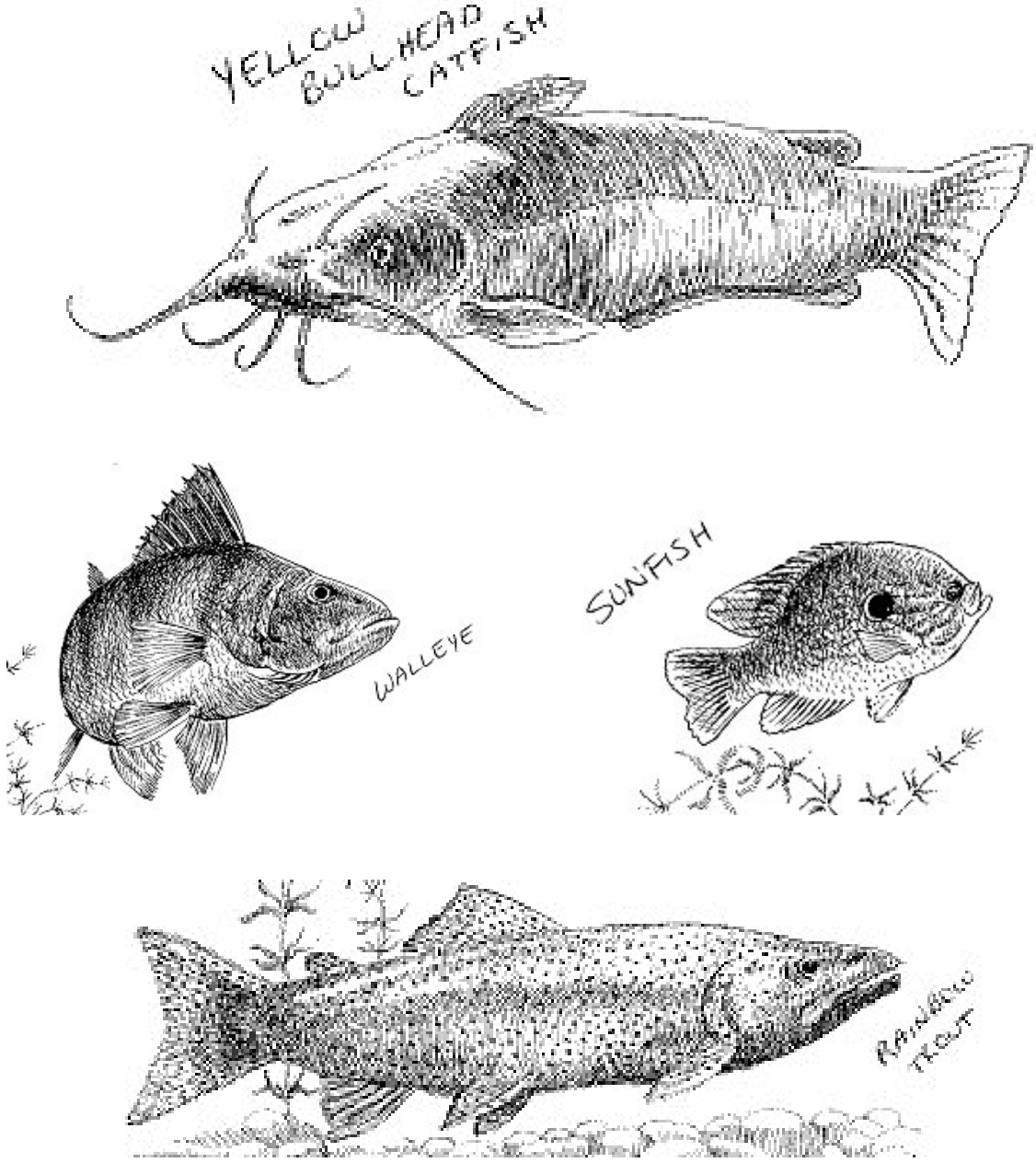
ARKANSAS CHAPTER
AMERICAN FISHERIES SOCIETY
2004 ANNUAL MEETING



Delta Rivers Nature Center
Pine Bluff, Arkansas

FEBRUARY 3-5, 2004

Front cover sketches provided courtesy of Bob Savannah – U. S. Fish & Wildlife Service

CHAPTER OFFICERS

Ken Shirley – President

Chris Davidson – President-Elect

Betty Crump – Past President

Mike Bivin – Treasurer

Colton Dennis – Interim Secretary

2004 Arkansas Chapter AFS Annual Meeting

Meeting Schedule

Tuesday February 3, 2004

10:00 a.m. – 4:00 p.m.	Meeting Registration
12:30 p.m. – 5:15 p.m.	Large River Fisheries Symposium
6:30 p.m. – 11:00 p.m.	Mixer* (Hampton Inn – Meeting Room)

Wednesday February 4, 2004

8:00 a.m. – 12:00 p.m.	Meeting Registration
8:15 a.m. – 12:00 p.m.	Technical Session 1
12:00 p.m. – 1:00 p.m.	Lunch (on your own)
1:00 p.m. – 3:00 p.m.	Technical Session 2
3:15 p.m. – 5:30 p.m.	Business Meeting
7:00 p.m. – 12:00 a.m.	Social/Meal* (Waterfront Community Center - Regional Park)

Thursday February 5, 2004

8:30 a.m. – 12:30 p.m.	Technical Session 3

*All events are at the Delta Rivers Nature Center unless otherwise noted.

LARGE RIVER FISHERIES SYMPOSIUM

TUESDAY FEBRUARY 3, 2004

MODERATOR: Ken Shirley, Arkansas Game & Fish Commission

12:30 p.m. Welcome

12:45 p.m. **Bill Layher** – Layher BioLogics RTEC, Inc.
"Three case studies sampling Arkansas' Large Rivers"

1:15 p.m. **Mike Eggleton[1], H. Schramm[2] and L. D'Abramo[2]** – [1]University of Arkansas at Pine Bluff, [2]Mississippi State University
"Catfish feeding Ecology and bioenergitics in the Lower Mississippi River"

1:45 p.m. **Reid Adams** – University of Central Arkansas
"Nursery habitats of young fishes in Pool 25, Upper Mississippi River"

2:15 p.m. **Billy Justus** – U. S. Geological Survey
"Ecological criteria for species at risk; data mining and data collection possibilities"

2:45 – 3:15 p.m. BREAK

3:15 p.m. **Jack Killgore and Jan Hoover –** U. S. Army Corps of Engineers – Waterways Experiment Station
"*Evaluation of water resource and restoration projects in the lower Mississippi River Basin*"

3:45 p.m. **Tim Flinn –** U. S. Army Corps of Engineers - Memphis District
"White River Basin Comprehensive Study"

4:15 p.m. **Mike Armstrong** – Arkansas Game & Fish Commission
"Minimum Flow Issues in the Upper White River"

4:45 p.m. **Randy Rushin –** Water Monitoring Solutions
"Stream & River Flow Monitoring using Acoustic Doppler Technologies"

LARGE RIVER FISHERIES SYMPOSIUM

Abstracts

THREE CASE STUDIES SAMPLING ARKANSAS' LARGE RIVERS

William G. Layher
Layher BioLogics RTEC, Inc.

Information will be presented from three fish sampling studies on large rivers in Arkansas. The Red River of Arkansas was sampled during 1997 and 1998. Over 5,000 net hours were expended to evaluate fish composition of the river. Information on sampling design and information on techniques used to sample all habitat types will be reviewed. A second study examined fishery resources in the Arkansas, White, and St. Francis Rivers. Both of these studies utilized hoop nets, gill nets, and trotlines. Comparisons of techniques from a practical perspective will be addressed. A third study specifically targeted alligator gars in a number of large river systems. Techniques used to attempt this sampling will be examined.

Catfish feeding ecology and bioenergetics in the lower Mississippi River

Eggleton, M.A.[1], H.L. Schramm, Jr.[2], and L.R. D'Abramo[3].

[1] Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff.
[2] Mississippi Cooperative Fish and Wildlife Research Unit, Mississippi State University.
[3] Department of Wildlife and Fisheries, Mississippi State University.

We conducted a comprehensive bioenergetic assessment of blue catfish *Ictalurus furcatus* and flathead catfish *Pylodictis olivaris* in the lower Mississippi River (LMR). Our objectives were to compare rates of food consumption (as energy intake) and energy partitioning patterns by catfishes in different river habitats through time. Catfishes were collected during 1997-1998 from three major riverine habitats—the main river channel, secondary (side) river channels, and floodplain lakes. Diet composition of both species varied among habitats and generally differed in the energy levels of the foods being consumed. Caloric (energy) densities of foods consumed by catfishes were generally greatest in floodplain lakes, least in the main river channel, and intermediate in secondary river channels. In spite of the greater energetic benefit of off-channel habitats, estimated caloric intake rates of both species did not vary statistically among habitats either year. Between-year variation in caloric intake was more significant for both species. Mean annual caloric intake rates of blue catfish increased an average of 31% across all habitats in 1998. In particular, caloric intake increased 151% in floodplain lakes between April and June 1998 compared to the same period in 1997. For flathead catfish, between-year increases in caloric intake averaged 37% between habitats in 1998 and were 56% between April and June. Increases in caloric intake observed for both species were attributed to warmer thermal conditions in 1998, especially during the annual flood pulse from March through May. Despite these annual variations in caloric intake, patterns in energy partitioning did not differ substantially between years. Results suggested that although different LMR habitats afforded catfishes different energetic returns in terms of foods consumed, realization of these benefits may not be accrued by catfishes every year. Furthermore, catfish energetics in the LMR were likely influenced by year-specific physical characteristics such as water temperatures and flooding regime.

Nursery habitats of young fishes in Pool 25, Mississippi River

Reid Adams
Department of Biology
University of Central Arkansas

Reproductive success of fishes inhabiting modified river systems has been impacted by alterations in flow regimes and loss of nursery habitat. Effective management and restoration is hindered by a lack of understanding of nursery habitat requirements for riverine fishes. During late spring/early summer of 2000, 2001, and 2002, I sampled young-of-year (late larvae/early juvenile) fish communities with a fine-meshed seine at 14 off-channel sites in a 2.5-km reach of Pool 25, Mississippi River. Sites represented three habitat types based on geomorphology and distance from the main channel: backwaters (lentic habitats > 1 km from the main channel), island fringes (slack-water areas bordering islands), and island sloughs (lentic habitats on islands). Samples contained a variety of species (51 taxa), and included taxa rarely collected in high numbers during early life stages (e.g., blue sucker, silver chub, river darter, and silver carp). Nonmetric multidimensional scaling and multi-response permutation procedures identified significant structuring ($p<0.05$) of young fish communities along a gradient from backwaters to island fringes during all three years. Community patterns generally corresponded with spawning characteristics of adults, where backwater sites and island fringes primarily provided nursery habitat for species that spawn in lentic (e.g., sunfishes and crappies) and lotic areas (e.g., blue sucker, carpsuckers, and mooneye), respectively. Island sloughs were intermediate, providing nursery habitat for species spawning in both lentic areas (e.g., buffaloefishes and gars) and in or near currents (e.g., emerald shiner, freshwater drum, and river darter). This study demonstrates the value of conserving or creating heterogeneity within off-channel areas to provide nursery habitat for a diversity of riverine fishes.

Ecological criteria for species at risk; data mining and data-collection possibilities

Billy Justus
U. S. Geological Survey

Biological assessment data for aquatic biota are used nationally to set biological criteria and goals that are presumed to reflect ecological conditions and the level of functioning that can be expected in reference or least-disturbed streams. If this approach were modified slightly, a combination of population data, habitat assessment data, and water-quality and quantity data could be used to establish the ecological requirements (criteria) necessary for optimum success of aquatic species at risk (of extirpation). These ecological criteria could then be used to identify and protect critical stream reaches, and to restore favorable conditions in streams or stream reaches where unfavorable conditions exist. Historic U.S. Geological Survey data collection activities across Arkansas and the Nation have resulted in large water-quality (including sediment and water chemistry) and water-quantity (e.g. minimum, mean, and maximum flows, and surface- and ground-water interactions) databases for many streams. Depending on the species at risk, some chemical or physical criteria may be established simply by data mining (evaluating existing data). Data mining could include such things as determining flow characteristics from historic gaging stations or using suspended sediment data to determine sedimentation tolerances for species that require gravel bar habitat. If water quality or quantity data are lacking for a particular species or stream, stream gaging and water-quality stations could be established.

Evaluation of Water Resource and Restoration Projects in the Lower Mississippi River Basin

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A variety of water resource projects are being evaluated by the U.S. Army Corps of Engineers in the lower Mississippi River Basin. Traditional projects (i.e., navigation and flood control) are generally long-term assessments of environmental and socio-economic impacts. Mitigation of adverse impacts is an important, and often controversial element of the overall project evaluation. More recently, the Corps has been funded by Congress to evaluate water supply and ecosystem restoration projects. Water supply is essentially diverting surface water from larger rivers into surrounding delta streams, bayous, and canals during the irrigation season. Examples include projects in Grand Prairie, Bayou Meto, and southeast Arkansas basins. Ecosystem restoration is funded through Sections 1135 and 206 of the Water Resource Development Act. They are short-term assessments that address specific problems associated with habitat degradation. In the lower Mississippi River Basin, these types of restoration projects include water level management (e.g., construction of weirs) in streams and oxbow lakes to maintain minimum pool elevations during low flow, hydraulically reconnecting lakes and streams, reducing sediment loads, reforestation, and management of invasive plant species in backwaters and lakes.

Quantitative evaluation of any water resource project requires the establishment of empirical relationships between physical habitat, which is the suite of variables that will be altered by a project, and biotic responses of fishes and amphibians. We have developed multivariate databases from synoptic field studies throughout the lower Mississippi River Basin to explore these types of statistical relationships. Using consistent field methods over the past 15 years, these databases span broad spatial and temporal conditions in floodplains, streams, and larger rivers. Regression-type habitat models are often used to quantify impacts or benefits, depending on the project, and output is consistent with the Habitat Evaluation Procedure (HEP). HEP is often used in Federal projects because it facilitates comparison of alternatives through incremental cost analysis, which is a required element of water resource evaluations. Validation of predicted impacts or benefits are generally lacking, but post-project monitoring is becoming a more common requirement that should alleviate some uncertainty in biological predictions.

White River Basin Comprehensive Study

Tim Flinn, U. S. Army Corps of Engineers – Memphis District

My presentation will be on the White River Basin Comprehensive Study. The purpose of this study is to develop a comprehensive watershed plan for the White River Basin. The comprehensive plan will serve as a framework for the environmentally sustainable development of water resources within the White River Basin. The problems and potential solutions will be examined in a comprehensive manner because of the interrelationships of the problems and potential solutions to all of the significant resources in the basin.

The White River basin is geographically divided into two terrain types (Ozark mountains and delta). The upper basin or the Ozark Mountain area is primarily concerned with water quality issues. The lower basin or the delta is concerned primarily with water quantity issues. To address the water quality issues in the upper basin in the comprehensive watershed plan we propose to develop studies to analyze the water quality in Beaver, Table Rock, and Taneycomo lakes. The upper basin areas around Fayetteville Arkansas and Branson Missouri are experiencing a heavy increase in population growth. The above-mentioned lakes are utilized by the public and are important to the local economy. The states of Arkansas and Missouri are concerned about the amount of wastewater effluent going into the lakes as well as runoff from chicken farms and other farm related waste. Their concerns center around how these treated and untreated wastes will impact the lakes aquatic ecosystem. At what point will the lakes no longer support aquatic life and therefore have an adverse impact on tourism and area residents in the area. The states see a need to develop tools to better predict water quality problems and to prepare for future needs.

To address the water quantity needs of the lower basin or the delta in the comprehensive watershed plan we propose to develop studies to analyze the hydrologic effects on the lower basin wetlands. This will involve developing a unsteady flow hydraulic model to better determine the river stages on the lower White River. Fifteen transects will be run along the White River along with three on Bayou de View and three on the Cache River. These transects along with the hydraulic data developed by the super model from the Little Rock District and the above mentioned unsteady flow hydraulic model will allow for a better understanding of how the White River relates to adjacent wetlands. Dr. Sammy King of Louisiana State University will do this study. This will allow the state of Arkansas to better predict how water releases upstream and water removals along the White River will impact the White River. This is key component to determining a TMDL for the state.

The study proposed by Dr. Heitmeyer of the Gaylord Memorial Laboratory of the University of Missouri-Columbia will involve four tasks over four years: Tasks 1 will synthesize information on historic ecosystem structure and processes; Task 2 will identify current land use patterns and changes from historic conditions; Task 3 will develop ecosystem restoration options; And Task 4 will involve participating in meetings of Resource Interests in the Lower White River Basin. The objective of this study is 1) Synthesize information on the historic geology, geomorphology, archeology, native ecosystems, and natural history of the Lower White River Basin; 2) Identify where and how the structure, function, and ecological processes of native ecosystems within the Lower White River Basin have been altered; and 3) Identify restoration approaches and ecological attributes associated with successful restoration of specific habitats and ecological conditions in the Lower White River Basin. When the study is complete, the habitat needs assessment generated and the GIS component will be useful in determining where and what habitat can be restored. This will help ensure the restored areas have a higher degree of success.

Dr. Jack Killgore of ERDC/WES will conduct a study evaluating the **permanent** wetlands in the lower White River. The primary objective is to develop correlative models describing the relationship between hydrogeomorphic features of permanent wetlands and their vertebrate assemblages. These data can be used in basin-wide assessments of wetlands habitats, to assess cumulative impacts of flood control or navigation on poorly studied habitats that often support imperiled species, and to develop management strategies for permanent wetlands that includes optimum design of restored or created wetlands.

Also Dr. Killgore will Develop habitat models for upper basin streams to quantify potential effects of streambed sedimentation and nutrient loading on fish diversity. Field studies will be conducted during low water season (summer/fall) to develop relationships between fish diversity (e.g., Index of Biotic Integrity) and water quality (nutrients, dissolved oxygen, turbidity). Evaluate benefits of nutrient reduction to Beaver and Table Rock Reservoirs. Habitat models developed in the 1960's and 1970's by the USFWS National Reservoir Research Program will be used to quantify benefits of decreased eutrophication to fish standing crop.

Minimum Flow Issues in the Upper White River, Arkansas and Missouri

Michael Armstrong
Arkansas Game and Fish Commission

Construction and operation of large federal water projects have had a profound impact on natural resource management. The Rivers and Harbors Act of 1938 authorized the construction of federal dams within the White River basin of Arkansas and Missouri for the sole purposes of flood control and hydropower generation. The need for these projects grew from a national desire for rural economic development in the mid-twentieth century. Fish, wildlife, and recreation received almost no recognition in the Congressional actions that established federal water policy in the White River basin. The Arkansas Game and Fish Commission has advanced the thesis that federal water policy is out of step with early 21st century public needs in the White River basin. Release of a minimum flow and achievement of state water quality standards in project tailwaters would result in greater economic benefits than is currently being realized under current project operations. The Water Resources Development Act of 1999 and 2000 authorized the re-allocation of storage in Water River basin projects for the purpose of minimum flow if these releases were determined to be technically feasible, environmentally acceptable, and economically justified. While the ongoing Corps of Engineer's Minimum Flow Study suggests favorable benefit/cost ratios can be realized at all White River projects releasing minimum flow, internal Corps policies, such as requiring the state pay cost of storage costs, continues to challenge the successful achievement of minimum flows below federal dams in Arkansas.

The Application of Acoustic Doppler Technologies to Measure Flow in Small Streams to Large Rivers

Randy Rushin
Water Monitoring Solutions

The use of Acoustic Doppler technology to measure water velocity and estimate water quantity is replacing other measurement instrumentation due to its high accuracy, ease of operation, automated flow computations, and minimal maintenance requirements. Acoustic Doppler instrumentation is used in shallow streams, irrigation canals, springs, marshes, and rivers. Data can be collected to obtain instantaneous discharge measurements or to obtain continuous velocity data. The focus of the presentation will be data collected with the U.S. Geological Survey on the St. Francis River in southeastern Missouri and northeastern Arkansas during June, 2003. Pictures and video of the sampling trip along with a variety of other applications will be presented.

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Arkansas Chapter AFS
2004 Annual Meeting

TECHNICAL SESSION 1

WEDNESDAY FEBRUARY 4, 2004

MODERATOR – Chris Davidson, U. S. Fish & Wildlife Service

8:15 a.m. Welcome

8:20 a.m. *Hedonic price analysis of U.S. farm-raised catfish* – Nathaniel J. Wiese* and Kwamena K. Quagrainie, University of Arkansas at Pine Bluff

8:40 a.m. *A comparison of new in-pond grading technology to live car grading for food-sized channel catfish (Ictalurus punctatus)* – Jeremy Trimpey* and Carole Engle, University of Arkansas at Pine Bluff

9:00 a.m. *Fluctuating Asymmetry and Condition in Golden Shiner (Notemigonus crysoleucas) and Channel Catfish (Ictalurus punctatus) reared in Sublethal Concentrations of Isopropyl Methylphosphonic Acid* – C. Green* and Steve Lochman, University of Arkansas at Pine Bluff

9:20 a.m. *Impact of propanil from rice fields on hybrid striped bass pond plankton and water quality* – Regina E. Edziyie* and Peter P. Perschbacher, University of Arkansas at Pine Bluff

9:40 a.m. *The effects of catfish stocking density on water quality, production characteristics, and cost* – Brent E. Southworth*, Carole R. Engle and Nathan Stone, University of Arkansas at Pine Bluff

10:00 a.m. *An Evaluation of Supplemental Stocking of Largemouth Bass in Pools of the Arkansas River* – N. Elizabeth Heitman*, Chris Racey and Steve Lochman, University of Arkansas at Pine Bluff

10:00 – 10:20 a.m. BREAK

* Student Presentation

TECHNICAL SESSION 1 (Continued)

MODERATOR – Colton Dennis, Arkansas Game & Fish Commission

10:20 a.m. *Characterization of floodplain lake fish assemblages in the Lower White River, Arkansas* – B. Lubinski*and M. Eggleton, University of Arkansas at Pine Bluff
J. Jackson, Arkansas Tech University

10:40 a.m. *Crappie population characteristics in floodplain lakes of the lower White River, Arkansas* – B. Lubinski*and M. Eggleton, University of Arkansas at Pine Bluff
J. Jackson, Arkansas Tech University

11:00 a.m. *Recent changes in abundance of an endemic species of darter, Etheostoma moorei Raney & Suttkus, of the upper Little Red River, Arkansas* – Michael R. Weston[1]*, Mitchell Wine[2] and R.L. Johnson[1], [1]Arkansas State University and [2]U. S. Fish & Wildlife Service

11:20 a.m. *Rehabilitating Urban Streams Saves Habitat and Money* – Steve Filipek, Jim Ahlert, and Darrell Bowman, Arkansas Game & Fish Commission

11:40 a.m. *Black bass mortality associated with club tournaments* – Lee Holt* and Joe Stoeckel, Arkansas Tech University

12:00 – 1:00 p.m. LUNCH

* Student Presentation

TECHNICAL SESSION 2

WEDNESDAY FEBRUARY 4, 2004

MODERATOR – Ron Johnson, Arkansas State University

1:00 p.m. *Validation of a Model Predicting Crappie Response to a Length Limit* – Chris Racey and Steve Lochman, University of Arkansas at Pine Bluff

1:20 p.m. *Evaluation of Reservoir Modeling for Evaluation of Striped Bass Habitat* – Joel M. Galloway and W. Reed Green, U. S. Geological Survey

1:40 p.m. *The Effect of the Introduction of Tilapia on the Fish Population in a Closed System Reservoir* – Sam Henry and Sam Barkley, Arkansas Game & Fish Commission

2:00 p.m. *Exploitation of Tilapia in a Closed System, Public Fishing Reservoir* – Sam Henry and Sam Barkley, Arkansas Game & Fish Commission

2:20 p.m. *U. S. Fish & Wildlife Service data gaps and needs* – Lindsey Lewis, U. S. Fish & Wildlife Service

2:35 p.m. *National Forest Plan* – Betty Crump, U. S. Forest Service

3:15 – 5:15 p.m. Arkansas Chapter AFS Business Meeting

7:00 p.m. – 12:00 a.m. SOCIAL/MEAL

8:45 p.m. TERMINATION OF SILENT AUCTION

Arkansas Chapter AFS
2004 Annual Meeting

TECHNICAL SESSION 3

THURSDAY FEBRUARY 5, 2004

MODERATOR – Betty Crump, U. S. D. A. Forest Service

8:30 a.m. *The Fishery of Prado Reservoir* – Ken Shirley, Arkansas Game & Fish Commission (Peace Corps, 1976 – 1978)

8:50 a.m. *Statewide walleye genetic survey in Arkansas* – Jon Stein, Arkansas Game & Fish Commission, Huseyin Kucuktas, Auburn University

9:10 a.m. *Fishes of the Strawberry River: Composition, Condition and Possible New Distributional Records* – Jim Wise, Arkansas Department of Environmental Quality

9:30 a.m. *Fish Communities of the Buffalo River Basin and Adjacent Basins and Comparison of Communities to Environmental Factors* – James C. Petersen, U. S. Geological Survey

9:50 a.m. *The freshwater mussel resources of the Sulphur and Little rivers in Arkansas* – Bill Posey, Arkansas Game & Fish Commission

10:10 – 10:30 a.m. BREAK

TECHNICAL SESSION 3 (Continued)

MODERATOR – Lea White, Arkansas Game & Fish Commission

10:30 a.m. *Attitudes, preferences, motivations, and recreational specialization of Arkansas trout anglers* – Jeffrey Williams, Darrel Bowman and Stan Todd, Arkansas Game & Fish Commission

10:50 a.m *Initial production responses of bluegills, redear sunfish, and largemouth bass to the addition of cover in newly-impounded southeastern U.S. farm ponds* – Jason Olive, Arkansas Game & Fish Commission, Don Jackson and Martin Brunson, Mississippi State University and Barry Smith, American Sportfish Hatchery

11:10 a.m. *Crayfishes of Arkansas: Diversity and Status* – Brian Wagner, Arkansas Game & Fish Commission, H. Robison and J. Radar, University of Southern Arkansas

11:30 a.m. *The watershed approach: A partnership for protection* – Rob Beadel, Arkansas Department of Environmental Quality

11:50 a.m. *Bull Shoals Aquatic Macrophyte Restoration Project* – D. Colton Dennis and Kevin Hopkins, Arkansas Game & Fish Commission

TECHNICAL SESSION ABSTRACTS

HEDONIC PRICE ANALYSIS OF U.S. FARM-RAISED CATFISH

Nathaniel J. Wiese[1], Kwamena K. Quagrainie[2]
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Hedonic pricing models have been used in a wide number of studies to relate market prices to product attributes. This technique allows for the valuation of product characteristics. It has also been used by natural resource managers in the travel cost model to determine consumer's willingness to pay for non-market goods. By relating observed market prices to product characteristics, implicit prices of each characteristic can be determined. These implicit prices can provide insight into the value of each characteristic.

Catfish processors primarily characterize catfish loads by delivery weight. After the delivery weight is determined, the load is docked (discounted) for deformed, diseased, dead, and out-of-size specification catfish as well as for trash fish and miscellaneous reasons. Farm managers must co stantly be aware of dockage practices to maximize farm profit. Thus, farm managers can use the information gained from this study when making production decisions at their catfish operation. The catfish load characteristics used for this study include: the net delivery weight (WGT), the weight of diseased and deformed fish (DD), the weight of trash fish (TRA), the quantity of fish arriving to the plant dead (DOA), the total weight of catfish received out of the specified size (OUT), and the weight of fish deducted for miscellaneous reasons (MISC). The price of an individual catfish load was set to be a function of its characteristics and seasonal dummy variables.

Data for this study was compiled from processing plants and catfish producers. The data included 3686 daily individual catfish loads spanning five years and sampled across 10 processing plants and 30 catfish producers. The results of the hedonic analysis indicated that seasonality variables and DOA variable did not have significant effects. The TRA, OUT, and MISC variables were significant and negative as expected. The DD variable was significant and positive which was not expected. From these results, it appears that to minimize dockage effects, farm managers should concentrate on reducing out-of-size catfish by improving grading techniques and also on reducing trash fish and miscellaneous deductions.

A COMPARISON OF NEW IN-POND GRADING TECHNOLOGY TO LIVE CAR GRADING FOR FOOD-SIZED CHANNEL CATFISH, *Ictalurus punctatus*

Jeremy Trimpey and Carole Engle

Aquaculture/Fisheries Center
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A series of grading trials were performed in experimental and commercial catfish ponds to compare new in-pond horizontal floating bar grading to current live car grading techniques. Three replicate trials were conducted in experimental ponds at three different temperature ranges (> 26°C, 13-26°C, < 13°C) with catfish size groups stocked in ratios of either 75:25, 50:50, or 25:75 sub-harvestable (<0.57 kg) to harvestable fish (≥0.57 kg). Commercial pond trials were replicated three times at each temperature range with a fish size range typical of ponds ready to harvest. Stress experienced by fish during harvest and grading was measured by mean serum glucose and cortisol levels. Grading speed was significantly greater ($P<0.05$) with the UAPB/Heikes grader (105-449 kg/min) than the traditional live car (0.5-0.6 kg/min). The UAPB/Heikes grader significantly decreased the proportion of sub-harvestable fish during all trials. In contrast, the traditional live car did not significantly reduce the proportion of sub-harvestable fish with the experimental methods used in this study during commercial trials or in the 25:75 distributions during hot and cold trials in experimental ponds. The UAPB/Heikes grader returned an average 2-4 times (range of 2-52) more sub-harvestable fish by weight to the pond than the traditional live car method. Glucose and cortisol levels in fish graded with the two grading technologies were not significantly different. The UAPB/Heikes grader sorted fish more accurately and consistently than the live car at all temperatures in both experimental and commercial trials.

Fluctuating Asymmetry and Condition in Golden Shiner (*Notemigonus crysoleucas*) and Channel Catfish (*Ictalurus punctatus*) reared in Sublethal Concentrations of Isopropyl Methylphosphonic Acid

C. C. Green and S. E. Lochmann

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Stress during embryological development can result in small random differences between the left and right sides of a bilateral trait. This fluctuating asymmetry (FA) has been proposed as a measure of the level of stress organisms experienced during embryological development. Some toxicants increase FA among groups with increasing exposure during development. In addition, studies have shown a relationship between asymmetry and condition. The United Sates has been ordered to incinerate chemical weapons in accordance with the Chemical Weapons Convention Treaty of 1997. In the event of an accident during incineration, sarin or its decomposition products have the potential to be expelled into the environment. Isopropyl methylphosphonic acid (IMPA) is the main hydrolysis product of Sarin. This study examines the use of FA as an indicator of developmental stress due to sublethal exposures to IMPA. We found significant differences in FA for morphological characters among groups of channel catfish (*Ictalurus punctatus*) exposed to sublethal concentrations of IMPA during development. This study found no significant relationship between individual condition and asymmetry.

Impact of propanil from rice fields on hybrid striped bass pond plankton and water quality

REGINA E. EDZIYIE AND PETER P. PERSCHBACHER

Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff
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Abstract: Hybrid striped bass production, mainly in the southern United States, is a rapidly growing sector of the aquaculture industry, replacing the decline in striped bass fishery. This area especially the Mississippi alluvial plain region accounts for approximately 82% of U.S. rice production. Rice production relies heavily on the use of herbicides (especially propanil) to control weeds. Spray drift from aerially applied propanil has the potential of affecting water quality and plankton in surface waters nearby. A USGS water quality assessment of the Mississippi embayment in 2000, detected propanil in surface waters between April and July. The purpose of this study was to determine the effect of propanil on hybrid striped bass pond water quality and plankton. This research was done using 15 mesocosms (550L each, and a surface area of $0.785m^2$), with three replicates and five treatments including a control with no propanil, 20% 40% 60% and 100% of the recommended field rate ($0.7ml/m^2$) in a completely randomized design. Samples were taken before and after treatments were applied. The variables measured were; morning oxygen (D.O), pH, Nitrite-Nitrogen (NO_2-N), Unionized ammonia nitrogen (UIA-N), Total ammonia-nitrogen (TAN), primary productivity, respiration, recovery, phytoplankton and zooplankton composition and numbers were determined. Generally, propanil had a negative effect on zooplankton numbers. There was no significant difference in NO_2-N and TAN. There were significant decreases in UIA-N, 24 h and 48 h after treatments were applied. Chlorophyll a concentrations ranged from 29-104 g/L and were higher in the mesocosms with propanil, and significantly higher after 72 h between control and the 60 and 100% treatments. Propanil significantly reduced primary productivity and respiration 48 and 72 h after treatments were applied, with the exception of the 0.2 treatment for respiration after 72h. Application of propanil resulted in a significant decrease in D.O and pH. There was recovery on the third day of the experiment.

THE EFFECT OF CATFISH STOCKING DENSITY ON WATER QUALITY, PRODUCTION CHARACTERISTICS, AND COSTS

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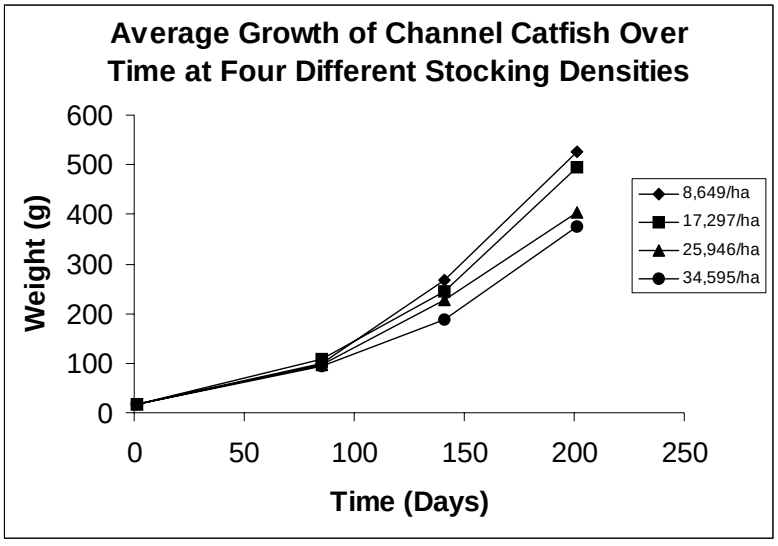
Channel catfish farming is currently considered to be the most successful aquaculture business in the United States. Improvements in technology have allowed aquaculture to become more intensive over time. With this increase in production intensity, the effects of interactions among factors related to stocking density, feeding rate and water quality on costs and net returns become important to farmers. Little research has been done using current production practices to quantitatively define these relationships. Twelve 0.1-hectar ponds at the University of Arkansas at Pine Bluff (UAPB) Aquaculture Research station were used for the study. Fingerlings (13-15 cm) were stocked in March at densities of 8,649; 17,297; 25,946 and 34,595 fish/ha with three replications per treatment to constitute four treatment groups. Fish were fed daily to apparent satiation with a 32% floating commercial catfish feed. A blower-type feeder administered feed to all ponds. This study monitored water quality at different stocking densities under satiation feeding to determine how stocking density affects growth, yield, survival, and feed conversion ratios (FCR). Mean weight at harvest decreased significantly as stocking density increased ($P < 0.05$). However, there was no difference in weight of fish stocked at 8,649/ha and 17,297/ha or between 25,946/ha and 34,595/ha. Nitrite, nitrate, total ammonia nitrogen (TAN), chlorophyll (a), total nitrogen (TN), total phosphorus (TP), chemical oxygen demand (COD) and secchi disk were monitored monthly, chlorides three times during the study, alkalinity and hardness twice, pH weekly and temperature and dissolved oxygen were measured twice daily. The relationships between stocking and feeding rates and various water quality parameters were also analyzed. The overall costs of producing channel catfish at different stocking densities and the espective effect on net returns were estimated.



An Evaluation of Supplemental Stocking of Largemouth Bass in Pools of the Arkansas River

By N. Elizabeth Heitman*, Chris Racey and Steve Lochmann

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Concerns about a diminishing largemouth bass *Micropterus salmoides* population in the Arkansas River were voiced by tournament and recreational anglers. In June 2002, Arkansas Game and Fish Commission stocked 50,000 hatchery-reared, oxytetracycline-(OTC) marked largemouth bass (mean TL = 45 mm) into each of two pools (five and nine) of the Arkansas River as one response to the public's concerns. We evaluated the contribution of stocked fish to the 2002 year class in September 2002 and May 2003 by examining otoliths for the presence of an OTC mark. Initial results indicate stocked fish contributed 15% and 22% in pools five and nine in fall 2002 and 13 % in both pools in spring 2003. There was no significant difference between mean lengths for OTC marked and wild largemouth bass for either pool in the fall or spring. However, the 2002 year class largemouth bass (OTC marked and wild) were significantly longer in pool nine than pool five in both fall (183 mm vs. 172 mm, $P = 0.02$) and spring (211 mm vs. 184 mm, $P = 0.001$). Results of this study indicate that stocking might be a viable management technique to supplement natural recruitment in the Arkansas River and should be further evaluated.

Characterization of floodplain lake fish assemblages in the Lower White River, Arkansas.

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The lower White River, Arkansas represents one of the least altered river-floodplain ecosystems (RFE) in the United States. The lower White River floodplain encompasses approximately 75,880 ha of bottomland hardwood forest that contains over 300 lakes scattered throughout public and private lands. River regulation including irrigation and navigation channel projects threaten to alter the natural hydrology of the lower White River RFE. The objective of this research was to examine relationships between fish communities and environmental variables associated with river/lake morphology and flooding regimes in lower White River floodplain lakes. Fish communities were sampled by experimental gill nets, mini-fyke nets, and night-time electrofishing during the summer and fall of 2002; environmental variables were measured concurrently. Multivariate direct gradient analyses suggested that lake depth, lake surface area, and distance to the main river channel were most important in the structuring of fish communities in lower White River floodplain lakes. We believe the degree to which fish communities are structured along variables associated with river regulation may help guide river management and species conservation efforts. This project also helps define baseline conditions for temperate-zone RFEs and assess empirical fish-environment relationships prior to alteration in the lower White River.

Crappie population characteristics in floodplain lakes of the lower White River, Arkansas

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Floodplain lakes in the lower White River floodplain (LWRFL) provide excellent opportunities for recreational fishing, especially for crappies. Recent concerns have been raised about the quality of recreational crappie fishing in the LWRFL, but no sport fishing data exists for any of these lakes. We collected crappies from 16 lakes within the White River National Wildlife Refuge using night-time electrofishing at two different DC-pulse frequencies (60 Hz and 15 Hz). Data from all lakes were complied to generate an ecosystem average for both crappie species pooled. CPUE as number of crappies/hr for 60 and 15 Hz was 482 ± 28 and 334 ± 39, respectively, suggesting that crappies were the second most abundant game fish next to bluegill. Mean back-calculated lengths at ages 1-6 were 132, 201, 243, 273, 284, and 329 mm. Annual total mortality generated from catch curves was 56%. Rates of angler exploitation and natural mortality were estimated to be 21% and 35%, respectively. The effects of implementing a 254-mm length limit was simulated using FAST (Fisheries Analyses Simulation Tool). Modeling indicated the length limit would minimally reduce yield, reduce number harvested two-fold, but increase mean weight of fish harvested. However, angler preferences for the above variables are unknown for LWRFL and would need to be assessed before implementation of any length limit.

RECENT CHANGES IN ABUNDANCE OF AN ENDEMIC SPECIES OF DARTER, ETHEOSTOMA MOOREI RANEY & SUTTKUS, OF THE UPPER LITTLE RED RIVER, ARKANSAS

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The yellowcheek darter, Etheostoma moorei Raney & Suttkus, is an endemic species of the upper Little Red River, Arkansas. Much of the known range of this species was inundated by the formation of Greers Ferry Lake beginning in 1962. Each stream flows directly into Greers Ferry Lake, which has served as an isolating barrier for the past four decades. Each stream must therefore be responsible for its own re-colonization during periods of drought. A post-inundation study two decades ago resulted in a total estimate of 60,000 individuals in the four streams. Suitable habitat for the yellowcheek darter in these headwater streams has declined, in part due to reduced flow, with estimates from sampling in 2000 identifying a decline of 80 % in numbers. E. moorei were again collected during August to October 2003 from the South and Middle forks of the Little Red River, Arkansas. There were 190 individuals collected from 15 riffle-trips, which represents a 250% increase in numbers from Wine et al. (2001). Most individuals (n = 171) were marked using Visible Implant Fluorescent Elastomer and also fin clipped. Few individuals (n = 6) have been recaptured to date. Sampling will be ongoing in the coming year.

Rehabilitating Urban Streams Saves Habitat and Money

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A city's 404 permit application to channelize and concrete a low order warmwater stream running through town keyed the US Army Corps of Engineers to contact the AGFC's Stream Team to review the city's plan. An Arkansas River Valley ecoregion stream's had been modified by road construction and was eroding several backyards causing the mayor to hire an engineering firm to rectify the problem. The firm's plan called for channelizing the stream and making it a concrete trapazoid, devoid of fish and wildlife habitat. The Stream Team surveyed the stream and developed an alternative bioengineering plan utilizing vortex weirs, log cribs, grading, matting and revegetating exposed stream banks, and some rock armoring. This plan was presented to the mayor, town council, engineering firm, and a neighborhood group as a more natural alternative keeping the stream's current sinuousity, aquatic habitat, and riparian habitat intact. The resulting rehabilitation work cost $30,000, which was $70,000 less than the original price tag. The engineering firm has begun utilizing this design on other projects as well.

Black bass mortality associated with club tournaments

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Abstract: Extensive research has been conducted to determine the effects of fishing tournaments on mortality of black bass. While the research has addressed a wide range of criteria that affect mortality, it has focused primarily on relatively large, sponsored tournaments. Little information exists on small, club or "local" tournaments. These tournaments, because of their high popularity, may have a significant impact on the biology and subsequent management of black bass populations. Our study addressed the mortality rates (initial and delayed) of fish following their release from local tournaments. The primary goal was to determine the impact of club tournaments on black bass mortality in Arkansas' reservoirs. From May of 2002 to September of 2003, data was collected from fifty-eight tournament events. Due to fishing pressure and proximity, we selected Lake Dardanelle, Greer's Ferry Lake, Lake Hamilton, and Lake Ouachita as our study reservoirs. Tournament caught fish were held, with control fish, in specially constructed cages to determine the effects of delayed mortality. Fish that were dead, or died during weigh-ins, were considered to be initial mortalities.

Validation of a Model Predicting Crappie Response to A Length Limit

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Abstract.— An equilibrium yield model was used to evaluate a 254-mm minimum length limit for crappie *Pomoxis* spp. in Lake Chicot, Arkansas. The trends predicted by the model were compared to trends observed up to eight years after implementation of the length limit. The model predicted an increase in population abundance with and without a length limit, but predicted no changes in preferred or memorable relative stock densities. Contrary to the model, rotenone data from before and after the implementation of the length limit indicated no change in population abundance. Size structure of the population did not change and was not significantly different than the size structure predicted by the model. The model appears to be more useful in predicting trends in size structure than population abundance. The length limit on crappie in Lake Chicot has not affected population abundance or size structure, most likely because of low exploitation and high recruitment variability.

Application of Reservoir Modeling for Evaluation of Striped Bass Habitat

By Joel M. Galloway and W. Reed Green
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Hydrodynamics and dissolved oxygen were modeled for three White River reservoirs in northern Arkansas (Beaver, Bull Shoals, and Norfork Lakes) for the period of 1994 to 1995 to evaluate changes in the reservoir because of proposed changes in minimum flow releases from the dams. The results from the models were later used to evaluate (1) the extent of striped bass (*morone saxatilis*) habitat in the reservoirs with suitable temperature and dissolved-oxygen concentrations and (2) the impact of the proposed minimum flow on the suitable striped bass habitat. Three temperature and dissolved-oxygen concentration ranges were used to evaluate striped bass habitat: (1) low impact below 25 degrees Celsius or above 5 milligrams per liter, (2) negative growth impact between 25 and 27 degrees Celsius or between 3 and 5 milligrams per liter, and (3) mortality beginning above 27 degrees Celsius or below 3 milligrams per liter. Time series plots of the reservoir volumes that have temperatures greater than 27 degrees Celsius or dissolved-oxygen concentrations less than 3 milligrams per liter show that the greatest negative impact (largest reservoir volume) to striped bass habitat occurred from June to December (stratification season) for both 1994 and 1995 on Beaver, Bull Shoals, and Norfork Lakes. More volume was impacted in 1995 than in 1994 for all three reservoirs. The greatest negative impact occurred at Norfork Lake, with nearly 100 percent of the reservoir affected during the stratification seasons for both 1994 and 1995, predominately because of dissolved-oxygen concentrations less than 3 milligrams per liter. Two minimum flow scenarios were evaluated for each reservoir: (1) the application of the proposed increase in minimum flow releases and (2) the application of the increased minimum flow releases plus an increase in reservoir pool elevation to account for the reservoir volume lost to the increased minimum flow. Comparison of the results of the model of existing conditions and the two minimum flow scenarios showed differences of less than 5 percent in all three reservoirs in the volume affected by limited temperature and dissolved-oxygen conditions.

Exploitation of Tilapia in a Closed System, Public Fishing Reservoir

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Abstract

An exploitation study was conducted to determine total estimated harvest of tilapia *Oreochromis niloticus* in a 101hectare, closed system, public fishing reservoir. Reward dart tags were used to mark 8.7% of 10,028 adult tilapia stocked into Lake Hogue, Arkansas in May 2003. Another 100 adults were tagged and released into hatchery control ponds for tag retention analysis. Anglers harvested approximately 33.4% of the fish using traditional bream fishing techniques. Sportsmen captured an additional 16.3% using dip nets during the winter die-off. Tag return data results strongly suggest that fishermen target tilapia during the hot summer months. Results also suggest that tilapia stocking can be used to create a new type of fishing opportunity that generates significant angler interest during a time of the year when fishing pressure is typically light.

The Effect of the Introduction of Tilapia on the Fish PopulationIn a Closed System Reservoir: A Progress Report

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ABSTRACT

A study was conducted at Lake Hogue, Arkansas to determine the effect of the introduction of tilapia on the fish population of this closed system reservoir. Electrofishing and rotenone sampling data was used to identify fish population trend changes that occurred from 1997 through 2003. Otolith examinations did not demonstrate significant improvement in growth rates among largemouth bass (*Micropterus salmoides).*. No significant changes were noted in largemouth bass population size structure over the study period although relative weights of almost all sizes of bass were improved. Bluegill (*Lepomis macrochirus)* relative weights also showed some improvement. Spring electrofishing results suggested that population size structure for bluegill improved while fall electrofishing records showed that a decrease was observed in the quality of the bluegill fishery. Available prey to predator (*AP/P*) ratios improved for young, intermediate and adult predators following tilapia stocking. Sampling failed to demonstrate recruitment of young tilapia into the lake's fish population. Tilapia introductions did not produce any major change in the largemouth bass population but may have indirectly contributed to an improvement in the forage fish populations.

The Fishery of Prado Reservoir

Kenneth Shirley – Peace Corps ’76-‘78

Prado Reservoir is a hydroelectric reservoir built in 1966 on a tributary of the Magdalena River in Central Colombia. It is the largest warm-water reservoir in the country. The Reservoir is 10,000 acres in surface area and has a maximum depth of 300 feet. When impounded the reservoir trapped many species of riverine and river bottom lake fishes but was not stocked. Catfishes, cichlids, and characins were the primary fish groups in the reservoir. The trapped fish grew quickly in the impounded water and an excellent commercial fishery developed, partially or totally supporting dozens of families who moved to the shoreline. By the early 1970’s the fishery collapsed resulting in the Colombian government contracting with Peace Corps to provide volunteers to find out why and produce solutions to the collapse. The primary portion of the resulting study was a creel survey in which all commercial fish entering the major ports were identified measured and weighed. The most important finding was that the fish species supporting the initial excellent fishery were riverine species unable spawn above the reservoir. They grew well, but then disappeared rapidly. Also, the lake exhibited a typical “new reservoir” phenomenon of good growth and high biomass followed by a decline in productivity toward its sustainable level. Solutions to the problem included developing techniques to artificially produce fingerling characins from wild brood stock combined with design of a lakeside hatchery to produce them, stocking small adult catfish caught below the reservoir where they grow much larger than in the river, and developing small pond aquaculture to supplement the wild fisheries.

Statewide walleye genetic survey in Arkansas

Jon Stein—AGFC
Huseyin Kucuktas—Auburn University

The walleye is a popular sport fish in Arkansas, and is native to the White River and possibly to the Ouachita River. The Arkansas Game and Fish Commission (AGFC) manages several walleye populations and Greers Ferry Lake has produced the current world record (22 lbs). The AGFC has stocked walleye originating from 13 different sources (9 state agencies, 2 federal and 2 private hatcheries). But since 1988, we have established two different walleye spawning projects to ensure that native stocks are maintained. This paper discusses a genetics survey on walleye from five locations in Arkansas. Mitochondrial DNA was amplified with Polymerase Chain Reaction (PCR) and we compared Restriction Fragment Length Polymorphysms (RFPL) between walleye populations. Preliminary results suggest that the White River (Beaver Tailwater) population in northwest Arkansas was distinct from the other sample sites. However, samples from four populations still need to be analyzed and information will be used to determine if various spawning projects are needed.

Fishes of the Strawberry River: Composition, Condition, and Possible New Distributional Records

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Fish community samples were collected from 19 sites in the Strawberry River watershed during the summers of 2001 and 2002. There were 86 species collected from these sites. Robison and Buchanan (1992) report 93 species of fish as occurring in the watershed, and The Nature Conservancy reports 103 fish species from the river (2002 personal communication with Ronnie Ulmer, TNC Winsboro LA.).

The cyprinids (minnows and shiners), centrarchids (sunfishes), and the percids (darters), comprised over 93% of all fishes collected. There were 22 species of cyprinids collected during the survey which represented over half of the total specimens collected. The stoneroller, bleeding shiner and bigeye chub were the most abundant cyprinids collected. There were 20 species of darters collected representing over 21% of all specimens collected. The rainbow darter was the most abundant darter collected. The centrarchids accounted for over 18% of all fishes collected with the longear accounting for almost 13% of the total specimens.

The tributaries of the Strawberry River watershed, excluding South Big Creek each demonstrated a similar fish community structure that was somewhat different than the average fish community structure of the Ozark Highland ecoregion reference streams. The minnows and catfishes were less abundant but the sunfishes and darters were more abundant. In addition, the percentage of primary feeders in these communities was lower and the diversity indices at each of the sites were much higher than those of the Ozark Highlands ecoregion sites. This is significant when assessing each of the communities to determine community health based on ecoregion based biological indicators. Without taking into account community composition differences that can occur between communities because of watersheds, an incorrect assessment could be concluded.

Ten species of fishes were collected during this survey that have had either a limited number of previous records or are perhaps new records for the Strawberry River: *Hiodon tergisus, Erimystax harryi, Mosostoma anisurum, Moxostoma carinatum, Moxostoma macrolepidotum, Lepomis puntactus, Crystallaria asprella, Etheostoma asprigene, Etheostoma proeliare,* and *Percina phoxocephala.* Additional literature research and/or taxonomic confirmation are pending.

Fish Communities of the Buffalo River Basin and Adjacent Basins and Comparison of Communities to Environmental Factors

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Fish communities of the Buffalo River Basin and adjacent basins of north-central Arkansas were sampled at 52 sites during the summers of 2001 and 2002 in a cooperative effort of the National Park Service, U.S. Forest Service, Arkansas Game and Fish Commission, and U.S. Geological Survey. This was the first extensive sampling of the Buffalo River since 1973. A total of 57 species was collected from within the boundaries of the Buffalo National River during this study. Although 10 previously collected species were not found, 4 new species were collected during this sampling effort. Communities throughout the study area typically are numerically dominated by minnows, sunfish, and darters. Comparison of selected taxonomic and trophic metrics among site categories (mainstem, tributary, headwater, and developed out-of-basin sites), multivariate analyses, and correlation analyses with selected environmental factors suggests that basin size and related channel morphometry factors are among the factors having the most influence on fish communities of the Buffalo River Basin and adjacent basins. Factors related to land use (such as water quality, bank condition, substrate embeddedness, and substrate size) generally had less influence on fish community structure. For example, stoneroller relative abundance generally was highest at small, forested headwater sites but also was high at developed out-of-basin sites with higher percentages of cleared land in their basins. Also, the relative abundance of invertivores typically was highest at mainstem sites and lowest at sites with smaller basins or higher percentages of cleared land in their basins.

The Freshwater Mussel Resources of the Sulphur and Little Rivers in Arkansas

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Arkansas is home to at least 75 species of freshwater mussels with additional species added as surveys and research continue. The Sulphur and Little rivers in Southwest Arkansas currently support a diverse mussel fauna that had been relatively unknown until recent surveys were conducted. This fauna has been economically important for commercial shell takers since 1992 where 39.9 tons of mussels have been harvested.

During the late 1970's and early 1980's, qualitative surveys were conducted in the Little River above Lake Millwood to determine locations for endangered species. In an effort to gather baseline data from both rivers, additional qualitative surveys were conducted in 2002 and 2003 to determine species composition of the Little and Sulphur rivers in Arkansas. Most of the 2002 and 2003 surveys were conducted in the Little River below Millwood Dam while the Sulphur River was surveyed from the Texas/Arkansas state line to the Hwy 71 Bridge in 2003.

Thirty-eight mussel species have been reported from the Little and Sulphur rivers in Arkansas. The Little River is the most speciose of the two with 37 total species reported. Of those, nine species are reported as dead or relic specimens. The Sulphur River contained 17 species, one of which is reported as a relic only.

The pimpleback (*Quadrula pustulosa*) is the numerically dominant species in the Little River followed by the three-horned wartyback (*Obliquaria reflexa*). At least two federally listed endangered mussels are known from the Little River and include a relic shell of the pink mucket (*Lampsilis abrupta*) and an extant, reproducing population of the Ouachita rock pocketbook (*Arkansia wheeleri*). The Sulphur River mussel fauna is dominated by the mapleleaf (*Q. quadrula*) followed by the southern mapleleaf (*Q. apiculata*). No federally listed species have been reported from the Sulphur River.

Title: Attitudes, preferences, motivations, and recreational specialization of Arkansas trout anglers.

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Abstract: Over 2,100 Arkansas trout permit holders were interviewed by phone during September-October 2003. The sample of resident and non-resident anglers was drawn randomly from the Arkansas Game and Fish Commission (AGFC) licensing database for fiscal year 2002-2003. Survey questions were designed to examine the motivations, attitudes, and management related preferences of trout anglers in Arkansas. Data gathered from the interviews will also allow for the determination of angler specialization level based on: (1) angling experience, (2) fishery resource use, (3) centrality of fishing to the angler's lifestyle, and (4) monetary investment in angling equipment. Analysis will involve investigating differences in angler behavior and characteristics based on residency, site fished most frequently, and specialization level. Results of this study will aid the AGFC Trout Management Program in the development and implementation of management plans for the various trout resources in the state.

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Presentation Media: Powerpoint

Title of Study: INITIAL PRODUCTION RESPONSES OF BLUEGILLS, REDEAR SUNFISH, AND LARGEMOUTH BASS TO THE ADDITION OF COVER IN NEWLY-IMPOUNDED SOUTHEASTERN U.S. FARM PONDS

Abstract:

Growth and condition of largemouth bass (*Micropterus salmoides*), bluegills (*Lepomis macrochirus*), and redear sunfish (*Lepomis microlophus*) were compared in four ponds with and without artificial structure. Evaluated were two treatment ponds with Virginia pine (*Pinus virginiana*) tree structures, and two control ponds without structures. Growth of largemouth bass and bluegills was significantly higher in ponds containing structure than in control ponds over the study period. There was no difference in redear sunfish growth in ponds with or without structure. There was no significant difference in condition of largemouth bass, bluegills, or redear sunfish between treatments. Abundance of bluegills and redear sunfish was affected more by the timing of the development of a phytoplankton bloom in the ponds than by the presence of structure. The primary effect of the structure was the facilitation of more efficient predator-prey interactions between both bluegills and invertebrate fauna and largemouth bass and bluegills.

Crayfishes of Arkansas: Diversity and Status

Brian K. Wagner
Arkansas Game & Fish Commission

Henry W. Robison and Jan Rader
Southern Arkansas University

Few states have comprehensive information on their crayfish fauna, yet experts consider crayfish one of the most imperiled faunal groups in North America. We are working to compile existing information and collect new data to assess the status of Arkansas' crayfish fauna. The currently recognized fauna numbers approximately 60 taxa in seven families, and we are aware of other species awaiting formal description. Arkansas boasts the most diverse fauna west of the Mississippi River, only exceeded by a couple eastern states. This is due to a high level of endemism: 15 are endemic to Arkansas and an additional 27 are limited to small areas of Arkansas and neighboring states. Two of the four federally protected crayfish are found in Arkansas. The status is much more alarming when it is noted that The Nature Conservancy considers that globally 10 Arkansas' crayfish are critically imperiled, 11 are imperiled or rare, and 34 have unknown status in the state. Our data compilation is the first step adequately conserving this poorly known fauna, and is a focus area for AGFC's Nongame Aquatics Program.

The Watershed Approach: A Partnership for Protection

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ABSTRACT: The word "Watershed" has become the new buzz word in the environmental field over the past few years. Even though this word is commonly heard, only 41% of Americans had any idea of what the term "watershed" meant. (National Environmental Education and Training Foundation 1999) The watershed is becoming the geographic unit of reference in which environmental issues are being addressed. The watershed includes all the land and the water, the forests and the farmland, and the homes and the businesses located within this unit. Using a watershed approach to address environmental issues requires an understanding of the local natural resources, economics, and ecology and requires stakeholder involvement. The watershed approach is valuable because it brings together different entities: loggers, farmers, ranchers, business owners, organizations, students, elected officials, corporations, and local, state and federal governments. These stakeholders have the task of finding common ground in their beliefs and practices and focusing on the issue of protecting the aquatic resource. This partnership of stakeholders combines knowledge, technical resources, manpower, financial assistance, and responsibility. The result of using a watershed approach yields a sense of ownership in the aquatic resource and a more cooperative effort when compared to traditional forms of environmental issues resolution.

Bull Shoals Aquatic Macrophyte Restoration Project

D. Colton Dennis and Kevin Hopkins
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Bull Shoals, a 45,440-acre flood control and hydropower reservoir of the White River in north central Arkansas and managed by the U.S. 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 (black basses and sunfishes) 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 cooperative agreement with the U.S. Army Corps of Engineers to restore aquatic vegetation in Bull Shoals reservoir in an effort to improve the standing crop of centrarchid species in the lake. During 2001, the AGFC began the initial phase of the project with a pilot study intended to determine which species of plants were suitable for introduction to Bull Shoals. Enclosures to exclude herbivorous animals, such as carp and turtles, were constructed and placed at five suitable locations. Five different species of native aquatic plants were placed in each of the 75 enclosures by using SCUBA equipment. Growth and survival of the planted species exceeded expectations on Bull Shoals reservoir with only one of five species not surviving and the remaining species expanding within the remaining enclosures. Phase II of the project scheduled to begin in 2002 was delayed a year due to high water levels in Bull Shoals (30 ft. above conservation pool) throughout much of the growing season. Phase II of the project began in 2003 with AGFC and Corps personnel establishing founder colonies at the five 2001 planting sites. Two different plantings were conducted in 2003, which included using 14 different species, totaling 1700 plants, at eight different water levels. The results of the 2001 and 2003 plantings in addition to plans for a continuation of Phase II in 2004 have been summarized in this presentation.