPAROUS BLUE CRAB CALLINECTES SAPIDUS IN MISSISSIPPI WATERS.** Darcie Dennis*, Patricia Biesiot, Harriet Perry, and Richard Fulford

10:15 – 10:30 **EFFECT OF TURTLE EXCLUDER DEVICES (TEDS) ON COMMERCIAL CATCH OF BLUE CRABS CALLINECTES SAPIDUS IN MISSISSIPPI.** Harriet Perry, Darcie Dennis, Dyan Gibson, John Anderson, Guillermo Sanchez, Traci Floyd and Bill Richardson

10:30 – 10:45 **OYSTER DENSITY, MARSH EDGE STABILITY, AND FAUNAL COMPOSITION OF SMALL NATURAL VERSUS CONSTRUCTED INTERTIDAL OYSTER REEFS IN THE NORTHERN GULF OF MEXICO.** Alix G. Stricklin*, Mark S. Peterson, John D. Lopez, Christopher A. May, Christina Watters, and Mark S. Woodrey

POST HURRICANE MONITORING

10:45 – 11:00 **THE STATUS OF MISSISSIPPI FISHERY RESOURCES AND FISHERIES RESEARCH TWO YEARS FOLLOWING HURRICANE KATRINA.** Harriet Perry, Jim Franks, Read Hendon, Don Johnson, Bradley Randall, and Mike Buchanan

11:00 – 11:15 **MONITORING MISSISSIPPI'S COMMERCIAL FINFISH FISHERIES RECOVERY AFTER HURRICANE KATRINA.** Brittany Breazeale, Don Baxter, and Grant Larson

11:15 – 11:30 **MONITORING MISSISSIPPI'S CHARTERBOAT FINFISH FISHERIES RECOVERY AFTER HURRICANE KATRINA.** Matt Hill, Buck Buchanan and Dale Diaz

11:30 – 11:45 **POST-HURRICANE KATRINA COHORT DEVELOPMENT AND STOCK ASSESSMENT OF FLATHEAD CATFISH, PYLODICTUS OLIVARIS, IN THE PASCAGOULA AND TCHOUTACABOUFFA RIVERS OF MISSISSIPPI.** Russell M. Barabe* and Donald C. Jackson

11:45 – 12:45 **LUNCH**

FISH/ENVIRONMENT RELATIONS

SESSION 5A MODERATOR **–** Steve Miranda, U.S. Geological Survey, Mississippi Cooperative Fish and Wildlife Research Unit.

12:45 – 1:00 **CORRELATION BETWEEN FISH ASSEMBLAGE METRICS AND ENVIRONMENTAL VARIABLES IN OXBOW LAKES OF THE YAZOO RIVER BASIN.** Nathan Aycock*, Leandro E. Miranda, and Seiji Miyazono

1:00 – 1:15 **SPATIAL AND TEMPORAL PATTERNS OF FISH ASSEMBLAGES IN A FLOODPLAIN WETLAND MOSAIC OF THE MISSISSIPPI RIVER.** Lainy Burkard*, Brad Williams, Ginny L. Adams, and S. Reid Adams

1:15 – 1:30 **INDEX OF BIOTIC INTEGRITY FOR DELTA STREAMS.** Jack Kilgore, Jan Jeffrey Hoover, Catherine E. Murphy, Steven G. George, and David Johnson

1:30 – 1:45 **PRELIMINARY DATA SUGGEST NUTRIENT-REFERENCE LAKE SELECTION IN TWO ARKANSAS ECOREGIONS.** Billy G. Justus

1:45 – 2:00 **DETERMINING WATERSHED CONDITION FOR AQUATIC VIABILITY AND CUMULATIVE EFFECTS OF THE SOUTH FORK SPRING RIVER, MISSOURI AND ARKANSAS.** Holly C. Martin***,** J. Alan Clingenpeel, Betty G. Crump, and Alan D. Christian

2:00 – 2:15 **BREAK**

COASTAL FISHERIES MANAGEMENT AND POPULATION DYNAMICS

SESSION 5B MODERATOR **–** Jim Franks, Center for Fisheries Research and Development, Gulf Coast Research Laboratory, The University of Southern Mississippi.

12:45 – 1:00 **EVALUATION OF BYCATCH REDUCTION DEVICES IN THE GULF OF MEXICO SHRIMP FISHERY.** Glenn R. Parsons

1:00 – 1:15 **ASPECTS OF THE BIOLOGY OF THE SPINED PYGMY SHARK, SQUALIOLUS LATICAUDUS, IN THE NORTHERN GULF OF MEXICO.** William B. Driggers, Alonzo N. Hamilton Jr., Nicholas M. Hopkins, Christina M. Schobernd, George H. Burgess, and Mark M. Leiby

1:15 – 1:30 **COMPARISON OF LARVAL SAMPLING TECHNIQUES IN TWO PUERTO RICO RIVER MOUTHS.** Christine Adelsberger* and J. Wesley Neal

1:30 – 1:45 **PUPPING AREAS AND MORTALITY RATES OF YOUNG TIGER SHARKS, GALEOCERDO CUVIER, IN THE WESTERN NORTH ATLANTIC OCEAN.** William Driggers, G. Walter Ingram Jr., Mark A. Grace, Terry A. Henwood, Carrie N. Horton and Christian M. Jones

1:45 – 2:00 **MISSISSIPPI'S COASTAL SHARK TAGGING PROGRAM: A PRELIMINARY ASSESSMENT OF DATA.** William D. Dempster, Eric R. Hoffmayer, Glenn R. Parson, Gary J. Gray, and Jason Tilley

2:00 – 2:15 **BREAK**

ENVIRONMENTAL RELATIONS

SESSION 6A MODERATOR – Dan Magoulick, BRD Cooperative Unit, University of Arkansas at Fayetteville.

2:15 – 2:30 **HYDROLOGICAL CONNECTIVITY INDEX FOR ALLUVIAL LAKES ON MINIMAL TOPOGRAPHIC FLOODPLAIN.** Seiji Miyazono*, Nathan Aycock**,** Leandro E. Miranda, and Todd Tietjen

2:30 – 2:45 **STREAM WATER QUALITY IN THE MISSISSIPPI DELTA: RANKINGS BASED ON INDEX OF BIOTIC INTEGRITY SCORES AND LIMNOLOGICAL MEASUREMENTS.** Todd E. Tietjen

2:45 – 3:00 **FISH ASSEMBLAGE RELATIONS TO DISSOLVED OXYGEN AT 35 SITES IN WEST GULF COASTAL PLAIN LOUISIANA STREAMS.** James E. Wallace and Billy G. Justus

3:00 – 3:15 **QUANTIFYING NILE TILAPIA REPRODUCITON ACROSS A RANGE OF SALINITIES: HOW SALTY DO AQUATIC CHICKENS LIKE IT?** Michael R. Lowe*, Mark S. Peterson, Nancy J. Brown-Peterson, Pamela J. Schofield, Jacqueline N. Langston, Denise R. Gregoire, and William T. Slack

3:15 – 3:30 **THE USE OF BIOTIC AND HABITAT INDICIES AS INDICATORS OF FRESHWATER MUSSEL HABITAT IN THE TYRONZA RIVER, ARKANSAS.** Nathan J. Wentz*, Alan Christian, John L. Harris, and Jerry L. Farris

COASTAL FISHERIES MANAGEMENT AND POPULATION DYNAMICS

SESSION 6B MODERATOR – Dennis Riecke, Mississippi Department of Wildlife, Fisheries and Parks.

2:15 – 2:30 **OBSERVATIONS OF JUVENILE TARPON (MEGALOPS ATLANTICUS) IN MISSISSIPPI COASTAL WATERS.** Jim S. Franks, Paul O. Grammer, and James R. Ballard

2:30 – 2:45 **AGE, GROWTH, AND REPRODUCTION OF SHEEPSHEAD, ARCHOSARGUS PROBATOCEPHALUS, IN MISSISSIPPI COASTAL WATERS.** Gray J. Gray, William D. Dempster, Jason Tilley, Nancy J. Brown- Peterson, J. Read Hendon, and Eric R. Hoffmayer

2:45 – 3:00 **MORTALITY OF SILKY SHARKS, CARCHARHINUS FALCIFORMIS, IN GULF OF MEXICO.** G. Walter Ingram, William B. Driggers III

3:00 – 3:15 **EFFECTS OF SEASON AND WIRE LEADER USE ON SHARK CATCH RATES OFF THE COAST OF THE SOUTHEASTERN UNITED STATES.** G**.** Walter Ingram, William B. Driggers III, John K. Carlson, and Enric Cortés

3:15 – 3:30 **HABITAT CHARACTERIZATION AND DISTRIBUTION OF THE SALTMARSH TOPMINNOW (FUNDULUS JENKINSI) ALONG THE NORTHERN GULF OF MEXICO.** John D. Lopez*, Mark S. Peterson, Jake Walker, Gretchen L. Grammer, Dave Ruple, and Mark S. Woodrey

3:30 – 3:45 **BREAK**

FISH HABITAT STRATEGIES

SESSION 7 MODERATOR – Al Christian, Arkansas State University.

3:45 – 4:00 **PROGRESS IN THE RESTORATION EFFORTS OF MISSISSIPPI'S ARTIFICIAL REEF HABITAT.** James Sanders, Kerwin Cuevas, and Dale Diaz

4:00 – 4:15 **MISSISSIPPI RIGS TO REEF PROGRAM: KEEPING VALUABLE HARD BOTTOM HABITAT IN THE NORTHERN GULF OF MEXICO.** Erik Broussard and Kerwin Cuevas

4:15 – 4:30 **RIM SHOALS HABITAT IMPROVEMENT PROJECT, BULL SHOALS TAILWATER, WHITE RIVER, ARKANSAS.** Tim Brunley and Larry Rider

4:30 – 4:45 **DESIGN AND CONSTRUCTION OF A MODIFIED BRETT SWIM TUNNEL.** Jay Collins, Krista Varble, and Jan Jeffrey Hoover

4:45 – 5:00 **BULL SHOALS AQUATIC MACROPHYTE RESTORATION PROJECT.** Kevin D. Hopkins and D. Colton Dennis

5:00 – 6:00 **POSTER SESSION II**

7:00 – 12:00 **BANQUET/RECEPTION**

POSTER PRESENTATIONS

POPULATION ECOLOGY OF GROTTO SCULPIN (COTTUS CAROLINAE) IN CAVE AND RESURGENCE STREAMS. Julie Day*

MISSISSIPPI DERELICT TRAP REMOVAL PROGRAM. Darcie Dennis*

THE EFFECTS OF HIGHWAY CONSTRUCTION ON THE ICHTHYOFAUNA OF OATS CREEK NEAR BRADFORD, WHITE COUNTY, ARKANSAS. Leigh French*

DEFINING ESSENTIAL HABITAT FOR POST-SETTLEMENT JUVENILE BLUE CRABS IN MISSISSIPPI BAYOUS UTILIZING FOUR TYPES OF SAMPLING GEAR. Dyan Gibson*

PHYLOGENETIC ANALYSIS ON THE SPECIAL CONCERN MUSSEL SPECIES: SOUTHERN HICKORYNUT, OBOVARIA JACKSONIANA (FRIERSON 1912), AND OUACHITA CREEKSHELL, VILLOSA ARKANSASENSIS (LEA 1862). Kentaro Inoue*

PHYSICAL AND CHEMICAL ANALYSIS AND VARIABILITY OF MAMMOTH SPRINGS NATIONAL FISH HATCHERY STOCK PONDS. Dusty Rains*

PRELIMINARY EXAMINATION OF THE RELATIONSHIP BETWEEN THE SPATIAL ARRANGEMENT OF HABITATS AND FISH IN THE TENNESSEE-TOMBIGBEE WATERWAY. Amy Spencer

QUANTIFICATION OF BRIDGE CONSTRUCTION SEDIMENT INPUT, TRANSPORT, AND DEPOSITION IN FRESHWATER MUSSEL HABITAT. Justin Ward

ORAL PRESENTATIONS

COMPARISON OF LARVAL SAMPLING TECHNIQUES IN TWO PUERTO RICO RIVER MOUTHS

Christine Adelsberger*, University of Arkansas at Pine Bluff, 1200 N. University Dr., Mail Slot 4912, Pine Bluff, AR 71601, cadelsberger@uaex.edu

J. Wesley Neal, University of Arkansas at Pine Bluff, 1200 N. University Dr., Mail Slot 4912, Pine Bluff, AR 71601

In the tropics, there is very little published information about freshwater fishes in general, and larval fishes in particular. There is also a growing interest in enhancing native fisheries worldwide. Management of any recreational fishery requires a thorough understanding of the natural life history of the species in question. Effective methods of larval sampling are a necessary precursor to any larval study. Larval sampling in freshwater systems of Puerto Rico was conducted in the mouths of two rivers, Cañas and Guanajibo, using two sampling methods: drift nets and light traps. Weekly samples were collected at the surface and bottom of each river mouth once per week from June to August of 2007. Drift nets were set for 24-hour periods and light traps were sampled for 12-hour overnight periods. Results indicated night sampling was most effective ($P < 0.0001$), and in night samples, 58% of larvae were caught in light traps.

EXPERIMENTAL STOCKING OF FLORIDA LARGEMOUTH BASS TO ENHANCE SPORT FISH RECOVERY IN PASCAGOULA RIVER OXBOWS FOLLOWING HURRICANE KATRINA

J. Brian Alford[*], Mississippi State University, Department of Wildlife and Fisheries, Box 9690, Mississippi State, MS, 39762, jba81@msstate.edu

Daniel M. O'Keefe and **Donald C. Jackson,** Mississippi State University, Department of Wildlife and Fisheries, Box 9690, Mississippi State, MS, 39762

James A. Rayburn and **N. Martin,** Mississippi Department of Wildlife, Fisheries and Parks, District 6, 211 Critz St. North, Wiggins, MS, 39577

Being one of the last physically unmodified river systems in the United States, the Pascagoula River in southeast Mississippi is a national icon for conservation of wild ecosystems. It has historically supported popular fisheries for black bass *Micropterus* spp., sunfishes *Lepomis* spp., crappies *Pomoxis* spp. and catfishes (*Ictalurus* spp. and *Pylodictis olivaris)*. In August 2005, Hurricane Katrina devastated these fisheries, washing large amounts of organic matter into the river, which led to hypoxia. Subsequently, extensive fish kills were reported and losses were estimated at 60.8 million fish worth approximately $20.5 million. Stock assessments conducted in oxbows during summer 2006 revealed that upstream, relatively disconnected oxbows contained overabundant young-of-year bluegill *L. macrochirus*, and reproductive output of largemouth bass *M. salmoides* was low (mean young-to-adult ratio = 5). Given the tragedy that Hurricane Katrina imposed on the psyche of local residents and the pressing desire by local anglers to reconnect to Pascagoula River fisheries, predator-prey balance was considered inadequate to immediately support catchable bass and bluegill stocks in these upstream oxbows. We hypothesized that stocking advanced fingerling bass (200-356 mm TL) would improve predator-prey balance in the oxbows, thus enhancing angling opportunities in the short-term. During December 2006, we stocked 15 advanced fingerling Florida strain largemouth bass *M. salmoides floridanus* per acre in five randomly selected oxbows. Five other randomly selected oxbows were left unstocked, serving as a control. We sampled the oxbows during fall 2007, and the effect of stock enhancement on bass and bluegill abundance and size-structure will be discussed.

GENETIC STRUCTURE OF LARGEMOUTH BASS (*MICROPTERUS SALMOIDES)* IN SEVERAL ARKANSAS LAKES AS DETERMINED BY MICROSATELLITE ANALYSIS FOLLOWING THE STOCKING OF FLORIDA BASS (*MICROPTERUS FLORIDANUS)*

Ryan M. Allen*, Arkansas State University, Department of Biological Sciences, P.O. Box 599, State University, AR 72467-0599, Ryan.allen@smail.astate.edu

Christopher B. Cato, Arkansas State University, Department of Biological Sciences, P.O. Box 599, State University, AR 72467-0599

Alan D. Christian, Arkansas State University, Department of Biological Sciences, P.O. Box 599, State University, AR 72467-0599

Ronald L. Johnson, Arkansas State University, Department of Biological Sciences, P.O. Box 599, State University, AR 72467-0599

The extent and effects of hybridization between the largemouth bass (*Micropterus salmoides*) and introduced Florida bass (*M. floridanus*) in southern lakes has been a great source of debate. Previous genetic studies investigating hybridization of these two species have often lacked sufficient resolving power to distinguish specific hybridization events. The goal of this study was to determine the incorporation of Florida bass alleles into several Arkansas lakes. To achieve this goal, a suite of seven microsatellite markers capable of distinguishing largemouth bass, Florida bass, and their hybrids were employed to categorize over 1200 individuals from 8 southern Arkansas lakes (Lakes Chicot, Columbia, DeGray, Erling, Millwood, Monticello, Ouachita and SWEPCO). These lakes had differing Florida bass stocking histories, ranging from no previous introductions to extensive and continued stocking. DNA extraction was performed on bass fin clips, microsatellite loci were amplified using PCR, and alleles were separated using capillary electrophoresis. The software *Structure* was used to analyze the distribution of microsatellite loci within individuals and populations, cataloging allele frequencies, and for admixture analyses. Largemouth bass allele frequencies ranged from 0.29 (Lake Monticello) to 0.99 (Brushy Creek of Lake DeGray) for the composite of the loci studied. Allele frequencies and cluster analysis are largely consistent with that predicted based upon stocking histories and protocols.

HOME RANGE, HORIZONTAL MIGRATION, AND SPATIAL PATTERNS OF THE FRESHWATER MUSSEL, *VILLOSA IRIS*

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The goals of this study were to determine home range, horizontal migration and spatial patterns for *Villosa iris*. *Villosa iris* brood glochidia from August to May, leaving June and July as the spawning period. A mark and recapture study was conducted from May to September 2007 at the South Fork (SF) and Spring (SR) rivers in north central Arkansas. We determined the home range to be 29.3±3.5 cm^2 and 43.0±10.6 cm^2 for SF and SR, respectively. Average migration rate and displacement for SF mussels were 2.1 cm/day and 2.0cm/day, respectively. For SR mussels, both average migration and displacement were the same at 2.6 cm/day. Within the SF, significantly more males were upstream of females during May and more males were upstream non-gravid females during June and July, when more non-gravid females were present. By September, more males were found downstream of gravid females. In the SR, more males were upstream of non-gravid females during June and July. During August more males were downstream of females. The opposite was observed during September, with more males found upstream of females. Male and female spatial patterns corresponded with spawning patterns, as more males were found upstream of non-gravid females during the spawning period.

CORRELATION BETWEEN FISH ASSEMBLAGE METRICS AND ENVIRONMENTAL VARIABLES IN OXBOW LAKES OF THE YAZOO RIVER BASIN

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Thirty oxbow lakes were sampled in the Yazoo River Basin in 2006 and 2007 to develop an index of biotic integrity. At each lake we recorded selected variables descriptive of lake water quality, morphometry, watershed land use, connectivity to adjacent rivers, and fish assemblages. As a preliminary step towards development of the index, relationships between metrics descriptive of the fish assemblages and the environmental variables were examined. From the fish assemblage data we developed metrics that described four general categories of ecological aspects of the fish communities including composition/abundance, richness/diversity, sensitivity/tolerance, and ecological functioning. Metrics within these four categories were examined with correlation analysis to assess whether they exhibited gradients relative to five environmental factors considered to be stressors of fish communities including water transparency, depth, connectivity to adjacent rivers, nutrients, and landscape composition. Preliminary results showed strong correlations between several fish metrics and environmental factors. Some of the strongest correlations were between sensitivity/tolerance metrics and water clarity, ecological function metrics and both depth and connectivity, and composition/abundance metrics and all five environmental factors.

AN EVALUATION OF ANGLER SUPPORT FOR PROPOSED CRAPPIE REGULATIONS AT SARDIS LAKE, MISSISSIPPI

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Sardis Lake is a flood-control reservoir in northwest Mississippi that was impounded in 1940 and is a popular crappie (*Pomoxis* spp.) fishing lake for many Mississippians and out-of-state anglers. Conflicts may arise between resident and non-resident anglers because of perceived higher use of the resource by non-resident anglers and these conflicts are exacerbated by adverse fishing conditions and perceived declining trophy crappie abundance. Although new crappie regulations at Sardis Lake may help to reduce conflict, reduce effort, and improve catch, our results suggest that the newly imposed limits have the potential to reduce both non-resident and resident angler participation. Creel technicians working for Mississippi State University intercepted anglers at Sardis Lake boat ramps between March 2006 and February 2007. Anglers were subsequently sent a mail questionnaire 1 to 3 months after first contact. Analyses of the mail questionnaire data indicate resident anglers and non-resident anglers differed in their level of support for three proposed crappie regulation changes. Whereas all anglers were not supportive of alternative regulations, non-resident anglers were more likely to oppose:
1) reducing the bag limit on crappie to 15 fish per day, 2) implementing a 2-pole limit for each angler, and 3) implementing a 1-pole limit for each angler. Non-resident anglers traveled farther, stay longer, and spent more money on their fishing trip than residents. These factors may account for the differences in level of support for proposed crappie regulations. The new crappie regulations may alter use patterns and have consequences for economic impact in the local area.

POST-HURRICANE KATRINA COHORT DEVELOPMENT AND STOCK ASSESSMENT OF FLATHEAD CATFISH, *PYLODICTUS OLIVARIS*, IN THE PASCAGOULA AND TCHOUTACABOUFFA RIVERS OF MISSISSIPPI

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Fisheries targeting catfish in south Mississippi are important cultural icons. If degraded or lost, the alternatives available to freshwater anglers in the region are sparse. On 29 August 2005 Hurricane Katrina generated a large flood-pulse in rivers throughout south Mississippi. Hypoxia associated with this flood-pulse event produced massive fish kills in main channel and backwater environments of these ecosystems. Immediate post-hurricane stock assessments raised concern that storm-related impacts to freshwater fisheries resources in these systems were so severe that restocking of principal sport fishes might be necessary. Prior to the initiation of restocking programs, assessments of residual stocks and natural stock recovery processes were recommended. . In this regard, our study addresses flathead catfish *Pylodictus olivaris* stocks in two of these river ecosystems: Pascagoula and Tchoutacabouffa rivers. During the period May-June 2007, we collected 267 and 65 flathead catfish from the Pascagoula and Tchoutacabouffa rivers respectively, utilizing low-frequency pulsed-DC electrofishing. Pectoral spines were collected and sectioned, and all spines are currently undergoing age determination. River-specific von Bertalanffy growth equations in conjunction with the direct proportion method are used to provide back-calculated lengths-at-age. Relative abundances (catch per unit of effort data) in association with estimates of instantaneous total mortality (Z) from length-frequency distributions, are being used to ascertain recruitment potentials of the flathead catfish stocks in both rivers. Benefits resulting from this study include information on cohort development and growth characteristics of flathead catfish in south Mississippi streams after a major disturbance.

POPULATION DYNAMICS OF BLACK BASS *MICROPTERUS SPP.* IN THE LOWER ARKANSAS RIVER

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Largemouth bass is one of the most popular sport fishes in Arkansas, especially in the impounded lower Arkansas River. Black bass fisheries in the river are currently managed with a 381-mm (15-in) minimum-length limit on largemouth bass, no length limit on spotted bass, and an aggregate creel limit of 10 black basses per day. To address management questions, largemouth bass *Micropterus salmoides* and spotted bass *M. punctulatus* populations were assessed during 2004-2005. Population metrics assessed included length, weight, gender, condition, age/size structure, growth, abundance, recruitment, and mortality of both black bass populations in all 11 pools of the lower Arkansas River. Results indicated that both black bass populations exhibited above-average condition, and average to good growth. Both populations were young with approximately 95% of the individuals consisting of ages 1-4. Size structure measures (as PSD and RSD_P) were within acceptable ranges for both species. Annual mortality approximated from catch curves was 45-50% for each species; angling-related mortality approximated from mathematical models was estimated to be 7-10%. There was a complete lack of longitudinal trends for most population metrics for either species. Population statistics for both species suggested that lower Arkansas River populations were comparable to similar impounded river systems in the U.S. Southeast. When compared to AGFC standards established for largemouth bass populations in Arkansas reservoirs, lower Arkansas River populations were frequently classified as “high-fisheries potential” waters. Results of this study will be valuable to fisheries managers by serving as a reference point or baseline dataset from which future research and management on the lower Arkansas River can be based. Immediate future research will target patterns in angler catch, harvest, and effort in different pools; potential impacts of competitive bass tournaments; and modeling that will assess potential effects of the current black bass management.

LARGEMOUTH BASS AGE AND GROWTH IN BELLAVISTA VILLAGE LAKES FIVE YEARS POST FERTILIZATION

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The seven lakes in Bella Vista Village, Arkansas were fertilized annually from 1994 through 2002, and many years prior to 1994. Due to conflicting desires for lake management among POA members, fertilization was ceased after 2002. Lake fertility now varies among the seven lakes from eutrophic to oligotrophic depending on the method used to represent Carlson's trophic state index (TSI). Electrofishing samples were conducted on all seven lakes during spring 2007 to assess current status of fish populations and gather for largemouth bass. For most lakes, bass size structure represented classic "stockpiling" around 11 inches and bass mean length-at-age of 2002 and 2003 year class was nearly identical in each of the seven lakes. Largemouth bass growth rates were modeled using back-calculated length-at-age. Growth curves from bass born during fertilization years were nearly identical to those for bass born post-fertilization.

MONITORING MISSISSIPPI'S COMMERCIAL FINFISH FISHERIES RECOVERY AFTER HURRICANE KATRINA

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Hurricane Katrina made landfall as a category three hurricane on August 29, 2005 causing catastrophic damage to coastal Mississippi. In the wake of this devastating storm the Department of Marine Resources has been focused on the rebuilding and revitalization of our valuable marine habitats and fisheries. This report focuses on a program designed to monitor fisheries recovery through a cooperative compensated reporting system with resident commercial finfish fishermen. Only Mississippi residents who held the appropriate commercial license in either license year 2004-2005 or 2005-2006 and had a current license were eligible to contract for this project. There were forty-eight (48) contracts signed by forty-four (44) individuals to participate in the program. The objectives of this program were to obtain by-catch, harvest, area fished, artificial reef use, and effort data from commercial fishermen. This monitoring program ran from November 1, 2006 through April 30, 2007. Fishermen turned in four thousand nine hundred sixty-two (4962) fisheries recovery reports with thirty (30) species reported. There were over forty-three thousand (43,000) fish harvested and over seventeen thousand (17,000) fish released during this six month period. Of the harvested fish, seven species make up over 95% of the total. Overall release mortality was less than 3%.

MISSISSIPPI RIGS TO REEF PROGRAM: KEEPING VALUABLE HARD BOTTOM HABITAT IN THE NORTHERN GULF OF MEXICO

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The Mississippi Department of Marine Resources (DMR), Mineral Management Service (MMS), and petroleum companies are working together to utilize decommissioned oil and gas platforms for offshore artificial reef development. This program is commonly known as "Rigs to Reef". Building on Title II of the National Fishing Enhancement Act of 1984, the National Marine Fisheries Service published a National Artificial Plan which opened the door for Federal support for offshore artificial reef projects. Further building on the National Artificial Reef Plan, the MMS and costal states developed the Rigs to Reef Program to stimulate the reuse of oil and gas production platforms for offshore hard bottom habitat. Oil and gas platforms that are no longer in production are required by the MMS lease agreement to be taken from the marine environment and be properly disposed of within one year after production ceases. The Rigs to Reef Program offers conservation minded alternative of the platform as opposed to onshore disposal with no subsequent habitat value. The average platform jacket can provide up to 1.2 hectares of hard bottom habitat for marine invertebrates and fishes. These submerged platform jackets currently provide habitat for thousands of marine species and create high density areas with complex food chains. Mississippi DMR artificial reef personnel are using the Rigs to Reef program to work cooperatively with oil/gas companies to utilize these abandoned structures for enhancing fish and invertebrate habitat. Together, they are creating premier habitat for fish stocks in the Northern Gulf of Mexico. This habitat is beneficial to both the marine organisms that inhabit these reef systems and the commercial and recreational fishermen who seek the highly prized fish that can be found within this newly created ecosystem.

AN EVALUATION OF THE FLATHEAD CATFISH POPULATION ON ROSS BARNETT RESERVOIR, WITH EMPHASIS ON HAND GRABBING

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Flathead catfish *Pylodictis olivaris* is known to be one of the most sought after species of catfish in Mississippi due to its capability to reach large sizes, aggressiveness, and edibility. Biologists have noticed over the years that hand grabbing is an increasingly popular method of catching catfish on Ross Barnett Reservoir, located in central Mississippi. Only two reports could be found where fisheries personnel strictly sampled for flathead catfish in the past, but had noted that hand grabbing was a growing sport on the reservoir and that flatheads seemed to be the primary target species. We performed a roving creel targeting hand grabbing anglers during the 2007 Mississippi hand grabbing season to estimate harvest and effort. We used low-frequency electrofishing to determine the size structure and population abundance. We also extracted pectoral spines for determining growth and mortality rates for flathead catfish in this reservoir. During the roving creel surveys, we asked anglers questions concerning how they fished, such as depths of boxes, types of probes, the number of boxes they have in the reservoir, etc. Creel data showed that 73% of the anglers targeted flathead catfish while hand grabbing and 73% of the fish harvested were flatheads. The overall CPE was 16 fish per km. The highest catch rates (47 per km) occurred along rip rap covered levees and were dominated by smaller fish. Larger fish were found in deeper waters along river channels and oxbows located within the reservoir. PSD value was 73 and Wr was 92. With little information available from the past, we wanted to gain a better understanding of the flathead catfish population at Ross Barnett Reservoir and determine if hand grabbing was having an effect on the population.

SPATIAL AND TEMPORAL PATTERNS OF FISH ASSEMBLAGES IN A FLOODPLAIN WETLAND MOSAIC OF THE MISSISSIPPI RIVER

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Floodplain habitat connected to the Mississippi River has declined and is particularly rare in upper and middle regions of the basin. The Missouri Department of Conservation recently purchased a tract of floodplain habitat in Scott County, Missouri having a diversity of aquatic areas (e.g., lowland stream, floodplain pond, and beaver pond) that periodically connect with the Mississippi River. Our objective was to survey fishes found in the study area and to examine variation in fish assemblage structure due to habitat and season. During spring and fall of 2006 and 2007, fishes were collected by seining and overnight sets of fyke nets and gill nets. We collected a total of 16,631 fishes, including 35 taxa. Resident fish assemblage composition was highly represented by native species of lowland faunal regions (e.g., *Aphredoderus sayanus, Elassoma zonatum, Amia calva, Lepomis gulosus,* and *Etheostoma gracile*). Assemblage structure varied in habitats sampled. A beaver pond, characterized by greater depths and presence of submerged vegetation contained the most unique assemblage. Species richness tended to be higher during spring, and seasonal patterns were influenced by flooding and summer dry periods. Riverine species (e.g., *Ictiobus*, *Moxostoma*, *Morone*) were only present in the wetland complex following flooding from the adjacent Mississippi River. The data suggest the floodplain area continues to support fishes typical of complex, floodplain habitat that periodically connects with the Mississippi River. Planned restoration activities by the Missouri Department of Conservation may further enhance the value of this floodplain area to the Mississippi River ecosystem.

RIM SHOALS HABITAT IMPROVEMENT PROJECT, BULL SHOALS TAILWATER, WHITE RIVER, ARKANSAS

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The objectives of the Rim Shoals Project were to stabilize critical areas of eroding streambank by constructing boulder hard points, placing boulder clusters for fish cover and scour pockets, placing large woody debris to provide habitat for fish and invertebrates, and to improve the overall quality of the fishery. Between December 18, 2006 and January 24, 2007, 3,500 tons of large boulders, 38 large hardwood tree structures and 36 rock "Lunker Bunker" type structures were placed in this 1.8 mile area for habitat improvement. A self-propelled, self-unloading barge, 40 feet in length and 14 feet wide, with 4 feet of draft was used to place these habitat materials. The project was completed for a total cost of $119,050.20. The large boulders and hardwood trees that were used in this project were obtained through donations and had a monetary value of $77,500.00. One of the major objectives of this project was to improve the overall quality of the trout fishery in the Rim Shoals area. A pre-project electro-fishing survey was conducted within the project area on September 27, 2006. The CPUE (fish/hr) for brown trout was 110 and 56 for rainbow trout. Brown trout ranged in size from 220mm to 616mm and rainbow trout ranged in size from 254mm to 353mm. A post-project electro-fishing survey was conducted within the project area on September 25, 2007. The CPUE (fish/hr) for brown trout was 125 and 60 for rainbow trout with brown trout ranging in size from 208mm to 635mm and rainbow trout ranging in size from 200mm to 361mm. Statistical analysis of the data showed no significant improvement in overall CPUE and size structure, however, a significant increase ($F = 11.05$; d.f. = 1; $P = 0.008$) in the CPUE of brown trout in the size class from 200mm - 250mm was observed in the post-project survey. Hopefully, this cohort of fish will continue to grow and contribute to the overall Brown Trout population in the area. Projects such as this have the potential to provide additional areas for quality angling opportunities, which will disperse angling pressure over a greater portion of the tail-water. Instantaneous angler counts made during an ongoing creel approach 100 anglers/mile in more popular areas on the Bull Shoals Tail-water. In the Rim Shoals area, pre-project instantaneous counts averaged 1.95 anglers/mile. This value has increased post-project to 3.19 anglers/mile. In fiscal year 2005-06, the Arkansas Game and Fish Commission sold 167,740 trout permits. From previous trout angler surveys it is estimated 25.8% of these anglers fish the Bull Shoals tail-water most often. Trout anglers spent an estimated $180 million dollars each year that generate over $10 million in state and local taxes. The completion of the Rim Shoals aquatic habitat improvement project will help maintain and/or increase the sale of trout permits that will be essential for future program funding. This in turn will help provide significant tourism, social and economic benefits to the State of Arkansas.

SPATIAL AND TEMPORAL IMPLICATIONS OF DAY VERSUS NIGHT ELECTROFISHING IN A LARGE FLOODPLAIN RIVER ECOSYSTEM

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We compared species richness, catch per unit effort (CPUE), and percent composition between day and night electrofishing in backwater and dike fields of the Arkansas River, AR. Fish were sampled in the fall of 2007 in four different habitats: backwater shorelines (24 paired samples), dike tips (11 paired samples), dikes (10 paired samples), and shoreline interdike zones (23 paired samples). Richness was higher for night samples in all habitats and ranged from 26 to 37 species. During the day richness ranged from 20 to 34 species. Individual species collected either during the day or at night, but not both, in each habitat were considered unique species. These ranged from 3 to 5 species during the day and from 7 to 10 species at night. Additionally, these species were rare and accounted for <3% of the catch. Catch per unit effort did not differ between day and night for most species. However, night electrofishing produced greater CPUE where differences were detected with one exception. Gizzard shad (*Dorsoma cepedianum*) CPUE was greater during the day in the interdike zone habitat. CPUE was greater at night for 6, 2, 4, and 11 species in backwater shoreline, dike tip, dike, and shoreline interdike zone habitats, respectively. Species composition in each habitat tended to change from day to night. In backwater shoreline habitat, the four most common species collected during the day were gizzard shad (28%), bluegill (*Lepomis macrochirus*) (27%), largemouth bass (*Micropterus salmoides*) (12%), and redear sunfish (*Lepomis microlophus*) (9%). Common species at night included bluegill (26%), gizzard shad (23%), largemouth bass (11%), and yellow bass (*Morone mississippiensis*) (10%). Common species collected during day sampling in dike tip habitat included longear sunfish (*Lepomis megalotis*) (40%), bluegill (15%), flathead catfish (*Pylodictis olivaris*) (7%), and blue catfish (*Ictalurus furcatus*) (6%). Predominant species at night included longear sunfish (50%), bluegill (17%), spotted bass (*Micropterus punctulatus*) (6%), and freshwater drum (*Aplodinotus grunniens*) (5%). In dike habitat, longear sunfish (29%), bluegill (19%), blue catfish (16%), and gizzard shad (11%) were the most common species collected during the day. This changed at night to longear sunfish (35%), bluegill (29%), freshwater drum (9%), and spotted bass (5%). In interdike zone habitat, the four most common species collected during the day were gizzard shad (31%), longear sunfish (25%), bluegill (8%), and redear sunfish (5%). At night the predominant species included longear sunfish (26%), freshwater drum (23%), bluegill (18%), and yellow bass (5%). We will continue this research to incorporate seasonal and habitat comparisons this spring. An additional focus of our research will include temporal and spatial food habits of largemouth and spotted bass.

DESIGN AND CONSTRUCTION OF A MODIFIED BRETT SWIM TUNNEL

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Swim tunnels are used to study energy expenditures, respiration, and critical swimming speeds of fish. Swimming performance data, critical for evaluating the risk of entrainment on imperiled species, by dredges or water diversion projects, have not been readily studied due to the need for large, effective, movable tunnels. We designed and constructed a Brett-type tunnel (Brett, 1964) to best accommodate swimming performance studies of large riverine fishes such as sturgeons. We first built a working section, or testing area, out of acrylic material measuring 1.8 by 0.6 m and configured other sections accordingly. Clear, acrylic material was used to enable continuous monitoring of all moving parts and swimming fish. Flow filters (acrylic grids) with pores 2x5 cm were constructed to create rectilinear flow in the tunnel. Filters were made using a water jet machine. Other materials used consisted of 38-cm diameter PVC and stainless steel to decrease corrosion that occurs over time in swim tunnels. To manipulate PVC and stainless steel parts, an abrasive chop saw was used. Acrylic phalanges were used to connect parts with only bolts and rubber seals. A five horse power Varidrive US Electrical Motor, capable of 1740 rpm, powered a stainless steel shaft attached to a 33 cm propeller, providing thrust and producing water velocities of 35 to 115 cm/s at < 40% power. Tunnel will produce substantially higher water velocities at full power. Water volume of tunnel is approximately 1359 liters. To decrease space occupied by a swim tunnel of this capacity and to provide mobility, a stainless steel frame was welded, the bottom of which was placed on heavy-duty 7.6 cm casters for easy locomotion of the entire tunnel. Tunnel, when empty, can be readily moved across a smooth flat surface by a single person. Bleacher-style steps provide easy access to the working section of the tunnel and a safe, stable working platform for the entire length of the structure. Future changes in design will reduce boundary layer of low velocity that is created along the tunnel bottom

MISSISSIPPI'S COASTAL SHARK TAGGING PROGRAM: A PRELIMINARY ASSESSMENT OF DATA

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Other than the suspected inshore and offshore movements of coastal sharks into the north central Gulf of Mexico in early spring and late fall, little is known about their movement patterns within this region. The main objective of Mississippi's Coastal Shark Tagging Program is to elucidate short and long-term movement patterns of coastal sharks within the north central Gulf of Mexico using tag-recapture techniques. To date, 2,592 coastal sharks representing nine species have been tagged in two previous shark studies (1998-2000, 2004-2007) in Mississippi coastal waters. The Atlantic sharpnose shark (n = 1,379) was the most abundant species tagged, followed by blacktip (n = 585), finetooth (n = 359), bull (n = 105), bonnethead (n = 79), blacknose (n = 39), spinner (n = 34), scalloped hammerhead (n = 8), and sandbar (n = 4). Twenty-two sharks have been recaptured (0.85%) to date, representing Atlantic sharpnose (n = 16, 1.16 %), bull (n = 4, 3.8 %), blacknose (n = 1, 2.5 %), and bonnethead (n = 1, 1.3 %). The Atlantic sharpnose shark traveled the furthest (n = 110.3 miles) and was at liberty the longest (n = 598 days) and obtained the highest rate of movement (n = 3.79 miles/day). Currently, our results are very limited, however, a cooperative tagging program with a selected group of fisher's will be implemented in 2008 to increase the tagging efforts.

FECUNDITY AND EMBRYO DIAMETER OF PRIMIPAROUS AND MULTIPAROUS BLUE CRAB, *CALLINECTES SAPIDUS*, IN MISSISSIPPI WATERS

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In the Gulf of Mexico, blue crabs support large commercial and recreational fisheries. Understanding the reproductive biology of this species is vital to the management of this fishery. Blue crabs are traditionally believed to produce one to six broods. However, recent evidence has shown that females have the ability to spawn up to 8 broods in a single spawning season, with as many as 18 broods over their lifespan. The present study was conducted to determine if fecundity and egg diameter varied by brood type (primiparous vs. multiparous) and collection season (Spring vs. Summer/Fall). Ovigerous crabs were obtained during the 2006 spawning season (March – September) from commercial crab traps in Pascagoula, MS. Fecundity was estimated using a count/dry weight method. The mean fecundity of all crabs collected was 2.8×10^6 eggs with a mean embryo diameter of 253.2 µm. There was a positive relationship between fecundity and female size. When equal-sized primiparous and multiparous crabs were compared, there was no significant difference in fecundity. While there was no difference in embryo diameter between brood types, Spring embryos were approximately 10% larger in diameter than those collected in the Summer/Fall. The results of this study will increase the understanding of the reproductive capacity of female blue crabs, providing useful information to help maintain a sustainable fishery.

ASPECTS OF THE BIOLOGY OF THE SPINED PYGMY SHARK, *SQUALIOLUS LATICAUDUS*, IN THE NORTHERN GULF OF MEXICO

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The biology of most deepwater marine organisms is poorly understood, especially for those species whose range is outside of areas where commercial fisheries have historically operated. As a result, knowledge of the distribution, life history and behavior of many deepwater organisms is largely based on anecdotal accounts of incidental observations or from specimens collected during fisheries-independent surveys. Recently, trawl fisheries for deepwater species, such as royal red shrimp, *Pleoticus robustus*, have developed in the northern Gulf of Mexico. As many organisms will ultimately be impacted by deepwater fishing activity, it is important to gain further understanding of the biology of these species for the future formation and implementation of sound management initiatives. On 10/28/2007, while conducting deepwater trawl operations in the northern Gulf of Mexico, an aggregation of 24 spined pygmy sharks, *Squaliolus laticaudus*, were captured in a single tow, verifying the occurrence of the species in this region. Morphometric analyses revealed two potentially sexually dimorphic characters. A morphological difference in pelvic fin structure between males and females was also noted. Analyses of trawl catch data and stomach contents indicated the sharks were feeding on mesopelagic cephalopods and teleosts. Although no mature males were collected, data suggested that the maturation process begins at approximately 150 mm total length (TL). Size at 50% maturity for female *S. laticaudus* was determined to be 160.11 mm TL; a size smaller than previously reported for this species.

PUPPING AREAS AND MORTALITY RATES OF YOUNG TIGER SHARKS, *GALEOCERDO CUVIER*, IN THE WESTERN NORTH ATLANTIC OCEAN

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From 1995 through 2006, 2,577 bottom longline sets were conducted in the western North Atlantic Ocean. The study area extended from approximately 36°00' N, 75°00' W to 26°00' N, 97°00' W; an area that encompasses both the coastal waters off the southeastern United States (Atlantic) and the northern Gulf of Mexico (Gulf). Over the course of the study, 335 young-of-the-year (YOY) and 219 juvenile tiger sharks, *Galeocerdo cuvier*, were captured. In the Gulf, YOY catch per unit effort (CPUE) was highest from approximately 88° to 83° W. In the Atlantic, the area of highest YOY CPUE occurred from 31 ° to 33 ° N. Distribution of juvenile tiger sharks was more uniform than observed for YOY throughout the range of the study. Annual survival rates of YOY and age-1 tiger sharks were estimated to be 51 % and 62 % in the Gulf and 39 % and 27 % in the Atlantic. Total instantaneous mortality rates of YOY and age-1 tiger sharks were estimated to be 0.67 and 0.47 in the Gulf and 0.93 and 1.32 in the Atlantic. In the Atlantic, age-specific *M* estimates ranged from 0.17 to 0.50 and 0.12 to 0.36 for YOY and juvenile tigers sharks, respectively. Estimates of age-specific *M* were more variable in the Gulf with values ranging from 0.16 to 0.98 for YOY and 0.11 to 0.57 for juveniles.

REPRODUCTIVE ECOLOGY AND LABORATORY SPAWNING OF THE WESTERN SAND DARTER, *AMMOCRYPTA CLARA*, WITH OBSERVATIONS OF PREVIOUSLY UNDOCUMENTED BEHAVIOR

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A reproductive life-history study was conducted on the western sand darter, *Ammocrypta clara,* in the Black River system in northeastern Arkansas. While much is generally known about percid fishes within the genus *Ammocrypta*, limited research has been conducted specifically dealing with *A. clara*. Gravid females and mature males were collected from the Current, Strawberry, and Black rivers from June to mid September 2007, indicating a late and protracted spawning season. Reproductively mature specimens were collected in late August for laboratory observation and spawning behavior was observed on 28 August 2007. Males and females were observed undulating and vibrating vigorously in corners and along the side of the tank, creating depressions in the sand substrate. Spawning events varied in the number of individuals participating, from one male and one female, up to 8 individuals of unknown sex ratios. Similar to spawning observations of *A. pellucida,* eggs were buried singly in the sand, but in contrast, eggs were also found at the sand surface. Eggs were collected from the aquaria on 29 August (n=58) and 30 August (n=31). Spawning behavior, including group or paired vibrations and depression building, continued through early September but no eggs were found after 30 August. During the observation period, fish remained buried in the sand except in crepuscular periods with more activity occurring at dawn compared to dusk. Most individuals came to the surface within 5 minutes of the application of light (to simulate dawn) and remained active for approximately one hour before burying in sand. Feeding was not observed during the spawning period, and active feeding did not resume until several weeks after spawning. In addition, post-spawn adults were active diurnally.

MOVEMENT OF PALLID STURGEON IN THE ATCHAFALAYA RIVER SYSTEM, LOUISIANA

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The pallid sturgeon *Scaphirhynchus albus* is an endangered species of riverine sturgeon that inhabits the main channels of the Mississippi River, Missouri River and large tributaries and distributaries of these rivers. They are normally found in swifter waters, but little is known about habitat requirements or habitat selection. Movement of adult pallid sturgeon was determined in the Old River (a distributary of the Mississippi River)-Lower Red River-Atchafalaya River system (ARS) by acoustic telemetry. Fish were initially captured downstream of a water control structure separating Old River from the Mississippi River, and 18 fish were surgically implanted with sonic tags 8 February 2007 through 23 March 2007. They were located 11 February 2007 through 11 April 2007 and 21 May 2007 through14 August 2007. Three fish were located repeatedly at the release site. Twelve fish were found downstream of the release site. Nine of these fish were repeatedly located within 0-3 km of the same location after they moved downstream a distance between 10 and 96 mi. The greatest average distance moved occurred between 16 June 2007 and 15 July 2007. The fish were typically located on the edge of the strong currents on steeply sloping bottom.

ASSESSMENT OF EXPLOITATION PATTERNS OF LARGEMOUTH BASS *MICROPTERUS SALMOIDES* IN THE LOWER ARKANSAS RIVER

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Largemouth bass *Micropterus salmoides* angling is popular throughout the lower Arkansas River. Historically, limited information has been available for Arkansas River largemouth bass populations outside of Lake Dardanelle. In 2004-2005, intensive studies were conducted that characterized basic population statistics such as abundance, age/size structure, growth, recruitment, and mortality of largemouth and spotted bass throughout the lower 11 pools of the river. The next step in this longer-term investigation is the characterization of patterns in angler effort, catch, and harvest. In September 2007, a tag-rewards study was initiated to assess largemouth bass exploitation in Arkansas River Pool 4 over one year. Eight hundred-fifty largemouth bass that were 330-mm total length or greater were collected, tagged, and released in late September 2007. Concurrently, bus route access-point creel surveys are being conducted to generate effort, catch, and harvest statistics, and assess angler satisfaction. After three months on Pool 4 (October-December 2007), tag-return rates were 15.4% and 96 angler surveys were completed. Tag returns will be adjusted in the future for angler non-response, tagging mortality, and tag loss. Tentatively, this research will be continued on Arkansas River Pool 2 in September 2008. Similar methods will be used, although more bass will be tagged for the exploitation estimation and creel surveys will be conducted using two bus-routes because of the pool's larger size and numerous access points. Research findings will be combined with earlier research, and used to support future largemouth bass management in the lower Arkansas River.

OBSERVATIONS OF JUVENILE TARPON (*MEGALOPS ATLANTICUS)* IN MISSISSIPPI COASTAL WATERS

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Tarpon, *Megalops atlanticus*, are large, migratory, elopomorphic fish that inhabit tropical and subtropical waters of the Western Central Atlantic Ocean, including the Gulf of Mexico (Gulf). Adult tarpon occur in Mississippi offshore waters during summer months as part of a presumed annual coastal migration from the southern Gulf. Since the Gulf's tarpon stock is documented to spawn (May – August) only off the coasts of south Florida and Yucatan, Mexico, the northern Gulf is considered an adult tarpon feeding ground. Since the 1950's, the tarpon stock has declined dramatically, attributable in part to over-fishing, but primarily to the depletion of known tarpon nursery grounds (mangrove and marsh habitats) in south Florida and along the Yucatan coast. Juvenile tarpon are rarely reported from Mississippi coastal waters (only 10 known specimens prior to 2006). Since the Mississippi coast is not a documented tarpon nursery ground, recent occurrences (2006 and 2007) of juvenile tarpon in a variety of Mississippi coastal habitats were worthy of 'opportunistic' investigation. In 2006 (October) and 2007 (April, September – November), young tarpon (N = 125, 50 – 840 mm FL) were opportunistically collected/examined from three coastal sites (two tidal sloughs in Jackson County; Biloxi Back Bay). Water quality was recorded during collection activities. Thirteen specimens were sacrificed to collect otoliths, stomach contents and DNA tissues, while the others were either measured and released or placed in aquaculture systems for observation and study. Simultaneous with our small-scale study efforts were documented collections by other researchers of small juveniles from an abandoned aquaculture pond located near a tidal slough, as well as anecdotal accounts from anglers of large juveniles (~ 10 kg) caught from local bayous and coastal rivers. The occurrence of young tarpon in local waters prompted numerous questions, among which were: what was the point of origin of the young fish; how were they recruited into Mississippi coastal waters; how old are the young fish; how large is the recently observed population of young tarpon; can young tarpon thrive in local estuarine habitats and survive winter conditions; will young tarpon be found in Mississippi coastal habitats in 2008? Speculations offered in response to those questions, along with an overview of preliminary study findings, are presented.

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MORPHOLOGICAL VARIATION IN JUVENILE PADDLEFISH

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Juvenile paddlefish (*Polyodon spathula*) exhibit conspicuous variation in the shapes of their rostra and caudal fins. We quantified morphological variation for a composite collection of young-of-year paddlefish (N = 54, 62-316 mm TL) using 9 measurements of the rostrum, body, and caudal fin. With increasing size of fish, relative length of rostrum increased, breadth of rostrum increased, and asymmetry of caudal lobes decreased. Smaller fish had short, narrow rostra (paddles) and conspicuously asymmetrical caudal lobes (heterocercal tails); larger fish had longer, broader rostra (spoonbills) and more symmetrical caudal lobes (supercially "homocercal" tails). Relationships between these morphological indices and fish size were all significant ($r^2 > 0.60$, $p < 0.0001$) but ranges of values at various sizes were sometimes substantial. Allometric growth of rostrum and caudal lobes was less pronounced for fish > 150 mm TL. Principal component analysis with specimens > 150 mm TL resulted in three morphologically discrete groups of fish: hatchery-reared fish from the Mermentau River, hatchery-reared fish from the Tombigbee River, and wild-caught fish from the Mississippi River. Differences in paddlefish morphology may be influenced by genetic factors, environmental influences, or a combination of both. Phenotypic differences in rostra and caudal fins will influence swimming performance.

AGE, GROWTH, AND REPRODUCTION OF SHEEPSHEAD, *ARCHOSARGUS PROBATOCEPHALUS*, IN MISSISSIPPI COASTAL WATERS

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Sheepshead, *Archosargus probatocephalus,* occurs in coastal waters of the western Atlantic Ocean from Nova Scotia to Brazil, with the densest populations found in the Gulf of Mexico. Sheepshead support an important winter recreational and commercial fishery in Mississippi, yet the fishery is not managed. Consequently, research is being conducted on life history aspects of this species. During 2004-2007, 423 sheepshead were collected from the Mississippi Sound and adjacent waters using various gear represented by 171 males (218 – 509 mm, FL) and 221 females (190 – 567 mm, FL). Otolith assessments provided estimated ages for 297 of the specimens, with males ranging from 1 to 11 years and females ranging from 1 to 12 years. Von Bertalanffy growth parameters were similar for males ($k = 0.256$, $L_{max}= 486.5$ mm, FL) and females ($k = 0.377$, $L_{max}= 440.0$ mm, FL). These values are comparable to other sheepshead age and growth studies in the south Atlantic and Gulf of Mexico. Males examined reached maturity during their first year, while females did not reach 100% sexual maturity until age-3. Peak GSI for females indicates that spawning occurs from February to April. Sheepshead exhibit asynchronous oocyte development and are batch spawners. Preliminary data suggest there is no relationship between fish size and egg number. Estimate of mean batch fecundity was 219,100 ± 38,700 eggs/female (range = 144,010 to 363,321 eggs/female).

MONITORING MISSISSIPPI'S CHARTERBOAT FINFISH FISHERIES RECOVERY AFTER HURRICANE KATRINA

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Hurricane Katrina made landfall as a category three hurricane on August 29, 2005 causing catastrophic damage to coastal Mississippi. In the wake of this devastating storm the Mississippi Department of Marine Resources (MDMR) has been focused on the rebuilding and revitalization of our valuable marine habitats and fisheries. To help in this effort the MDMR designed a program to monitor fisheries recovery through a cooperative compensated reporting system with resident charterboat captains. Only Mississippi residents who held a charterboat license in either license year 2004-2005 or 2005-2006 and had a current license were eligible to contract for this program. There were fifty-seven (57) contracts signed by fifty-one (51) individuals to participate in the program. The objectives of this program were to obtain by-catch, harvest, area fished, artificial reef use, and effort data from charterboat captains. This monitoring program began on October 1, 2006 and is ongoing. The data presented in this report covers the first year of the project (October 1, 2006 - September 30, 2007). There were twelve multi-passenger overnight vessels which participated in the program whose harvest and by-catch data is not included in this report. Captains turned in three thousand four hundred eighty-six (3486) fisheries recovery reports in which seventy (72) species were reported. Over fifty-eight thousand (58,000) fish were harvested during this time period with ten species making up 90% of the total harvest. Over seventeen thousand (17,000) fish were released with an overall release mortality of 7.5%. Seventy percent of the fishing time occurred within Mississippi waters. Nineteen percent of the fishing time was spent on a Mississippi artificial reef site.

STANDARD METABOLIC RATE ESTIMATES OF BLACK CARP AT DIFFERENT TEMPERATURES AND RELATED SNAIL CONSUMPTION RATES

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Standard metabolic rates (SMR; mg O_2 kg^{-1} h^{-1}) of fed black carp *Mylopharyngodon piceus* (mean Wt = 223 g, range = 138-338 g) were measured with swim tunnel respirometry at 20, 25, and 30 C (*n*=5 at each temperature). SMRs for each fish were determined with a linear regression of oxygen consumption at water velocities of 15, 30, 45, and 60 cm sec^{-1}. The mean SMR of fish at 20, 25, and 30 C was 90.05, 269.81 and 290.13 mg O_2 kg^{-1} h^{-1} respectively. These values are similar to those found in other studies. The SMRs were not affected by fish weight at any temperature (20 C: $F_{1,3}$=0.30, *P*=0.62; 25 C: $F_{1,3}$=0.33, *P*=0.61; 30 C: $F_{1,3}$=3.61, *P*=0.15). Using a standard oxy-calorific coefficient multiplier of 3.20, mean SMRs were 288.16 calories kg^{-1} h^{-1} at 20 C, 863.39 calories kg^{-1} h^{-1} at 25 C, and 928.42 calories kg^{-1} h^{-1} at 30 C. A sample of snails (*Physa* spp.) from local ponds with a mean weight of 23 mg and a mean shell length of 6 mm had an energy value of 342.13 calories g^{-1} (wet weight). Black carp at 20, 25, and 30 C would need to consume 0.84, 2.52 and 2.71 mg g^{-1} h^{-1}, respectively, to meet their SMR requirements. Thus young black carp with an average weight of 223 g would need to consume at least 196, 589, and 633 23 mg snails day^{-1} at 20, 25, and 30 C, respectively, to meet standard metabolic requirements.

BULL SHOALS AQUATIC MACROPHYTE RESTORATION PROJECT

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Bull Shoals, an 18,389 hectare flood control and hydropower reservoir of the White River in north central Arkansas and managed by the U.S. Army Corps of Engineers is devoid of any significant amount of aquatic vegetation. Shoreline nursery habitat is a major factor in production and survival of young-of-the-year centrarchid species. The lack of aquatic macrophytes in the reservoir is attributed to the combination of a limited source of plant propagules (seeds, spores, etc.) flushing into the system and flood control operations, which have prevented the natural establishment of aquatic vegetation in the reservoir. In 2002, the AGFC entered into a Section 206 cooperative agreement with the U.S. Army Corps of Engineers to establish native aquatic vegetation in Bull Shoals reservoir in an effort to improve fish nursery habitat. During 2001, the AGFC began the initial phase of the project with a pilot study intended to determine which plant species were suitable for introduction. Phase II of the project began in 2003 and concluded in 2004. Exclosures to exclude herbivorous animals, such as carp and turtles, were constructed and placed at five suitable locations. Approximately 3,000 potted plants representing sixteen species and three growth forms (submersed, floating-leaved, and emergent) were used over the two years in establishing five founder colonies with assistance from personnel from the Lewisville Aquatic Eco-systems Research Facility (LAERF) at Lewisville, TX. During the two-year project, AGFC personnel were trained in many aspects of founder colony establishment, including site selection, plant production, cage construction and placement, and transplantation and evaluation techniques. AGFC personnel remained committed to maintaining and expanding the founder colony sites from 2005 until present. By October 2007, spread (growth outside of founder colonies) was observed and supports the premise of aquatic habitat restoration.

EFFECTS OF A SUMMER HIGH WATER EVENT ON YOUNG OF THE YEAR LARGEMOUTH BASS IN THE ARKANSAS RIVER

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Abundance of young of the year largemouth bass in regulated river systems can be impacted by high water events that occur at unusual times. The Arkansas River has a 10-year average flood cycle with peak flow near 150,000 cfs from late March to mid April. In the summer of 2007, the river exhibited a distinctly different hydrograph. The river was over 150,000 cfs from mid-June to early-August. We conducted electrofishing studies to estimate the relative abundance of YOY largemouth bass in ten backwaters of Pool 4 of the Arkansas River following this unusual summer. We also measured weight and length of YOY largemouth bass. CPUE estimates for September 2007 ranged from 1.6 to 22.7 fish/h with an average (SD) of 12.8 (7.5). November CPUE estimates from previous research during a normal flow year ranged from 18.5 to 53.8 fish/h with an average of 35.6 (13.3). The CPUE estimates were significantly different ($p<0.01$) between years. Largemouth bass had an average length of 139.0 (8.9) in 2007 and 162.9 (23.3) in 2003. The lengths from September 2007 were modified to compare to November 2003 data. Length was significantly different ($p<0.01$) between years. Relative weight of largemouth bass was 100.3 (4.5) in 2007 and 103.8 (5.6) in 2003. Condition was not significantly different ($p=0.16$) between years. The unusual flow in 2007 appears to have decreased the fall CPUE estimates and might have caused slower growth in the YOY largemouth bass.

HARVESTABLE HYBRID STRIPED BASS STOCKING IN AN URBAN FISHING PROGRAM: FISHING SUCCESS, ANGLER ACCEPTANCE, AND INFLUENCE ON POND PREY COMMUNITIES

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The Arkansas Game and Fish Commission (AGFC) recently expanded its statewide Family and Community Fishing Program (FCFP) to include seasonal put-take stockings of hybrid striped bass (HSB; *Morone chrysops* x *M. saxatilis*). The goals were to provide a unique fishing opportunity for urban anglers and influence size structure of stunted bluegill *Lepomis macrochirus* through predation. This study examined fishing success, angler satisfaction, and HSB influence on pond prey communities during the first year of stocking. In October 2006, HSB were stocked at two densities in three ponds each. Three additional ponds did not receive HSB and served as reference ponds. Creel surveys were used to collect angler catch, effort, and satisfaction data. Electrofishing was conducted prior to stocking to assess bluegill size structure, and was repeated the following summer for comparison. Creel surveys showed highly variable effort, catch, and harvest of HSB. At least 51% of the HSB stocked were estimated to be caught within one month following stocking, with a harvest rate of 63%. Despite high initial removal of HSB, significant increases in bluegill size structure and condition were observed, suggesting HSB can be used to improve bluegill growth rates and maximum size while simultaneously diversifying urban fisheries.

OBSERVATIONS OF SPAWNING AND NURSERY HABITAT OF THE ALLIGATOR GAR, *ATRACTOSTEUS SPATULA*, IN THE FOURCHE LAFAVE RIVER, ARKANSAS

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The alligator gar, *Atractosteus spatula*, has declined throughout its range in the southern United States. Very little information is available on the reproductive biology of this large, riverine species in need of conservation. We documented spatial and temporal aspects of the alligator gar's reproductive ecology following the discovery of young-of-year individuals in the Fourche LaFave River system, a tributary of the Arkansas River. During spring and early summer of 2007, we determined the timing and location of alligator gar spawning events by sampling larvae with dip nets and seines, as well as, a direct spawning observation. Initially, we found evidence of two spawning events (late May and mid to late June) in two small, lowland tributaries of the Fourche LaFave River (West Fork Mill Creek and Lawson Creek). The spatial pattern of abundance of alligator gar larvae suggested spawning occurred primarily in tributaries as no larvae were collected in adjacent floodplain or main channel habitats. On the afternoon of June 17, we directly observed spawning in West Fork Mill Creek and subsequently monitored egg masses and early larval stages. Spawning events corresponded with an increase in river stage on the lower Fourche system due to back flooding from the Arkansas River when water temperatures ranged from approximately 22^{o}C to 25^{o}C. Flood waters receded during late July, and juvenile alligator gar (19.5 – 43 cm TL) isolated from the mainstem of the Fourche LaFave River were found in West Fork Mill Creek, Lawson Creek, and an additional tributary, Caney Creek. Currently, 92 alligator gar juveniles are involved in a mark-recapture study to examine condition, growth, and survival in disconnected tributaries. Our initial observations underscore the value of small, 1st-order tributaries as spawning and nursery habitat for alligator gar and highlight the importance of considering entire drainage networks in the conservation of large-river fishes.

MORTALITY OF SILKY SHARKS, *CARCHARHINUS FALCIFORMIS*, IN GULF OF MEXICO

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Estimates of total (*Z*), natural (*M*), and fishing mortalities were calculated for age-0 silky sharks, *Carcharhinus falciformis*, in the Gulf of Mexico. Total mortality estimates of 0.94 and 1.01 were based on catch curve analysis of data collected during fishery-independent bottom longline surveys conducted from 1995-2006. Several indirect age-dependent methods of calculating *M* were employed and resulted in estimates ranging from 0.29-0.54 (mean = 0.39, S.D. = 0.09). Fishing mortality estimates ranged from 0.40 to 0.81 (mean = 0.63, S.D. = 0.12). It was concluded that bycatch mortality was primarily responsible for the high *Z* of silky sharks and that reducing byctach mortality could be a significant measure in efforts to rebuild the silky shark stock in the Gulf of Mexico.

EFFECTS OF SEASON AND WIRE LEADER USE ON SHARK CATCH RATES OFF THE COAST OF THE SOUTHEASTERN UNITED STATES

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Recently, there has been intense debate concerning the reported decline of several shark species in the western North Atlantic Ocean and Gulf of Mexico, including populations of thresher (*Alopias* spp.), mako (*Isurus oxyrinchus*) white (*Carcharodon carcharias*), blue (*Prionace glauca*), tiger (*Galeocerdo cuvier*) and hammerhead (*Sphyrna* spp.) sharks. Based on comparisons between data collected during exploratory research cruises conducted in the 1950s to pelagic longline fishery observer data collected during the 1990s, it was widely reported that oceanic whitetip (*Carcharhinus longimanus*) and silky (*C. falciformis*) shark populations in the Gulf of Mexico have declined by 99.3 and 91.2%, respectively. A number of factors could have affected the conclusions of studies reporting dramatic declines in shark populations, including the use of limited data sets, omission of other potentially useful data sets, possible species misidentifications and temporal differences in soak times, fishing depths and gear configuration. The purpose of this presentation is to report on recent findings which suggest that 1) the change from wire to monofilament leaders in the commercial longline fishery is, at least in part, responsible for the magnitude of the estimated decline of some shark species in the western North Atlantic Ocean, 2) the inclusion of longline catch data collected during periods when certain shark species do not occur in specific regions heavily biased the catch-per-unit-effort estimates upon which reported declines were based, and 3) based on recent fishery-independent survey data, the decline in silky shark abundance in the Gulf of Mexico reported by Baum and Myers (2004) is overstated.

PRELIMINARY DATA SUGGEST NUTRIENT-REFERENCE LAKE SELECTION IN TWO ARKANSAS ECOREGIONS

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In 2006, the U.S. Geological Survey (USGS) began a cooperative study with the Arkansas Department of Environmental Quality (ADEQ) and U.S. Environmental Protection Agency (USEPA) Region VI to identify nutrient-reference lakes in four lake classifications previously established by ADEQ. Identifying lakes with reference water quality will facilitate future water-quality assessments for all lakes within each of these lake classifications. Three of the lake classifications are associated with the Mississippi Alluvial Plain (MAP) ecoregion--lowland reservoirs, reservoirs constructed on Crowleys Ridge, and oxbow lakes that are disconnected from the main stem of large rivers; and a fourth classification-- upland reservoirs--is associated with the South Central Plain (SCP) ecoregion. The combination of a multifaceted screening process (that utilized historical data, land use information, and aerial photography) and reconnaissance sampling was used to select two lakes from each classification for intensive sampling. Rodgers and Hamptons Reservoirs were selected as lowland reservoirs; Lake Austell and Bear Creek Lake were selected from Crowleys Ridge; Lake Grampus and Noble Lake (replaced by Lake Faulkner for the last six sampling events) were selected as oxbows, and Cox Creek Lake and Lower White Oak Lake were selected as SCP reservoirs. The USGS sampled water quality (nitrogen, phosphorus, carbon, and chlorophyll *a*, for example) at these lakes on nine occasions from December 2006 – October 2007, and collected dissolved oxygen (DO) data continuously for 48 hours in July and August 2007. Median total nitrogen (TN) and median total phosphorus (TP) concentrations measured in both lakes for each of the four classifications were comparable to results of other water quality constituents, and to results of the 48-hour DO study. Median TN and TP concentrations in Rodgers Reservoir [(0.93 and 0.086 milligrams/liter (mg/L)] were less than half the median concentrations for Hamptons Reservoir (1.71 and 0.242 mg/L). Median concentrations for TN and TP in Lake Austell were 0.48 and 0.026 mg/L compared to 1.06 and 0.042 mg/L in Bear Creek Lake. Median concentrations for TN and TP were 0.63 and 0.034 mg/L in Lake Grampus compared to 0.84 and 0.096 mg/L in Lake Faulkner (for the last six sampling events). Median concentrations for TN were slightly lower in Cox Creek Lake than in Lower White Oak Lake (0.49 mg/L compared to 0.62 mg/L) but were essentially the same for TP (0.046 and 0.049 mg/L). These preliminary data suggest that Rodgers Reservoir, Lake Austell, Lake Grampus, and Cox Creek Lake could be selected as reference lakes for the four lake classifications. Among these four lakes, lowest median concentrations for TN and TP were measured in Lake Austell (0.48 and 0.026 mg/L) while highest median TN and TP concentrations were measured in Rodgers Reservoir (0.93 and 0.086 mg/L).

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An Index of Biotic Integrity (IBI) was developed for streams in the Yazoo Delta based on seining data. Two phases of the study were completed: selection of metrics used in the IBI to describe fish assemblages referred to as a "pilot study," and merging of an extant database to calculate final IBI metric values. Five metrics were selected: number of species, total number of individuals collected, proportion of individuals classified as invertivores, number of intolerant species, and proportion of individuals classified as rheophlic. Data collected over a 15-year period were combined to calculate IBI scores. Four IBI's were developed for delta streams that incorporated waterbody size and flow status: large unregulated flowing, large unregulated non-flowing, small flowing, and small non-flowing. Separation of streams by flow status increased correlations of metrics with potential habitat stressors such as excessive sediment and low water. Impairment of streams in Yazoo Delta habitats is often associated with sluggish or non-flowing conditions, particularly during the low water period. IBI scores ranged from 7 to 24 with a maximum possible score of 25. Each IBI approximated a normal distribution with a median of 15 for all categories, but variance was higher for non-flowing streams. Results of this study will be used by the Mississippi Department of Environmental Quality to determine the degree of waterbody impairment and the need to develop Total Maximum Daily Loads for stressors on fish assemblages in the Yazoo Delta.

FISH FEEDING IN CHANGING HABITATS: EFFECTS OF INVASIVE MACROPHYTE ERADICATION

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Invasive species are taking a great toll on freshwater habitats, one of our most vulnerable and least understood ecosystems. A great number of lakes in the U.S. have been invaded by Eurasian watermilfoil, *Myriophyllum spicatum*, and there is an increasing pressure to manage this invasion to improve recreational lake use and restore native macrophytes. However, there are very few studies on the effects of invasive macrophyte eradication on the rest of the community. Feeding interactions are particularly sensitive to changes in habitat complexity. This study was designed to determine whether changes in underwater habitat due to watermilfoil eradication have long-term effects on fish feeding. In a unique sampling strategy utilizing popnets, plant, invertebrate, and fish data were collected simultaneously from the same quadrants. We looked at stomach fullness and niche width as a function of invasive and total plant abundance and conducted multivariate analysis of bluegill, *Lepomis macrochirus*, feeding selectivity in the context of changing plant communities. Degree of stomach fullness did not correlate with the proportion of invasive plants. Bluegill in exhibited high selectivity for Diptera and their preferences varied little in the different plant habitats. There were differences in bluegill niche width among the lakes but these differences were not consistent with invasive plant control. Overall, the components of fish feeding studied were minimally affected by Eurasian watermilfoil eradication.

TANK PRODUCTI0N OF SUNSHINE BASS FINGERLINGS USING *ARTEMIA* FROM MICROCYSTS

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Protocols for culture of sunshine bass larvae to fingerling size in tanks involve an initial feeding of rotifers before larvae are weaned to *Artemia* nauplii and prepared feed. Maintaining rotifer cultures requires space, time, equipment, supplies, and trained culturists. The rotifer cultures are often unstable, which increases risk of poor sunshine bass fingerling production in tanks. Elimination of the use of rotifers would greatly enhance the feasibility of reliable tank culture of fingerlings and should reduce production cost. This experiment was comprised of three treatments with three replicates per treatment. In one treatment, larvae were initially fed rotifers (*Brachionus plicatilis*) and then weaned to *Artemia* nauplii (0.48 mm X 0.19 mm). In a second treatment, larvae were fed *Artemia* nauplii throughout the experiment. In a third treatment, larvae were fed microcyst *Artemia* nauplii (0.43 mm X 0.18 mm) for the entire experiment. Sunshine bass larvae, 4 dph, were stocked into 100-L tanks at 75 larvae/L. Larvae were fed according to the three treatments until 14 dph. Only 4.3% of the larvae fed *Artemia* nauplii survived. Survival was significantly higher for larvae fed microcyst *Artemia* nauplii and larvae fed rotifers and *Artemia* nauplii (37.9% and 93.6%, respectively). Larvae fed microcyst Artemia nauplii (7.26 mm SL) and larvae fed rotifers and *Artemia* nauplii (7.13 mm SL) were significantly longer than larvae fed *Artemia* nauplii (6.86 mm SL). This experiment is the first time that sunshine bass have been cultured to 14 dph on *Artemia* nauplii without rotifers at first feeding.

HABITAT CHARACTERIZATION AND DISTRIBUTION OF THE SALTMARSH TOPMINNOW (*FUNDULUS JENKINSI*) ALONG THE NORTHERN GULF OF MEXICO

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The saltmarsh topminnow, *Fundulus jenkinsi*, is a resident of *Spartina* marshes along the northern Gulf of Mexico (nGOM) but due to a lack of information on its abundance, distribution and habitat, it has been categorized (state and federal) as a Species of Special Concern in coastal areas ranging from Texas to Florida. Development within these coastal areas leads to the loss of valuable saltmarshes that could negatively impact this species, which necessitates studying their habitat and developing a conservation plan. During three seasons (Spring, Summer, Fall, 2007), 1,080 Breder traps were fished from high to low tide along the marsh edge in Terrebonne Bay, LA, Grand Bay, MS, Weeks Bay, AL, and Apalachicola Bay, FL, with associated physical-chemical variables measured. *F. jenkinsi* was collected in all systems except Apalachicola Bay, which is apparently beyond its eastern range. Principal component analysis (PCA) was used to ordinate physical-chemical variables (temperature, salinity, dissolved oxygen, turbidity, plant stem density, water depth, and bank slope) into component I (temperature (+), dissolved oxygen (-), salinity (+) and water depth (+)) and component II (plant stem vegetation (+) and bank slope (+)), explaining 54.2% of the total variance. PCA showed that *F. jenkinsi* was caught more often in the spring with higher abundance than any other seasons. These environments reflected habitats with higher dissolved oxygen, low water temperature, low salinity, shallow water depth and bank slope, and less dense vegetation along the marsh edge. No regional differences could be interpreted between Terrebonne Bay and Grand Bay; however, PCA suggests that *F. jenkinsi* are more abundant in the Weeks Bay system. A stepwise multiple regression showed that environments characterized by higher temperature, salinity and water depth and with low dissolved oxygen was significantly correlated to the mean abundance of *F. jenkinsi* (R^2 = 0.264). Overall, seasonal changes were clearly observed in these habitats whereas no clear distinction among regions other than Weeks Bay could be shown. A second set of seasonal collections will be made in 2008 to continue to characterize *F. jenkinsi* habitats and its distribution in the nGOM to additional science-based data to support the development of a regional conservation plan.

QUANTIFYING NILE TILAPIA REPRODUCITON ACROSS A RANGE OF SALINITIES: HOW SALTY DO AQUATIC CHICKENS LIKE IT?

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Species introductions are considered one of the most pervasive threats to aquatic biodiversity worldwide. The life history strategies of the family Cichlidae make them ideal candidates for not only species introductions but also aquaculture. In Mississippi, for example, Nile tilapia *Oreochromis niloticus* is commonly produced in local aquaculture facilities and their escape has led to the their establishment in several coastal drainages. Though the species ability to overwinter at temperate latitudes has been the focal point for the majority of research, salinity can also have profound effects on the secondary production of this freshwater fish. In this study, sex-specific somatic and gonad production was quantified for Nile tilapia exposed for a minimum of 30 days to one of eight salinities (0 to 70 ppt; 10 ppt increments). Male tilapia grew equally well at salinities up to 50 ppt; however, gonad development did not differ among salinity treatments. Female tilapia, on the other hand, showed negative growth at salinities > 30 ppt. The gonadosomatic index (GSI), adjusted for body weight, decreased with increasing salinity and was significantly reduced above 20 ppt. Additionally, the production of vitellogenic oocytes (eggs ≥ 1mm diameter) was significantly reduced above 20 ppt. Our results suggest that Nile tilapia is not limited to inland rivers and streams and, in fact, appears capable of surviving and producing offspring in salinities that commonly occur in Mississippi estuaries.

DETERMINING WATERSHED CONDITION FOR AQUATIC VIABILITY AND CUMULATIVE EFFECTS OF THE SOUTH FORK SPRING RIVER, MISSOURI AND ARKANSAS.

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Habitat quality within a freshwater ecosystem is determined by activities within the watershed. Therefore, the influence of these activities upon habitats, or waterbodies, can be described to determine the condition of the habitat. The objectives of this project were to determine watershed condition of the South Fork Spring River, Missouri and Arkansas, by examining the physical and anthropogenic interactions on aquatic habitats within the watershed by 1) using DEMs to delineate the watershed, 2) using 2002 National Land-use Classification Data, 3) determining sediment values with WEPP: road model, and 4) examining the relationship between stream fish and freshwater mussel assemblages with the sediment load modeled from the watershed land cover. Nine sites within the watershed were divided into sub-watersheds that ranged in size from 13,659 acres to 200,546 acres for site 1 and 9, respectively. Total sediment delivery to the stream for current conditions to each site was estimated to range from 3,533 tons/yr to 15,504 tons/yr. Total sediment delivery into the stream decreased from 13% to 5% moving downstream as total area increased. As determined by Terrell et al. (1996), 6 out of 13 variables tested for fish life history characteristics displayed a wedge-pattern. Seventeen out of 24 variables for freshwater mussel life history characteristics displayed a wedge-pattern. Risk levels were determined based on wedge shaped relationships. Based on these datasets, streams in the Ozark Highland ecoregion, such as the South Fork Spring River, are considered high risk for an adverse biotic response to sediment increases.

A COMPARISON OF CRAPPIE FISHING METHODS ON MISSISSIPPI FLOOD CONTROL RESERVOIRS: MANAGEMENT IMPLICATIONS

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There has been an increasing trend in recent years in the proportion of crappie anglers fishing by trolling on Mississippi's flood control reservoirs. Perceived harvest inequities have precipitated several petitions and/or political pressure from single pole anglers calling for MDWFP to ban or regulate trolling. To obtain data suitable to support or refute such actions, crappie anglers were identified as single pole (pole) or multiple pole (troll) fishing while they were interviewed during routine roving creel surveys on Enid, Grenada, and Sardis Lakes. Additionally, the total number of poles fished was recorded on Sardis Lake. Statistical analyses indicated party size was similar between the two groups. The proportions of the two groups varied seasonally and similarly on all lakes; pole anglers predominated in spring, and troll anglers predominated in summer and fall. CPE varied from lake to lake, but trolling CPE was constantly higher on all lakes. CPE also varied seasonally, but the differences between the two methods were consistent over months. Crappie CPE declined with party size for both groups, but trollers were more efficient at larger party sizes. Crappie CPE was directly related to the number of poles fished per person. We modeled different levels of trolling and potential pole limits to prognosticate likely effects on exploitation.

HYDROLOGICAL CONNECTIVITY INDEX FOR ALLUVIAL LAKES ON MINIMAL TOPOGRAPHIC FLOODPLAIN

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Connectivity between river and adjacent floodplain lakes has often been cited as a major factor affecting fish assemblages. However, it is often difficult to measure hydrological connectivity in floodplains where topographic relief is minimal, and therefore difficult to pinpoint where and when connection occurs. We developed a qualitative and a quantitative index of connectivity with variables readily available from aerial photography. The qualitative index separated connectivity into classes by roughly dividing the lakes into three groups (no, intermittent, and direct connection), based on distance from river, existence of levee, field observations, and personal communications with landowner. The qualitative index was created by combining information about water course distance, area of neighboring water bodies, and type of inlet/outlet. Validity of these indexes was assessed in 17 floodplain lakes of the Yazoo River Basin in Mississippi by measuring correlation with fish assemblage structure. In a direct gradient analysis, the quantitative connectivity index had higher correlations with fish assemblages than the qualitative index. Riverine species such as smallmouth buffalo had strong direct correlation with the connectivity indexes and lacustrine species represented by bluegill had inverse relationships with the indexes.

THE EFFECTS OF LARGEMOUTH BASS VIRUS ON A QUALITY LARGEMOUTH BASS POPULATION IN ARKANSAS

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A 22.4-ha impoundment experienced an outbreak of largemouth bass virus (LMBV) in the summer of 2006. All dead or moribund largemouth bass throughout the entire event were documented and removed. This study estimated percentage of largemouth bass lost, and examined size distribution, condition, and biomass following the epizootic. Boat-mounted electrofishing was used to collect largemouth bass for a mark-recapture population estimate and other population metrics, and a sample of fish were necropsied and examined for evidence of LMBV, parasites, other infectious diseases, and physical abnormalities. Cell cultures from moribund bass developed cytopathic effects typical of LMBV and PCR confirmed the presence of the LMBV genome. The stock-size largemouth bass population was estimated to be 2,301 ± 528 fish (103 bass/ha). The total observed mortality during the LMBV outbreak was 176 largemouth bass (7% of the initial population). The total biomass was estimated as 1,592 kg of stock-size bass, or a relative biomass of 71.5 kg of stock-size largemouth bass/ha. Largemouth bass *RSD-Q*, or the proportion of quality-size fish (≥300 mm) to stock-size fish (≥200 mm), was 79%, and the proportion of preferred-size (≥380 mm) to stock-size largemouth bass (*RSD-P*) was 36%, yet only 2% were memorable-size (≥510 mm) or larger. Relative weight of largemouth bass was unusually variable, ranging 32-117 with a number of fish demonstrating W_r values less than 60. All fish in poor condition that were examined had damage to the jaw, gills, or stomach most likely attributable to hooking injuries. These results demonstrate that largemouth bass abundance and biomass in the reservoir remained very high despite mortalities attributed to LMBV outbreak, but the largest size classes may have been reduced.

EVALUATION OF BYCATCH REDUCTION DEVICES IN THE GULF OF MEXICO SHRIMP FISHERY.

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We collected basic fish behavior information and applied those data to the problem of fish bycatch in the Gulf of Mexico shrimp fishery. The ratio of bycatch to shrimp captured in the Gulf fishery is about 4.56. A bycatch reduction device that significantly reduces that ratio is sorely needed. Additionally, shrimp trawling results in the capture of many juvenile red snapper, *Lutjanus campechanus* and may have contributed to the decline of that fishery. In laboratory studies, we found that red snapper exhibit a strong optomotor response (the tendency of fish to follow a moving pattern), are negatively phototactic, and are very sensitive to changes in flow pattern. We therefore designed several bycatch reduction devices in an attempt to exploit these behaviors. These devices were tested aboard the commercial shrimp vessel *The Simple Man,* fishing in the northern Gulf of Mexico. Paired trawling provided a control and a treatment with every trawl. The nested cylinder bycatch reduction device (NCBRD) has been shown to be the most effective to date, reducing total fish bycatch by about 50% with shrimp loss as low as about XX%. When Cylaume lights were placed on the NCBRD, we observed an increase in the reduction of red snapper bycatch, but not overall bycatch reduction.

TEMPORAL PATTERNS OF DEVELOPMENT IN SOUTHERN BROOK LAMPREY (ICHTHYOMYZON GAGEI) IN CADRON CREEK, ARKANSAS

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Lampreys are one of the few living representatives of the ancient jawless fishes. Of the four species in Arkansas, three are nonparasitic, including Southern Brook Lamprey, *Ichthyomyzon gagei*. *Ichthyomyzon gagei* live for approximately 51 months and have a distinct larval and adult period. Subsequent to spawning, adults die due to loss of the digestive tract that occurs during adult transformation. Specimens were collected from September 2004 through April 2006 with a backpack electrofisher. We measured total body length, eye diameter and weight of the digestive tract, gonads, fat, and total body. Eye diameter increased significantly throughout the collection period in both metamorphosing and non-metamorphosing individuals. Metamorphosing individuals developed a significantly larger eye compared to non-metamorphosing individuals. Gonadal development began in November and gonadosomatic index (GSI) peaked in January and remained high through February. In metamorphosing individuals GSI was negatively correlated with both visceral fat ($r = -0.73$, $P < 0.001$) and digestive somatic index ($r = -0.72$, $P < 0.001$). Digestive tract mass of metamorphosing specimens decreased sharply during early (September to November) metamorphosis to a nonfunctional remnant and feeding ceased. As a result, energy stored as fat is utilized for the large energy requirements of gonad development. Based on our data, use of digestive somatic index may provide a mechanism for detecting transformers at an earlier date than previous studies. Due to the imperiled status of several lamprey species, species determination at the ammocete phase is critical to understanding and protecting these species

EFFECT OF FRY STOCKING DENSITY ON THE PRODUCTION OF ROSY RED FATHEAD MINNOWS IN POOLS

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The fathead minnow is widely cultured as a bait, forage and feeder fish, with farm-gate sales of $9.85 million in 2005. Fathead minnows are typically produced using the spawning-rearing pond method, which provides little control over fish sizes. New indoor hatchery methods now provide fathead minnow fry for stocking. This study was conducted to examine the relationship through regression analysis between initial fry or final fish densities and production parameters. Rosy red fathead minnow fry (1-3 d) were obtained from jar hatching of sodium sulfite-removed eggs and stocked volumetrically at densities of 292; 1,168; 2,044; 2,920 and 3,796 fry/pool in 10, 5.9 m^2 continuously aerated, plastic-lined pools. Stocking rates were equivalent to 0.49 – 6.42 million fry/ha. Fish were fed daily with a prepared minnow feed, sampled at 3-week intervals, and harvested after 81 days. Survival ranged from 19.7 to 57.7% and did not differ significantly among densities. Mean fish weight per pool decreased logarithmically with final fish density (R^2 = 0.953).Yield generally increased with initial stocking density (Power function, R^2 = 0.846). While results from pool studies should be extrapolated with caution, at stocking densities equivalent to 2.0 million fry/ha and above, yields were in the range of 1,000 to 1,500 kg/ha. These results suggest that large quantities of small fathead minnows can be produced by stocking of fry. However, the economics of this alternate culture system remain in question.

EFFECT OF TURTLE EXCLUDER DEVICES (TEDS) ON COMMERCIAL CATCH OF BLUE CRABS *CALLINECTES SAPIDUS* IN MISSISSIPPI

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Bycatch of diamondback terrapins in traps has been a concern in all states harvesting blue crabs. Fishery dependent studies on the effectiveness of bycatch reduction devices in reducing terrapin mortality and the effect of these devices on harvest of blue crabs are limited. In this study, the effect of Turtle Excluder Devices (TEDs) on the commercial catch of blue crabs, *Callinectes sapidus*, in Mississippi was examined. Commercial crab traps were equipped with a 2 x 6 inch rectangle of stiff wire attached to each access funnel in the trap. Traps with TEDs were randomly mixed with standard crab traps in the trap lines of three cooperating fishermen. Project personnel accompanied fishermen on trips every other week to collect biological data on harvested crabs and catch information. Current data cover the period May to December 2007. Mean carapace width of crabs collected in standard traps was 146.4 mm; mean carapace width of crabs collected in traps with TEDs was 150.5 mm. On average, the TED traps collected fewer non-harvestable crabs (ovigerous females and sublegal crabs) than did standard traps; however, these differences were not statistically significant. Catch per unit effort (CPUE) was calculated as crabs·trap^{-1}·day^{-1}. Overall CPUE for standard traps was 7.39, whereas overall CPUE for TED traps was 7.18. Catch per unit effort of legally harvestable crabs was 5.20 in standard traps and 5.19 in traps with TEDs. There was no significant difference between the CPUE in standard traps and traps modified with TEDs.

THE STATUS OF MISSISSIPPI FISHERY RESOURCES AND FISHERIES RESEARCH TWO YEARS FOLLOWING HURRICANE KATRINA

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Hurricane Katrina dealt a devastating blow to the Gulf Coast with all segments of coastal fisheries severely impacted. Commercial harvesting and processing sectors suffered heavy loss of vessels and plant capacity, respectively. Most of the recreational fisheries infrastructure (bait, tackle shops, boats, repair and maintenance shops, etc.) were essentially destroyed, and few have recovered. Loss of commercial and recreational fishing activities resulted in a catastrophic loss of income to the coastal economy. Impacts to biological resources varied, but most have recovered. The oyster fishery, however, was decimated and restoration of productive reefs in the western Mississippi Sound is underway. Limited oyster harvest began during the winter of 2007-2008. To date, overall assessments of water quality have shown few problems in coastal waters. All fisheries research and management organizations on the Mississippi coast were severely impacted by the storm. The University of Southern Mississippi's Gulf Coast Research Laboratory (GCRL) was so heavily damaged by the storm's high winds and 25-foot tidal surge that the replacement cost of destroyed infrastructure was estimated to exceed $35 million. About 65 of the 200 staff and faculty, as well as 17 graduate students, were displaced from their offices, labs or other facilities. Many GCRL employees lost historical data and/or professional materials, some of which date back 40 years. Facilities of the Mississippi Department of Marine Resources (MDMR) in Biloxi and the NOAA National Marine Fisheries Service Laboratories in Pascagoula were totally destroyed, and the offices housing the Mississippi Department of Environmental Quality (MDEQ) were uninhabitable. Research personnel from those agencies were forced to move into trailers. Colleagues at the Grand Bay NERR site lost their offices, external buildings, and considerable equipment. Within one week of the storm, personnel from GCRL, MDMR, and MDEQ combined forces and pooled available equipment to initiate post-hurricane resource assessments along the coast. As of the beginning of 2008, coastal fisheries research facilities and programs are, for the most part, back on line, although, as with some of the coastal fisheries resources, full recovery may be years away.

HABITAT PREFERENCES OF THE STARGAZING DARTER *PERCINA URANIDEA* AND GENETIC COMPARISON OF DISJUNCT AND CONJUNCT POPULATIONS

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The distribution of the stargazing darter *Percina uranidea*, a member of subgenus Imostoma, is disjunct with populations in the White and Ouachita River systems of Arkansas, Missouri and Louisiana. The bulk of the distribution occurs in Arkansas. Published information on this species is limited to morphology, general distribution, general habitat and feeding habits. The stargazing darter is currently listed as a species of lower risk near threatened on the IUCN Red List of Endangered Species even though the conservation status of the species has never been verified. This study has been designed to establish microhabitat preferences, possible benthic fish species associations, relative abundance and current distribution of stargazing darters. Distribution and density information will help determine if greater protection for the species is warranted. This study also focuses on the genetics of the species to determine if distinct populations can be discerned within the same river system and between the river systems. This information will help determine whether the current populations should be treated as a single population, management units or evolutionary significant units.

PROGRESS IN THE RESTORATION EFFORTS OF MISSISSIPPI'S ARTIFICIAL REEF HABITAT

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Mississippi has fifteen permitted offshore reefs which encompass approximately 6475 hectares of water bottom. These reefs range in size from 1.2 hectares to 4047 hectares. In addition to its offshore sites, Mississippi also has 44 permitted inshore reef sites that encompass approximately 162 hectares of water bottom. These inshore reefs range in size from 2 to 8 hectares. On August 29, 2005 Mississippi was hit by Hurricane Katrina. The effects on Mississippi's artificial reefs were extensive. It is estimated that 80 to 90 percent of material deployments inshore and offshore were scoured and buried and no longer function as reef habitat. Utilizing funds from the Emergency Disaster Recovery Program (EDRP), Mississippi Department of Marine Resources embarked on a 5 year restoration project of its inshore and offshore artificial reefs. The inshore reef development portion of this project began with deployments around accessible fishing piers for Mississippi's shore fishermen. Materials used were crushed concrete, limestone, and oyster shell. An average of 688 m^3 was deployed around twelve public piers. This amount varied with the size of each pier. In addition to reef development around piers, 14 low profile fishing reefs accessible to both wade fishermen and small boat owners were created along Mississippi's coast. An averaged 688 m^3 of material was also used to develop these reefs. The offshore reef development portion of this project has utilized 846 individual items, deployed on three offshore sites (FH-1, FH-2, & FH-13). The three types of materials deployed were concrete culverts (600), steel hull vessels (6), and "Florida Limestone" pyramid reefs (240). The next four years' activities will include more deployments, assessment, and monitoring to ensure stability, durability and biological effectiveness.

LAKE NORFORK CREEL SURVEY - A NEW WAY TO OBTAIN PRESSURE ESTIMATES AT NIGHT

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Previous creel surveys conducted by the Arkansas Game and Fish Commission and other agencies on large water bodies have largely been limited to day-time creels. While angler interviews can easily be conducted at night resulting in useful data, obtaining estimates of pressure (angling Hrs/Ha) and parameters such as catch and harvest requiring those estimates is more difficult. Unless the water body has one access point where all users can be counted, pressure counts are usually obtained by flying the entire water body to count the anglers. Since this can only be done during daylight, previous estimates of fishing pressure, catch and harvest generally apply to daylight hours only. In this study, we used night vision equipment to count the anglers on Norfork Lake at night to supplement pressure data obtained in day-time from flights. The 3-year study ran from December 1, 2003 to Nov. 30, 2006. Anglers were interviewed on 4 randomly selected days and 4 nights monthly on each of the 4 lake sections. Questions asked included starting and ending times, species targeted, tournament participation, fishing methods, use of AG&FC tree piles, and others. Fish harvested were identified and measured, and anglers were asked to estimate size and number of each fish released. Harvested striped bass and hybrid stripers were also weighed. The entire lake was flown 8 times per month during daytime on randomly selected dates and starting times. All fishing boats, boat anglers, scuba parties and bank anglers observed were counted. At night during each interview period, the creel clerk traveled the lake using night vision equipment to count boats and bank anglers within that lake section. During the creel survey we interviewed 3016 parties containing 5640 anglers. Of these, 1255 parties containing 2377 anglers were interviewed at night. Norfork Reservoir received approximately 67.1 Hrs/Ha of angling pressure of which 21% was at night. Anglers caught 55.3 fish/Ha./year. They harvested 16.4 fish weighing 13.2 Kg./Ha. Had the creel survey been limited to daytime only, the creel survey would have overestimated the proportion of the angling directed at crappie and striped bass while greatly underestimating angling directed at walleye, catfish, sunfish and, in normal years, white bass. In the daytime, walleye and catfishing made up 3.7% and 3.4% of all targeted trips but at night those species made up 9.3 and 10.3% of fishing trips respectively. White bass were more often sought at night during years with enough inflow for a spawning run (largely a night fishery) up the tributary streams (10.3% vs. 4.7% day). However, they were more often sought during the day in 2005 when extreme low inflow virtually eliminated the spawning run (14.7%Vs.7.0%) which also masked any significant difference between day and night for white bass when combining the entire 3 years of data. Surprisingly, sunfish too were more often sought at night (1.4% day vs. 5.6% at night) however so few anglers sought sunfish that this number may be an artifact of those low numbers and the same angler being interviewed several times.

FIELD MEASUREMENT OF CATFISH HATCHERY AND FRY POND pH AND THE IMPLICATIONS FOR FRY SURVIVAL

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Recent research has shown that channel catfish fry survival may be influenced by the change in pH from lower to higher values at the time of stocking from the hatchery into ponds. To assess the implications of this research to hatchery management, pH was measured in commercial hatcheries and a variety of ponds into which fry are stocked during the 2007 hatchery season in Mississippi. Most commercial catfish hatcheries in Mississippi use ground water supplied from a deep aquifer. These wells range in depth from 200 to 400 meters deep in most cases. They are typically moderately alkaline 150-200 mg/l, and extremely soft with no iron. Calcium chloride is added to the incoming water by metered pumps to raise hardness from near zero to 50 mg/l. In the hatchery tanks and troughs containing 4-6 d post hatch fry, pH ranged from 7.2 to 8.6. Most commonly pH values were 7.4-7.9 in troughs containing 400-600 fry/l with water flow rates near 12 l/min. Values for pH in ponds prepared for receiving fry were commonly 7.8-8.2. However, when fry are loaded into transport tanks they commonly experience densities of 1700-2,000 fry/l for up to 30 minutes. In these tanks liquid oxygen is bubbled through porous ceramic diffusers to maintain adequate dissolved oxygen levels and having no water exchange the pH drops to 7.4 in most cases. Pond water added to the transport tank by small pump from the receiving pond is used to adjust temperature to near that of pond. Adjustment of pH by pumping pond water into the transport tank is difficult from as the densely loaded fry are constantly adding carbon dioxide to the water from respiration. Temperature adjustment is usually achieved in 10-15 minutes but pH may remain nearly unchanged. Stocking of fry into ponds with pH greater than 8.0 may result in mortalities. Ponds freshly filled with water from the shallow alluvial aquifer were more nearly the same pH as the transport tanks. Ponds with certain weed problems may be especially problematic as they had pH levels > 9.0.

OYSTER DENSITY, MARSH EDGE STABILITY, AND FAUNAL COMPOSITION OF SMALL NATURAL VERSUS CONSTRUCTED INTERTIDAL OYSTER REEFS IN THE NORTHERN GULF OF MEXICO

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Small intertidal oyster reefs enhance the sustainability of estuarine ecosystems in the northern Gulf of Mexico in several ways: (1) they increase habitat structure and complexity, (2) attract diverse faunal assemblages, and (3) stabilize the marsh edge by promoting sediment deposition and buffering wave energy. Much of the research addressing the loss or degradation of this unique habitat is concentrated on larger subtidal reefs; the limited data on small intertidal reefs indicates they serve a similar function. We evaluated the temporal changes in the faunal assemblage and physical characteristics of oyster reefs to determine a trajectory of oyster and faunal growth of constructed reefs. In 2006, prior to anticipated spat events, reefs (30.5mL x 1.8mW) were constructed of *Crassostrea virginica* cultch and paired with designated natural oyster reefs (> 91 m apart) in each of three subsystems (Bayou Cumbest, Crooked Bayou, North Rigolets) of the GB-NERR. Plastic sampling trays (48.3cm x 30.5cm x 11.4cm) filled with the same cultch were randomly interspersed within each constructed reef; samples with the same dimensions were collected from the paired natural reefs. Samples were quantified for faunal diversity and density and oyster density at each of three growth stages (spat, seedling and adult). In addition, changes in marsh edge behind the reefs were measured by recording the distance between upland and lowland stakes using a midline transect. Split-plot ANOVA was used to assess effects of treatment (natural vs. constructed) on oyster density and taxonomic richness over time (within subjects factors) and among bayou subsystem and habitat type (between subjects factors). Between subjects tests indicated spat and seedling oyster density and taxa richness were significantly higher in constructed reefs versus natural reefs, regardless of subsystem. As spat density declined over time in each subsystem, seedling density increased. Adult oysters were significantly more abundant in North Rigolets compared to other subsystems, with no statistical difference between the constructed and natural reefs within any subsystem. Adults in North Rigolets showed greater initial density in natural reefs, though the density in the constructed reefs eventually surpassed those of the natural over time. Marsh edge distance change showed marked seasonal fluctuations in advance and retreat.

STREAM WATER QUALITY IN THE MISSISSIPPI DELTA: RANKINGS BASED ON INDEX OF BIOTIC INTEGRITY SCORES AND LIMNOLOGICAL MEASUREMENTS

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The US Army Corp. of Engineers in conjunction with the Mississippi Department of Environmental Quality has worked to determine the quality of water in the streams of the Mississippi Delta region using an Index of Biotic Integrity (IBI) approach. This approach to water quality monitoring seeks to use information extracted from fish community composition and habitat parameters to provide an integrated and comprehensive picture of water quality that is reported to be superior to traditional grab samples analyzed for chemical water quality parameters. I have been working to collect water samples from a subset of these sampling sites and analyzing this water using traditional measures of water quality. These samples have been analyzed for a variety of chemical (Nitrite+Nitrate-Nitrogen, Ammonium-Nitrogen, Soluble Reactive Phosphorus, Oxygen, pH), biological measures (Total Coliform bacteria, Fecal Coliform bacteria, Chlorophyll a, Chemical Oxygen Demand), and physical measures (suspended sediments, temperature). I have compared these data sets in two different ways: evaluating the relative positioning of different streams when using different measures of “water quality” and examining correlations between IBI scores and quantitative measures of water quality. Taken together these approaches will help substantiate the value of the IBI approach and provide guidance for mitigation and restoration activities that likely would benefit these streams.

STATUS AND DISTRIBUTION OF WILLIAMS' CRAYFISH, *ORCONECTES WILLIAMSI*, IN ARKANSAS

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Orconectes williamsi is a rare stream-dwelling crayfish that is endemic to the upper White River basin of Arkansas and Missouri. This study surveyed a semi-random selection of stream sites in the Arkansas portion of this range in order to characterize the crayfish communities, identify co-occurring fishes, and evaluate the status of *O. williamsi* in Arkansas. Collections of a total of 2,372 individual crayfish specimens were made at 68 sites, including 197 *O. williamsi* from 23 sites. *O. meeki* was the crayfish species most commonly associated with *O. williamsi*, occurring at 87% of sites occupied by *O. williamsi*. The fish species most commonly encountered in streams with *O. williamsi*, were *Etheostoma spectabile, Campostoma anomalum*, and *Semotilus atromaculatus*. *O. williamsi* was found in the smallest streams sampled, with coarse substrates and no aquatic vegetation. It showed a strong preference for riffle habitats. It is our opinion that the species is somewhat imperiled in Arkansas, and should be considered rare and vulnerable range-wide.

FOOD HABITS OF SYMPATRIC SPOTTED (*LEPISOSTEUS OCULATUS*) AND SHORTNOSE (*LEPISOSTEUS PLATOSTOMUS*) GAR DURING FLOODING OF AN ARKANSAS RIVER TRIBUTARY

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Gars are generally thought to be avid predators, predominantly feeding on fishes, and to a lesser extent, invertebrates. Though southern river systems typically contain multiple gar species, few studies have examined feeding characteristics of sympatric populations. Further, little information exists on food resources of shortnose gar *Lepisosteus platostomus* or how diet may vary among sexes. We report results of an initial examination of diet in shortnose gar and spotted gar *Lepisosteus oculatus* from the Fourche LaFave River in Arkansas. Stomachs were dissected and examined from 74 adult spotted gar (46 - 81 cm TL) and 91 adult shortnose gar (49 - 76 cm TL) collected during May to July 2007, corresponding to back-flooding from the Arkansas River. Forty-seven (64%) spotted gar and 54 (59%) shortnose gar contained identifiable prey items. Considering frequency of occurrence, important food resources of spotted gar were fish (74%), crayfish (26%), aquatic insects (11%), and terrestrial insects (9%). Similarly, fish (59%) was the most commonly occurring food item in shortnose gar, but they consumed aquatic (24%) and terrestrial (35%) insects more frequently than spotted gar. Additionally, shortnose gar utilized amphibians (17%) as prey. There was a trend for variation in diet due to sex in spotted gar, as females (n = 27) mostly contained fish, but males (n = 20) had a more diverse diet of fish, crayfish, and insects. No difference in diet was observed between male (n=32) and female (n=22) shortnose gar. Initial analyses suggest similar-sized, sympatric spotted gar and shortnose gar had different feeding habits where shortnose gar utilized a wider variety of prey, including both aquatic and terrestrial food resources. A more exclusive consumption of fish by female spotted gar may reflect variation in body size, activity-level, or habitat.

FISH ASSEMBLAGE RELATIONS TO DISSOLVED OXYGEN AT 35 SITES IN WEST GULF COASTAL PLAIN LOUISIANA STREAMS

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In the summer of 2007, during low flow conditions, the U.S. Geological Survey (USGS) sampled fish at 35 stream sites in the West Gulf Coastal Plain (WGCP) ecoregion of Louisiana. Sites were selected by the U.S. Environmental Protection Agency (USEPA) Region VI using a probabilistic sampling design. USEPA suspected that data collected for the chosen sampling sites would indicate a range of ecological conditions. Therefore, prior to this study five in that domain were selected as reference sites. The study was initiated to assess between fish assemblage relation to dissolved oxygen, and to provide information that could be used to validate or refine existing aquatic life use categories and water-quality criteria for streams in the WGCP ecoregion. Fish were collected by electrofishing and seining and were identified to species. Concurrent with fish sampling, dissolved oxygen, pH, specific conductivity, temperature and turbidity were monitored, and dissolved oxygen metrics (such as hourly change, minimum, maximum, and median.) for late summer, low-flow conditions were calculated. Measured dissolved oxygen values ranged from 0.16 milligrams per litter to 12.01 mg/L. Average hourly changes in dissolved-oxygen concentration ranged from 0.04 mg/L to 1.36 milligrams per litter. Sites were divided into three categories; low (less than 3.0 mg/L), medium (3.0 mg/L to less than 5.0 mg/L), and high (5.0 mg/L and greater) based on median dissolved-oxygen concentration. A total of 74 species comprised of 9,509 individuals was collected. Five species, bluegill (*Lepomis macrochirus*), western mosquito fish (*Gambusia affinis*), longear sunfish (*Lepomis megalotis*), green sunfish (*Lepomis cyanellus*), and warmouth (*Lepomis gulosus*), represented approximately 60 percent of the total abundance. Species richness increased relative to dissolved-oxygen concentration; 45 species were collected at sites in the “low dissolved oxygen” category of which 37 percent were western mosquito fish (*Gambusia affinis*). Species richness at “medium” and “high” dissolved-oxygen category sites was 55 and 69 species, respectively, with bluegill (*Lepomis macrochirus*), being in the greatest abundance in both. Species found only at sites in the “high” dissolved-oxygen categories included: blacktail shiner (*Cyprinella venusta*), chestnut lamprey (*Ichthyomyzon castaneus*), creek chubsucker (*Erimyzon oblongus*), dusky darter (*Percina sciera*), flathead catfish (*Pylodictis olivaris*), ironcolor shiner (*Notropis chalybaeus*), logperch (*Percina caprodes*), longnose gar (*Lepisosteus osseus*), mimic shiner (*Notropis volucellus*), mud darter (*Etheostoma asprigene*), redfin shiner (*Lythrurus umbratilis*), scaly sand darter (*Ammocrypta vivax*), striped shiner (*Luxilus chrysocephalus*), and weed shiner (*Notropis texanus*).

DIETARY COMPOSITION OF BLUEGILL (*LEPOMIS MACROCHIRUS*) WITHIN CHANGING PLANT COMMUNITIES OF EURASIAN WATERMILFOIL (*MYRIOPHYLLUM SPICATUM L.)*

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Eurasian Watermilfoil (*Myriophyllum spicatum* L.) form dense stands that alter aquatic habitat and hinder native plant growth. Studies conducted using herbicide application to selectively remove these stands, have shown increase in native plant communities, creating heterogeneity in the littoral zone. Little is known how these changes in plant communities affect the diet of fish foraging. We evaluated the diets of Bluegill sunfish (*Lepomis macrochirus*) from two Minnesota lakes selected for having 80% coverage of Eurasian Watermilfoil. A low-dose endothall/2, -D treatment was applied to the two lakes and used as an experimental manipulation to shift the plant composition. Pre-treatment data were collected in 2003 and post-treatment data in 2004. Bluegills were sampled in the summer during (June) and autumn (September) using electro-fishing. Transects were conducted within the littoral zone to collect fish, and 20 bluegill were randomly taken from these samples for diet analysis. The bluegill were preserved and transported to the lab were the stomach contents were analyzed. All macroinvertebrates were identified to taxonomic order. Dietary compositions were compared before and after herbicide application, and among abundance level (stem densities) of Eurasian watermilfoil and native plants. Our results illustrate differences in the diets and potential preferences of prey by bluegill during a shift from a dominant exotic/invasive plant to a more diverse plant community.

THE USE OF BIOTIC AND HABITAT INDICIES AS INDICATORS OF FRESHWATER MUSSEL HABITAT IN THE TYRONZA RIVER, ARKANSAS

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The Tyronza River, Arkansas has been designated by the Arkansas Department of Environmental Quality as a channel altered stream for the Mississippi Alluvial Valley - Delta Ecoregion. The Tyronza River has been suggested as a candidate for habitat restoration and a potential refuge for the endangered fat pocketbook mussel, *Potamilus capax*. The objectives of this study were to: 1) complete a qualitative mussel survey of the entire river to obtain species distribution, relative abundance, and catch per unit of effort (CPUE) data; 2) quantitatively sample nine mussel assemblages based on the qualitative survey results; 3) assess habitat and water quality using USEPA protocols for fish and aquatic macroinvertebrates; 4) characterize stream habitat using the Basin Area Stream Survey; and 5) analyze cumulative watershed effects. A total of 70.4 river km of the Tyronza River were surveyed during autumn 2006 and spring 2007 resulting in 363 sample sites and a total of 33 species being observed, 8 of which were only collected as relic shells. Quantitative sampling resulted in 25 live species, 2 of which were not present in the qualitative survey, *Toxolasma lividus* and *T. parvus*. Mean densities per site ranged from 1.0 to 1.9 mussels / m^2 with an overall mean of 1.4 mussels / m^2 (± 0.3 SD). The results of this study will aid in the development of a Habitat Restoration Plan (HRP), which is essential information for updating of the 1989 US Fish and Wildlife Service recovery plan for *P. capax.*

FISH ASSEMBLAGES ON GRAVEL BARS IN THE ARKANSAS RIVER

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Gravel bars are utilized by various fish species during different life history stages and during different seasons, providing sites for spawning, feeding, and refuge. We examined temporal and spatial variability of fish assemblages on gravel bars in the Arkansas River. Surveys were conducted to identify gravel bars in Pools 7-12 of the Arkansas River. Gravel bars were stratified by depth (deep or shallow) and distance from an upstream lock and dam (0-3, 3-6, or 6-9 nm downstream). Three gravel bars were randomly selected from each strata. Fish assemblages on each gravel bar were sampled three times from August to November 2007. Each sample consisted of duplicate trawls with a 3-m Herzog Armadillo trawl. Sampling will continue through July of 2008. Water quality (temperature, dissolved oxygen, pH, conductivity, chlorophyll, salinity, and surface velocity) and substrate samples were collected on each gravel bar in conjunction with fish samples. Preliminary results indicate that gravel bar habitat in the Arkansas River is primarily utilized by ictalurids, centrarchids, cyprinids, and percids. The five most abundant fish species were blue catfish, channel catfish, silver chub, bluegill, and river darter. Fish species richness was significantly different between shallow and deep gravel bars ($P< 0.0001$). Shallow gravel bars (<4 m) had approximately two times the number of species than did the deep gravel bars. Fish species richness was also significantly different ($P = 0.0002$) between the summer (August - September) and fall (October - November). The summer had less than half the number of species than in the fall. While richness was not significantly different ($P =0.1406$) among the distance categories (0-3, 3-6, and 6-9 nm from the upstream dam), there was a decrease with increasing distance from the dam. Relative abundance for the three most abundant species was analyzed for differences among depths, distance strata, or seasons. There were no differences in relative abundance among depths ($P = 0.7930$), distance strata ($P = 0.4905$), or seasons ($P = 0.5578$) for blue catfish. There were no differences in relative abundance among depths ($P = 0.8758$), distance strata ($P = 0.0694$), or seasons ($P = 0.8189$) for channel catfish. There were differences in relative abundance among depths ($P <0.0001$), distance strata ($P = 0.0005$), and seasons ($P < 0.0001$) for silver chub. Shallow gravel bars had a higher silver chub relative abundance than did deep gravel bars. There was a decrease in silver chub relative abundance with increasing distance from the dam, and silver chub relative abundance was higher in the fall than in the summer.

POSTER PRESENTATIONS

POPULATION ECOLOGY OF GROTTO SCULPIN (*COTTUS CAROLINAE*) IN CAVE AND RESURGENCE STREAMS

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Grotto sculpin are a unique population of banded sculpin (*Cottus carolinae*), endemic to cave systems underlying Perry County, Missouri. These troglomorphic fish are currently listed as state threatened in Missouri and a federal endangered species candidate. Given the paucity of comprehensive studies of non-game fishes worldwide, particularly benthic species, combined with the unstable nature of the cave environment, collection of baseline data are crucial to examine population ecology and ensure survival of grotto sculpin. Grotto sculpin are highly susceptible to pollution via suspected agricultural and waste runoff, so the goal of this study was to examine recolonization potential in the event of a catastrophic event (e.g., contaminant spill) in two cave populations and their corresponding resurgence streams. Cave sites were divided into 10 m sections and individual fish tagged using unique elastomer combinations every four to eight weeks beginning August 2005. Presence of adult grotto sculpin remained consistent throughout sampling for the two cave locations. In resurgence streams, however, there was a marked decline of adults in late winter (January-March) and a peak in abundance of young-of-year in May, which corresponded to the presence of larval sculpin drifting from resurgence springs. This late winter decline in adults may coincide with the subterranean movement of adult fish for reproduction. Approximately 90% of individuals in cave populations moved less than 50 meters between sampling intervals. Based on our data, the relatively sedentary nature of the grotto sculpin may limit their ability to recolonize habitats. Population estimates, growth patterns, and movement detail will also be discussed.

MISSISSIPPI DERELICT TRAP REMOVAL PROGRAM

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The wire crab trap dramatically changed the Gulf of Mexico blue crab fishery. While adoption of the crab trap had a positive impact on fishing efficiency and harvest, their proliferation has resulted in an increase in the problems associated with lost or discarded traps. Derelict traps result from abandonment and inadvertent loss of actively fished gear. These traps contribute to the mortality of blue crabs and other bycatch, exacerbate user group conflicts, create visual pollution, damage sensitive habitats, and can be navigational hazards. Conservative estimates of trap loss for the Gulf of Mexico approach 250,000 traps per year. In 2000, the Mississippi Department of Marine Resources (MDMR) in cooperation with the Gulf Coast Research Laboratory (GCRL) began a program to address derelict traps in Mississippi waters. Coastal waters were surveyed by air and boat to locate areas of dense trap concentrations. Initial efforts were limited to agency personnel from the MDMR and GCRL and focused on accurate recording of trap location and condition. Identification and enumeration of bycatch species was also recorded. This provided a scientific base of information that could be used to evaluate impact on natural resources. Removal programs in 2000 and 2001 focused on shallow waters and targeted traps visible on winter low tides and onshore. In 2003 and 2004 the MDMR and GCRL held volunteer-based retrieval programs. No programs were held in the two years following hurricane Katrina (2005 and 2006). In 2007, monies from a hurricane Katrina recovery grant were used to fund a retrieval program using commercial crab and shrimp fishermen to collect derelict traps. These two programs removed over 11,000 traps from state waters. To date, over 16,000 traps have been removed from Mississippi waters.

THE EFFECTS OF HIGHWAY CONSTRUCTION ON THE ICHTHYOFAUNA OF OATS CREEK NEAR BRADFORD, WHITE COUNTY, ARKANSAS

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From June 1983 to July 1987, the Arkansas Highway and Transportation Department built the segment of U. S. Highway 67, a four lane highway on new alignment, through the White River floodplain associated with the Oats Creek wetland complex. As part of the Section 404 permit process and a larger study of ecosystem level impacts, AHTD biologists were required to document fish species richness and abundance in the wetland prior to, during, and after highway construction. From February 1981 to June 1990, a total of 91seine and gill net samples were collected on a monthly basis (when water levels allowed) from immediately upstream and downstream of the new highway right of way. Initial identifications and enumerations were conducted by the AHTD during the sampling period. We re-identified, re-enumerated preserved fish in the collections and measured fish for length, width and mass and analyzed the data to determine if there were changes to the fish community during or following construction.

DEFINING ESSENTIAL HABITAT FOR POST-SETTLEMENT JUVENILE BLUE CRABS IN MISSISSIPPI BAYOUS UTILIZING FOUR TYPES OF SAMPLING GEAR

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Post-settlement biotic processes associated with predator/prey dynamics are thought to heavily influence juvenile blue crab survival and both structured and soft sediment habitats have been shown to provide important refuge. As part of a program to better define the physical and biotic components of juvenile blue crab habitat in Mississippi coastal waters, a study to determine effective sampling techniques for 12-60 mm juvenile blue crabs was conducted. Three Mississippi bayous were sampled at various depths and locations with four gear types: benthic sleds, trawls, seines, and minnow traps. Minnow traps were most effective for capturing juvenile blue crabs within the desired size range (mean, 32.6 mm). Benthic sleds and seines targeted smaller blue crab juveniles (mean, 10.8 and 8.9 mm, respectively). In general, larger juveniles and adult crabs were most common in trawls (mean,150.5 mm). Nearshore shallows adjacent to marsh were found to be important habitat for juveniles < 60 mm. Larger juveniles and adults preferred deeper, less structured habitats. Future sampling efforts should incorporate additional gear types including lined trawls and suction sampling to better refine density estimates.

PHYLOGENETIC ANALYSIS ON THE SPECIAL CONCERN MUSSEL SPECIES: SOUTHERN HICKORYNUT, *OBOVARIA JACKSONIANA* (FRIERSON 1912), AND OUACHITA CREEKSHELL, *VILLOSA ARKANSASENSIS* (LEA 1862)

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The special concern southern hickorynut, *Obovaria jacksoniana*, occurs in Missouri through southern portions of the Mississippi Interior Basin and from eastern Texas through western Alabama drainages. The Ouachita creekshell, *Villosa arkansasensis*, is difficult to differentiate from *O. jacksoniana* based on conchological characters. Since both species have been listed on conservation status, genetic divergences of both generic and species levels are important to for conservation. We used mitochondrial DNA sequences from the ND1 and COI genes for phylogenetic analysis. In addition to the 40 specimens of *O. jacksoniana* collected in Arkansas and Mississippi and the 21 specimens of *V. arkansasensis* collected in Arkansas, we also used published sequences for analysis. Phylogenetic analyses do not support monophyletic both genus of *Obovaria* and *Villosa* as both *O. jacksoniana* and *V. arkansasensis* occurred in same phylogenetic clade. Based on the phylogenetic analyses, there may be two genetic variations among *O. jacksoniana*, a population from east side of Mississippi River and population from west side of Mississippi River. These results suggest that species we call *V. arkansasensis* may be same species as *O. jacksoniana* and that the two populations of *O. jacksoniana* from east and west side of Mississippi River may be taxonomically distinct species.

PHYSICAL AND CHEMICAL ANALYSIS AND VARIABILITY OF MAMMOTH SPRINGS NATIONAL FISH HATCHERY STOCK PONDS

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The goal of this project was to determine the physic-chemical variability of each pond in order to provide a greater understanding of the variability of each pond in relation to its stocking history in order for hatchery personnel to make data driven management decisions. Fifteen ponds at the Mammoth Spring National Fish Hatchery were analyzed for variability in physical chemical properties in relation to primary and fish production. Physical- chemical water analysis of each pond was collected every other week between April and July of 2007. Parameters measured onsite included dissolved oxygen, pH, conductivity, total dissolved solids, and salinity. Water samples also were collected for analysis of total nitrogen and total phosphorus in the lab. Across the 15 ponds, dissolved oxygen ranged from 7.67 mg/L to 20.30 mg/L, pH ranged from 5.15 to 11.66, conductivity ranged from 208 to 652, total dissolved solids ranged from 112.4 to 326.0, and salinity ranged from 0.0 to 0.3. Total nitrogen ranged from 0.09 to 1.08 mg/L and total phosphorus ranged from 0.018 to 0.081 mg/L. The next step of this project is to relate these findings to stocking history and production to determine if certain ponds perform better than others. In addition to the physic-chemical analyses, we also are in the process of analyzing chlorophyll and zooplankton samples.

PRELIMINARY EXAMINATION OF THE RELATIONSHIP BETWEEN THE SPATIAL ARRANGEMENT OF HABITATS AND FISH IN THE TENNESSEE-TOMBIGBEE WATERWAY

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An estimated loss of 1,325 acres of aquatic habitat in the Mississippi portion of the Tennessee-Tombigbee Waterway (TTW) occurred during the system's first 20 years. Losses exceeding 5 to 44% of area present in 1985 have occurred in specific habitats thought to be important for fish production, such as backwaters and bendways. The quality of fish habitat commonly is judged by relative abundance of fish, with better habitats assumed to have higher relative abundance. Previous interpretations of relative abundance have failed to consider the position of sampling sites in the aquatic landscape. This research evaluates the hypothesis that catch rate in a site of a particular habitat is independent of the type of habitat adjacent to the site. We developed a comprehensive sampling protocol to examine the spatial patterns of fish populations in three lakes of the TTW. We sampled the fish assemblages in all accessible habitats (i.e., bendways, backwaters, embayments, and main channel) in Aliceville, Columbus, and Aberdeen Lakes during late Fall 2007. Distributional maps were developed for each of these lakes to visually examine the spatial patterns of fish population abundances. Preliminary analyses suggest higher abundances of recreationally important species such as largemouth bass *Micropterus salmoides* and crappies *Pomoxis* spp. in off-channel habitats such as backwaters and bendways. These species also appear to increase in abundance in habitats farther from the main navigational channel and in habitats in the lower portions of the lakes. Habitats with greater abundances of such species are also those identified with the greatest losses in area during the past 20 years. We plan to sample fish again in Spring 2008, Fall 2008 and Spring 2009 in addition to characterizing the physical habitat to further develop a spatial database of fish and habitat in the TTW. This database will be used to identify certain habitats that while presently provide quality habitat for certain species may be at risk of habitat degradation thus having the potential to negatively impact desired species. Recommendations such as habitat restoration and dredging can then be made to ensure losses in habitat do not affect the future of recreational fisheries in the TTW. Furthermore, the results of this study can be used to site restoration activities for maximal benefit and to conduct meaningful evaluations of habitat management activities

QUANTIFICATION OF BRIDGE CONSTRUCTION SEDIMENT INPUT, TRANSPORT, AND DEPOSITION IN FRESHWATER MUSSEL HABITAT

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Sedimentation derived from road and bridge construction has been shown to produce negative effects on the biotic integrity of aquatic ecosystems. Increased sediment loads, both suspended and bedload, derived from these projects are currently considered a threat to freshwater mussels. This project seeks to quantify the perceived threat of sediment input, transport, and deposition to freshwater mussel habitat downstream of a bridge construction site. The bridge construction being studied is expected to last nearly two and one half years. The study reach for this project is located in the Coastal Plain Eco-region of south-central Arkansas in the Saline River; this area is known to harbor the endangered mussel, *Lampsilis abrupta* (Say, 1831). The control reach is approximately 1000 m upstream of the AR 167 bridge and extends 165 m downstream, while the treatment reach begins immediately downstream of the bridge and extends 300 m downstream. The objective of this project is to quantify changes in substrate composition in relation to freshwater mussel aggregates and assess community level changes via measures of species composition and spatial distribution. Possible reduction in available habitat and changes in community composition could be observed due to deposition and species sediment tolerances.