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Regional Reports

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Regional Reports

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REGIONAL REPORTS

REGION I-NORTHEAST

John Odenkirk of the Virginia Department of Game and Inland Fisheries (VDGIF) reports that the 2007 sampling season for the non-native northern snakehead (*Channa argus* or NSH) saw decreased time on the Potomac River for VDGIF crews in the form of boat electrofishing samples due to the presence of investigators from Virginia Tech University. The Tech students and technicians were involved in a variety of intensive studies, many of which had parallel objectives. This crew made a variety of timely discoveries and data are still being analyzed, but look for some good future publications. Sampling that was completed by VDGIF crews during 2007 resulted in a NSH boat electrofishing mean catch rate of 2.9 fish per hour which represented a decline from 2006 (6.1 fish per hour). However, there was no significant difference between catch rates in 2006 and 2007. Catch rate in 2006 was significantly higher than in 2004 or 2005. The linear trend continued to indicate an increasing population. Reported angler catches (34) reached a third consecutive annual record despite decreased publicity. This linear trend also indicated an increasing population. Range, based on angler catches, increased substantially and known colonized waters included approximately 80 km of the mainstem Potomac River from Little Falls (Washington, D.C.) downstream to Aquia Creek (Stafford County, Virginia) including tributaries within Maryland, Virginia, and D.C. VDGIF plans to resume bi-monthly assemblage and NSH-specific sampling April-September in an effort to document NSH population characteristics and any potential changes to the fish assemblage.

When not analyzing specimens and writing up results on the sicklefin redhorse and Carolina redhorse (*Moxostoma sp. cf. erythrurum*), Dr. Robert Jenkins did find the time to retire from Roanoke College. Since then he has worked with Lee Henebry, a Roanoke College senior, who is completing a major report on a two-year study of age, growth, maturation, female gonadal cycle, chronology of spawning, and sexual dimorphism of the bigeye jumprock (*M. ariommum*), an upper and middle Roanoke River basin drainage endemic. The species is listed as State Threatened in North Carolina. For a small fish (standard length < 200 mm), they have aged this somewhat bizarre sucker to a maximum age of 15 years.

The Carolina madtom (*Noturus furiosus*) is a rare fish endemic to the Tar and Neuse River basins in North Carolina. It is a species of Special Concern and also a proposed state Threatened species as ranked by the North Carolina Wildlife Resources Commission and the North Carolina Natural Heritage Program. Surveys over the last two decades suggested a decline in historic populations.

Two projects are currently underway. The first project is at North Carolina State University where work is entering its second year. Graduate student Steve Midway, who is advised by Drs. Tom Kwak and Derek Aday, is working in the field and in the laboratory trying to answer general life history questions as well as understand more specific behaviors. Field work is helping them understand habitat use and availability, whereas habitat preferences are being tested in controlled laboratory experiments. Surveys were conducted in 2007 in the Tar River basin (TRB), while 2008 surveys will be conducted in the Neuse River basin (NRB).

The second project started in 2007 when Chris Wood and Rob Nichols, non-game biologists with the NCWRC, conducted 60 surveys at 30 sites with historical records of *N. furiosus*. Data were compared to records from the 1960s to detect any temporal change in occurrence. They also applied a new method to estimate the proportion of sites occupied (occupancy) and detection probabilities for a subset of sites with the computer software package PRESENCE using repeat detection/non-detection data. Additionally, they examined aspects of the general biology and population structure of *N. furiosus* (e.g., spawning period, size structure, age structure, CPUE, etc.). Results indicated a significant temporal change in occurrence in the NRB ($X^2 = 0.30$, $p < 0.05$). Frequencies of occurrence decreased from 0.67 (SE = 0.05) to 0.13 (SE = 0.04) between the 1960s and 2007 data. Only one site surveyed in the NRB displayed a robust population. There was no significant temporal change in occurrence in the TRB. Occupancy estimates were similar to observed frequencies of occurrence due to high detection probabilities. Availability of nesting locations was an important covariate in estimates of occupancy. Further investigations are needed to determine if estimating occupancy represents an important state variable for long term, large scale monitoring programs.

Michael Fisk, a graduate student at North Carolina State University, has begun working with staff from the NCWRC and Progress Energy, studying robust redhorse (*M. robustum*) on the Pee Dee River in North and South Carolina. The goals of the project are to describe spawning habitat, compare spawning and non-spawning habitat-use versus habitat availability, and to determine the effects on habitat-use before and after a spring minimum flow is established for the Blewett Falls Hydroelectric Plant. The Robust Redhorse Pee Dee Technical Working Group will be sampling the river this spring to collect additional adult fish to insert radio tags with the hope that habitat-use data will be collected from relocating radio-tagged fish. The purpose of the study is to gain a better understanding of the species spawning habitat requirements in the Pee Dee River and to determine if the minimum flow regime will benefit spawning riverine fishes such as *M. robustum*.

Ryan Heise with the North Carolina Wildlife Resources Commission has also been working with *M. robustum*, conducting electrofishing surveys and radio tracking on the Pee Dee River in North and South Carolina. Ryan is working with the Robust Redhorse Conservation Committee (RRCC), a cooperative, voluntary partnership formed between state and federal resource agencies, private industry, and the conservation community to direct the recovery of the species. One of the major goals of the RRCC is to evaluate the population status and distribution of this species throughout its known range. The objectives in the Pee Dee River are to determine the status of the *M. robustum* population, document habitat use, and determine migratory patterns. A total of 51 *M. robustum* were captured from 2000-2007 (including 14 recaptures). Forty-nine adult *M. robustum* have been captured in large Piedmont shoals and side channels in a 20 rkm reach immediately downstream from Blewett Falls Dam in North Carolina. To improve catch rates and learn more about *M. robustum* life history, a radio tagging study began in 2005. Telemetry relocations and capture data indicate that some of these fish make long distance movements (up to 100 rkm) downstream into the South Carolina Coastal Plain region, use the shoal habitats near Blewett Falls Dam for spawning, and show spawning site fidelity. Efforts on the Pee Dee River will continue in order to better understand *M. robustum* life history requirements.

John Crutchfield, lead environmental specialist for Progress Energy, reports that in the near future, American shad (*Alosa sapidissima*) and American eel (*Anguilla rostrata*) will be making their way past Blewett Falls Dam on the Pee Dee River, thanks to a hydro relicensing agreement reached between Progress Energy (the hydro project owner) and NMFS, USFWS, NCWRC, and the South Carolina Department of Natural Resources. The agreement provides for fish passage around Progress Energy's Blewett Falls and Tillery hydroelectric plants, beginning in 2013. Under the agreement, fish passage facilities will be built and will begin operation by 2013, including provisions for creating downstream passage. *Alosa sapidissima* will be captured, sorted, and transported by tanker truck to specified areas in the river basin above the Blewett and Tillery dams. *Anguilla rostrata* will utilize a lift-ladder system to move them past Blewett Falls Dam. The plan will focus on the long-term enhancement of these two major migratory species in the Yadkin-Pee Dee River basin. In addition to the passage program, several studies will be conducted to monitor the populations of both species and to determine the effectiveness of the passage program. According to Crutchfield, these agreements provide a balanced, scientific approach to passing these species upstream of our power plants and they are the culmination of two years of negotiations among all parties to reach a mutually agreeable solution to enhance this migratory fish resource. The relicensing process for the Tillery and Blewett hydroelectric plants began in 2003 and the next license is expected to be issued during this summer.

The North Carolina Wildlife Resources Commission has recently updated non-technical, educational profiles for several species of fishes: the Carolina madtom (*Noturus furiosus*), tangerine darter (*Percina aurantiaca*), American shad (*Alosa sapidissima*), Atlantic sturgeon (*Acipenser oxyrinchus*), walleye (*Sander vitreus*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), Roanoke hog sucker (*Hypentelium roanokense*), black crappie (*Pomoxis nigromaculatus*), and white crappie (*Pomoxis annularis*). These profiles may be found at: http://www.ncwildlife.org/pg10_OutdoorKids/pg10d_1.htm

According to Bryn Tracy at the North Carolina Division of Water Quality (NCDWQ), between early April and late June 2007, the stream fish assemblage assessment program sampled 87 basin-wide sites in the Tar, Catawba, and French Broad River basins. The complete data, ratings, analyses, and reports for these river basins will be available in spring 2008 at <http://www.esb.enr.state.nc.us/BAU.html> and <http://www.esb.enr.state.nc.us/bar.html>. Fish assemblage data collected by NCDWQ are used for more than just basin-wide assessments. Each year the data are screened from sites that are consistently rated excellent and may be eligible for supplemental classification as High Quality Waters (HQW) or Outstanding Resource Waters (ORW). HQW is a supplemental classification that is, "...intended to protect waters with quality higher than state water quality standards." HQW are generally those waters that are, "...rated as excellent based on biological and physical-chemical characteristics through Division monitoring or special studies," (NCAC, 2007). ORW are considered, "unique and special waters of exceptional state or national recreational or ecological significance and that the waters have exceptional water quality while meeting the following conditions: 1) that the water quality is rated as excellent based on physical, chemical or biological information; and 2) the characteristics which make these waters unique and special may not be protected by the assigned narrative and numerical water quality standards," (NCAC 2007). In addition, a waterbody must exhibit one or more values or uses: "1) there are outstanding fish (or commercially important aquatic species) habitat and fisheries; 2) there is an unusually high level of water-based recreation or the potential for such recreation; 3) the waters have already received some special designation which do not provide any water quality protection; 4) the waters represent an important component of a state or national park or forest; or 5) the waters are of special ecological or scientific significance such as habitat for rare or endangered species or as areas for research and education," (NCAC 2007). In addition to the HQW and ORW requests for reclassifications, DWQ also receives reclassification requests to reclassify waterbodies to trout waters. Trout waters are those that, "...are freshwaters protected for natural trout propagation and survival of stocked trout... trout waters are those waters which have conditions which shall sustain and allow for trout

propagation and survival of stocked trout on a year-round basis" (NCAC 2007).

Based on these criteria, since 2000 at least 14 waters have been formally reclassified or are in the process of being reviewed for reclassification, using fish data. These waters are:

- Outstanding Resource Waters (ORW): Swift Creek, Tar River basin; Little Grassy Creek, Catawba River basin; Deep Creek, Neuse River basin; North Fork First Broad River, Broad River basin, and Buffalo Creek and upper Yadkin River, Yadkin River basin
- High Quality Waters (HQR): Walnut Creek, Broad River basin, and North Prong Lewis Fork, Yadkin River basin.
- Trout Waters: Wesser Creek, Tuskegee Creek, and Camp Creek, Little Tennessee River basin; and Richland Creek, Fines Creek, and Boylston Creek, French Broad River basin.

(Reference: NCAC. 2007. North Carolina administrative code. Effective May 1, 2007. Environmental Management Commission. North Carolina Department of Environment and Natural Resources. Division of Water Quality. Raleigh, NC.)

Based upon an examination of the 2007 data, unusual or new DWQ distributional records have been recorded for the following river basins. The basis for determining if a record is unusual or new is if the collection is not shown in Menhinick (1991) or if it was collected for the first time by staff from a particular county in the river basin of interest. These records are:

Tar River basin

- eastern mudminnow (*Umbra pygmaea*), Little Fishing Creek, Warren County
- flat bullhead (*Ameiurus platycephalus*), Red Bud Creek, Nash County
- green sunfish (*Lepomis cyanellus*), Parker and Tyson creeks, Pitt County

Yadkin River basin

- central stoneroller (*Camptostoma anomalum*), Forbush Creek, Yadkin County

Catawba River basin

- fieryblack shiner (*Cyprinella pyrrhomelas*), Glade Creek, Alexander County
- coastal shiner (*Notropis petersoni*), Waxhaw Creek, Union County
- fathead minnow (*Pimephales promelas*), Duck Creek, Alexander County
- mountain redbelly dace (*Phoxinus oreas*), Mulberry Creek, Caldwell County
- green sunfish (*L. cyanellus*), Curtis and North Muddy creeks, McDowell County

French Broad River basin

- rosieside dace (*Clinostomus funduloides*), Crab Creek, Transylvania County
- green sunfish (*L. cyanellus*), North Toe River, Avery County

- swamp darter (*Etheostoma fusiforme*), Fines Creek, Haywood County

The inter-basin transfer and introduction of species has been documented in years past during the assemblage assessments. For example, in the Catawba River basin, the greenhead shiner (*Notropis chlorocephalus*) should be one of the dominant native species. In the adjacent Yadkin River Basin, it is the redlip shiner (*N. chiliticus*). However, in several streams in Alexander, Lincoln, and Mecklenburg counties, *N. chiliticus* has displaced or has hybridized with the *N. chlorocephalus*. Ethanol-and formalin-preserved specimens of both species from throughout the Catawba River basin were vouchered at the North Carolina State Museum of Natural Sciences for future studies on the distribution and possible hybridization of these two species. Mollie Cashner, a Ph.D. candidate at Tulane University, is actively studying the hybridization of these two species in this part of the Catawba-Santee River basin.

A recent examination of data from the French Broad River Basin in North Carolina, documented at least 21 non-indigenous species have been reported from the basin. The list includes: threadfin shad (*Dorosoma petenense*), goldfish (*Carassius auratus*), rosieside dace (*C. funduloides*), grass carp (*Ctenopharyngodon idella*), common carp (*Cyprinus carpio*), bluehead chub (*Nocomis leptoccephalus*), fathead minnow (*P. promelas*), creek chubsucker (*Erimyzon oblongus*), white catfish (*Ameiurus catus*), flat bullhead (*A. platycephalus*), chain pickerel (*Esox niger*), rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), eastern mosquitofish (*Gambusia holbrooki*), white bass (*Morone chrysops*), redbreast sunfish (*Lepomis auritus*), green sunfish (*L. cyanellus*), pumpkinseed (*L. gibbosus*), redear sunfish (*L. microlophus*), swamp darter (*E. fusiforme*), and yellow perch (*Perca flavescens*). Not included in this list are some tropical fish that now call the Basin home — the blue tilapia (*Oreochromis aureus*) and the Amazon sailfin catfish (*Pterygoplichthys pardalis*) which are found in Lake Julian (Buncombe County) and an unknown species of pacu which was caught in the Pigeon River (Haywood County) in August 2007. Species that seem to be recently expanding their ranges include *N. leptoccephalus*, *E. niger*, and *A. platycephalus*. If you are aware of additional distributional records of the North Carolina fauna or introduced species, please share this information and voucher your specimens with Wayne Starnes at NCSMNS (wayne.starnes@ncmail.net). Also, please share any of your locality records with Bryn H. Tracy (bryn.tracy@ncmail.net).

Wayne Starnes and Gabriela Hogue report that the big push to database NCSM's fish holdings made substantial headway over the past year. Fully databased lots (including complete geo-referencing) number approximately 45,000 as of this writing. These include the entire original NCSM holdings (i.e., exclusive of the numerous orphan collections acquired over the past 15 years), the nearly 3,000

large tank and vat specimens (most of these stemming from the UNC Institute of Marine Science collection acquired in 1996), thousands of lots of NC Division of Water Quality voucher material from their statewide IBI program, and numerous other freshwater and marine accessions. Moreover, locale data for nearly the entire UNC IMS collection, the extensive NC Wildlife Resources Commission 1960s statewide surveys material, and the collections of Rudy Arndt and Fritz Rohde from NC, SC, and NJ have been upgraded, georeferenced, and entered in preparation for databasing an additional 30,000 or more lots associated with those acquisitions. NCSM's current funding from NSF expires in July and an attempt to renew fell slightly short, but will be sought again for 2009. Meanwhile, support from the NCWRC for the curation and databasing of the backlog of their early 1960s surveys material appears to be committed and will be important in sustaining this heightened databasing effort until perhaps NSF support can be again obtained. It is estimated that an additional 45,000 to 50,000 lots comprising the various orphan collections are yet to be fully processed and databased, though the aforesaid effort to enter and georeference locales will facilitate the completion of a large portion of these.

By about the time this report is published it is hoped that the databased portions of NCSM's fish holdings (plus herpetological and aquatic invertebrate holdings) will be fully accessible online via the new collections webpage that is now in the final testing phases. These may also include a mapping feature. All should soon be available as a link from the Museum's main site (<http://www.naturalsciences.org/>) plus other avenues. It is also planned to participate in the GBIF effort and other networks that globally link collections. Uploads of NCSM's holdings are already supplied to the Discover Life site (<http://www.discoverlife.org/>) created in a large part and maintained by John Pickering of the University of Georgia.

In other NCSM news, Morgan Raley, Wayne Starnes, and Art Bogan are in the final stages of translocating and re-equipping the museum's molecular lab, formerly operated jointly with the NCSU College of Veterinary Medicine. It will occupy a mobile lab facility located at the museum ResLab facility in west Raleigh and reside there for approximately two years until the new Nature Search facility is completed in downtown Raleigh adjacent to the main museum. This will be a multi-venue forum in which scientists and the public are in close interaction, with the aim of better conveying how research is done and its relevance to that public. It will feature a working molecular lab which interfaces with programming and outreach, showcasing the role of both genetics and natural history collections in biodiversity research and conservation. Both in the interim facility and future home, various systematic and conservation genetics projects on fishes, freshwater mussels, and other organisms will be pursued. Tangential to this effort, NCSM has begun the accumulation of sizeable collections of ethanol preserved tissues and associated vouchers of

diverse species from the eastern U.S. and further afield. Currently, funding for freezer facilities are being sought in order to better maintain tissues for the long term and it is proposed that this facility could become a designated major tissue repository for the southeastern U.S.

In other news, perhaps not reported elsewhere, North Carolina has had a new native species recorded from the state. The federally endangered Roanoke logperch (*Percina rex*) was twice taken in 2007. Duke Energy biologists took a juvenile while sampling in the Dan River below the dam at Eden, NC. Follow up work by Wayne Starnes NCWRC biologists Rob Nichols, Chris Wood, and Megan McCormick yielded a large adult male from a large shoal area in the nearby Smith River in the town of Eden. This is a considerable downstream range extension from populations known in the upper Smith River area in Virginia. Further sampling is planned to learn more of the extent of this population. On the other side of the state, the golden topminnow (*Fundulus chrysotus*) was discovered by Fritz Rohde to now penetrate into NC in swampy areas south of Lake Waccamaw. Just how long this species has resided in the state is questionable but this region has not been without a significant amount of sampling in past decades. These collections may represent the gradual and somewhat recent northward dispersal of this extremely attractive species into NC waters.

During June to October 2007, Gerald Pottern of Robert J. Goldstein and Associates and NC-WRC staff surveyed for the federally endangered Cape Fear shiner (*N. mekistocholas*) in Haw River (10 collections), Deep River (14 collections), Rocky River (11 collections), Cape Fear River (15 collections), and a few major tributaries in Chatham, Lee, Harnett, Moore, and Randolph counties in central NC. This was the first comprehensive range-wide survey for *N. mekistocholas* since the original status survey in 1984-1986. Backpack shocking and seining were both attempted, but shocking was discontinued when it became apparent that using two seines was much more effective in capturing large schools of mixed shiners in which *N. mekistocholas* were often found. The extreme drought of 2007 facilitated sampling in bedrock and boulder-dominated river segments. These are extremely difficult to wade and sample during normal flow conditions. Tributary streams, even the largest ones, had negligible flow and most yielded only fish species typical of headwater streams and lentic habitats. This suggested that fishes typical of larger flowing streams had moved downstream out of the tributaries. Consequently, most effort was focused on the main rivers and mouths of tributaries.

In the Lower Deep and Rocky Rivers, the 2007 survey yielded approximately 85 *N. mekistocholas* at five sites on the Deep River between NC Highway 22 below Highfalls Dam (Moore County) and US-1 near Moncure (Chatham-Lee County line). *Notropis mekistocholas* appears to be doing well in this 56 km river segment, especially in shallow rocky areas with abundant water willow (*Justicia* sp.), riverweed (*Podostemum* sp.), and filamentous algae. The

removal of Carbonton Dam in 2005 has restored several miles of free-flowing habitat and may improve genetic exchange between shiner sub-populations upstream and downstream. The 2007 survey also found 13 *N. mekistocholas* specimens at five sites on the lower five miles of Rocky River in Chatham County, between Woody Dam and the Rocky-Deep River confluence. Previous collections from 1984 to 2004 have also found *N. mekistocholas* to be relatively common in the lower Rocky River and Deep River between Highfalls Dam and Moncure.

In the Upper Deep River, the 2007 survey yielded only one *N. mekistocholas* from the Deep River upstream of Highfalls Dam, taken at the foot of Coleridge Dam near NC Highway 22-42 in southeastern Randolph County. This represents the furthest upstream that *N. mekistocholas* has been collected in Deep River. Previous collections between Coleridge Dam and Highfalls Dam include 3 specimens taken in 1985 (Pottern) and 28 specimens taken between 1992 and 1994 (NC-WRC). *Notropis mekistocholas* appears to be uncommon or rare in Deep River between Coleridge Dam and Highfalls Dam and has never been reported upstream of Coleridge Dam. Our farthest upstream sample was just below Ramseur Dam, 11 km above Coleridge. It is unclear what effects the recently built Randleman Reservoir (on Deep River just upstream of Ramseur) may have on flow regimes, temperature, water chemistry, nutrient cycling, or other ecological parameters downstream in occupied *N. mekistocholas* habitat.

In the Upper Rocky River, six collections from Rocky River upstream of Woody Dam in Chatham County, where *N. mekistocholas* was common in collections from 1966 to 1971, yielded no specimen in 2007. The species apparently declined in Rocky River during the 1970s (prompting the 1984 status survey) and the last record upstream of Woody Dam was a single specimen collected at NC Highway 902 (type locality) in 1985. *Notropis mekistocholas* appears to be extirpated from Rocky River above Woody Dam. However, all other species of minnows, darters, killifish, madtoms, and other riffle-pool dwelling fishes previously reported from Rocky River are still present in this segment as of 2007 and the habitat still looks suitable for Cape Fear shiners.

The 2007 survey yielded one *N. mekistocholas* in Haw River, taken 6.4 km upstream of Bynum Dam in Chatham County, slightly upstream of the Rock Rest area where NC-WRC collected several specimens in 1993 and one in 2000. No specimens were found in 2007 in Haw River downstream of Bynum Dam where NC-WRC collected a few specimens in 1992 between US-15-501 and US-64. The lower 13 km of Haw River, downstream of US-64, is impounded by two dams and no longer suitable for *N. mekistocholas*, including the Robeson Creek area where this shiner was fairly numerous in the 1960s prior to Jordan Lake Dam construction. *Notropis mekistocholas* appears to be rare in Haw River above Bynum Dam and rare, or perhaps extirpated, between Bynum Dam and Jordan Lake. It is almost certainly extirpated from the segments impound-

ed by Jordan Lake Dam and Buckhorn Dam.

The 2007 survey yielded only one *N. mekistocholas* in Cape Fear River, just below NC Highway 217 near Erwin in southern Harnett County. This represents the farthest downstream the species has been recorded in Cape Fear River. No *N. mekistocholas* were found in tributaries in 2007, or in 7 collections from Neills Creek over a two-day period in 2003 (according to Gerald Pottern and Ryan Heise). Previous collections in Cape Fear River and tributaries below Buckhorn Dam include 22 specimens from Neills Creek and Parkers Creek in 1962 (NC-WRC), one specimen from the main river in 1975 (CP and L), and six specimens from Neills Creek in 1986 (Pottern). This new collection near Erwin confirms that *N. mekistocholas* is extant but rare in Cape Fear River and in Harnett County. Apparently suitable habitat extends from the foot of Buckhorn Dam (Chatham-Lee County line) to the Harnett-Cumberland County line, below which rocky riffle-pool habitat is absent and the river transitions to a Coastal Plain ecosystem.

Amanda Hill of the USFWS (Charleston, SC) was selected to present at the 2nd International Symposium on Diadromous Fish: *Challenges for Diadromous Fishes in a Dynamic Global Environment*, held in Halifax, Nova Scotia in June. Amanda was one of 42 selected worldwide to provide an oral presentation at the symposium. Her presentation titled, "*The Santee Cooperative Accord: Restoring Diadromous Fish through Prioritization of Sub-basins*" focused on a developing collaborative approach among federal and state resource agencies and utility companies to restore diadromous fish in the Santee Basin. Amanda represents the Service's goals of protecting and conserving inter-jurisdictional fishes as the Service's hydropower coordinator in South Carolina. She actively participates in the Federal Energy Regulatory Commission's relicensing processes for hydroelectric projects.

Mark A. Cantrell of the USFWS (Asheville, NC) also attended the symposium and was selected to contribute in one of two poster sessions. His poster titled "*How Dammed is Your Watershed: First Approximation of an Index to Relative Dammedness of United States Watersheds*" provides an index of dams on multiple scales with focus on the Atlantic Coast. The Dammed Index can be used to evaluate diadromous fish restoration efforts among watersheds. In related work, Mark continues to seek out-migrating American eels (*A. rostrata*) while they are in their 'silver eel' phase with an array of large fyke nets in the Lower Pee Dee and Santee Rivers during late Fall.

The symposium was sponsored by the American Fisheries Society Northeast Division and was attended by over 200 international scientists. Only the second international symposium on the topic, attendees reflected on the first symposium held in 1986, *Common Strategies of Anadromous and Catadromous Fishes*. The 2007 symposium focused on new aspects of biology, migration, energetics, effects of climate change, and population dynamics

of diadromous fishes. Presenters and attendees came from over 20 countries to listen to 42 presentations on a diverse range of topics in six sessions, with a special emphasis on anthropogenic impacts and management in a changing global climatic environment. Proceedings from the meeting, including Amanda's full manuscript and Mark's poster abstract will be published in the AFS Symposium series.

– Wayne Starnes

REGION II-SOUTHEAST

Carrie Straight, Bud Freeman, Mary Freeman, and Brett Albanese are continuing to work on the Georgia Fish Atlas Project. To date, they have developed a draft website with pictures and downloadable maps for over 100 species. The draft website will be advertised to SFC members when it is ready for review. On a related note, the Nongame Section is working with species experts to develop species accounts and photos for fishes, crayfishes, mussels, and dragonflies that were added to Georgia's protected species list in fall of 2006. Carrie Straight has begun her dissertation work on robust redhorse (*M. robustum*) in the Broad River system of Georgia. Bud and Mary's students along with Megan Hagler have many projects in the Conasauga and Coosa systems this year, including a sampling efficiency study for the federally endangered Conasauga logperch (*Percina jenkinsi*). The DNR Stream Team has initiated sampling in the Southern Coastal Plain Ecoregion of Georgia, which is resulting in many new distribution records for Georgia fishes. The Stream Team recently hired Paula Marcinek to assist them with fish identification, sampling, and data analysis. Jim Peterson and Jason Meador of UGA Forestry-USGS have recently completed a monitoring protocol for freshwater mussels in the Altamaha Basin. Jason Wisniewski is working with Colin Shea on a similar monitoring program for mussels in the lower Flint River system of southwest Georgia. The Warnell School of Forest Resources (UGA) hired Dr. Robert Bringolf in 2007. Robert has extensive experience with fishes, mussels, and toxicology issues and is eagerly pursuing these interests in the Conasauga system. Also in the Conasauga, the USFWS Crew and TNC sponsored a conservation and research summit for the Conasauga system this spring. The summit was very successful and Alice Lawrence (USFWS) has followed through with a list of high priority tasks and an email listserve for conference participants.

– Brett Albanese

REGION III-NORTH CENTRAL

Steve Fraley and T. R. Russ of the North Carolina Wildlife Resources Commission (NCWRC) report that the Pigeon River Fish Restoration (French Broad River basin) continues to move forward. Since 2003, the NCWRC and

cooperators from the University of Tennessee, Blue Ridge Paper Products, the North Carolina Division of Water Quality, Western Carolina University, and others have been working to reintroduce native fishes to the recovering Pigeon River in North Carolina. Silver shiners (*Notropis photogenis*), telescope shiners (*N. telescopus*), mirror shiners (*N. spectrunculus*), Tennessee shiners (*N. leuciodus*), and gilt darters (*Percina evides*) have been translocated from source populations in North Carolina and Tennessee. To date, best indications of success are from the *N. photogenis* which are now considered reestablished over more than 12 km of our target reach and *N. telescopus*, of which multiple year classes are consistently being recovered in decent numbers over several stretches of the River. First reintroduced in spring 2007, *N. leuciodus* are already showing early promise for success. After three years of translocations, the first evidence of *P. evides* recruitment was documented by the capture of an untagged individual in August 2007, however overall recovery rates are low. Fall 2007 translocations were cancelled due to the 2007-2008 drought, high water temperatures, and stressed source populations. Banded darters (*E. zonale*), highland shiners (*N. micropteryx*), and bigeye chubs (*Hybopsis amblops*) will be added to the efforts over the next couple years as other species become established.

With assistance from staff from the USFWS and Conservation Fisheries, Inc. (CFI), the first year survey of a 10-year population monitoring study for the federally threatened spotfin chub (*Erimonax monachus*) in the Little Tennessee River (Macon County) was completed. This population is considered one of the strongholds for the species. The scope and duration of this study specifically follows the Recovery Plan's prescribed actions for obtaining information needed for delisting the species. Ten sites were surveyed by visual snorkeling techniques between Franklin and Fontana Reservoir. Area-specific transects and timed random searches were performed at each site. Previous anecdotal impressions of relatively low numbers were confirmed: a total of 333 fish were observed and the majority of these were found in the lower reaches of the river. On average, the number of *E. monachus* observed per hour and number observed per 50 m transect were much higher at the lower five sites than the upper five sites: 8.2 vs. 0.9 fish and 3.6 vs. 0.8 fish, respectively. Overall, the population appeared low with the total observed average for all 10 sites being 4.6 *E. monachus* per 1 hour snorkel time and 2.2 per 50 m transect.

Fraley and Truss have also provided an update on the Cheoah River Restoration (Little Tennessee River basin). With minimum flows restored and other habitat improvements, substantial habitat for *E. monachus* appears to be available in the formerly bypassed Cheoah River in Graham County. In cooperation with the USFWS and CFI, Fraley and Russ will rear *E. monachus* fry produced by CFI for release in the Cheoah River. The first cohort should be hatched during the summer of 2008 and be ready for release in the summer of 2009.

They also report that a lot is happening with sicklefin redhorse (*Moxostoma sp. cf. macrolepidotum*) which is a significantly rare, proposed state threatened, species as ranked by the NCWRC and NC Natural Heritage Program. These actions were made possible by great cooperative efforts among agencies and academia. Scott Favrot, a graduate student at North Carolina State University and supported by funding from the NCWRC and USFWS, recently completed his field studies in the Hiwassee River System. Seasonal movements, spawning habitat, and other aspects of migratory and reproductive ecology were the focus of his study and he will be completing his thesis this spring or early summer. In the meantime, Dr. Robert Jenkins is nearing completion of his long-awaited extensive study and description of the species. Genetic analyses are underway by Dr. Greg Moyers at USFWS in Warm Springs, GA. Fraley and Russ (NCWRC) collected gametes from the Little Tennessee River population during the spring of 2007 for propagation experiments by CFI, with support and assistance from Mark Cantrell, USFWS. These experiments were successful enough for approximately 1,500 juveniles to be released into the Oconaluftee and Tuckasegee rivers (Little Tennessee River System) as an early part of efforts to augment and expand the Tuckasegee River population. The Eastern Band of Cherokee Indians are also partners in this effort and will be working with CFI to grow-out sicklefin redhorse fry again in 2008 and gametes will again be collected in April 2008.

As part of implementation of the NCWRC's Wildlife Action Plan, Fraley and Russ will also be monitoring the status of priority non-game fishes in eight river basins (the New, Watauga, Catawba, Broad, French Broad, Little Tennessee, Hiwassee, and Savannah) in the Western Region at 5 year intervals. In 2007, they began that effort in the French Broad (SFC Region III) and Catawba River (SFC Region I) systems. The sampling regime augments data collected in IBI bio-assessments by the North Carolina Division of Water Quality and the Tennessee Valley Authority. Generally, the news was better from the French Broad River basin than from the Catawba River basin. A few highlights from the results included:

- declines in some of the more sensitive species in the Catawba River basin, notably the Santee chub (*Cyprinella zanema*), a significantly rare species as ranked by the NC Natural Heritage Program;
- mountain madtom (*Noturus eleutherus*), a special concern species as ranked by the NCWRC and NC Natural Heritage Program, was found in the mainstem of the French Broad River at Hot Springs in Madison County for the first time since a specimen was collected by Dr. David Starr Jordan in 1888;
- Ohio lamprey (*Ichthyomyzon bdellium*), a significantly rare species as ranked by the NC Natural Heritage Program, is expanding into the Blue Ridge portion of the French Broad system;
- mooneye (*Hiodon tergisus*), a special concern species as ranked by the NCWRC and NC Natural

Heritage Program, was found in the mainstem of the French Broad River near Hot Springs in Madison County for the first time since specimens were obtained by W. D. Harned in 1977 from local fisherman fishing the mainstem of the river near river mile 115 between the towns of Marshall and Hot Springs;

- sharphead darter (*Etheostoma acuticeps*), a state threatened species as ranked by the NCWRC and NC Natural Heritage Program, continues to do well in the upper Nolichucky River system; and
- stonecat and the blotchside logperch (*N. flavus* and *Percina burtoni*, respectively), both state endangered species as ranked by the NCWRC and NC Natural Heritage Program, are still extant, but narrowly distributed in the upper Nolichucky River system.

Fraley and Russ anticipate publishing all the results in the near future. They will be conducting status surveys in 2008 in the New and Watauga River systems.

According to Dave Coughlan of Duke Power Company, Duke Energy will be removing the Dillsboro Dam on the Tuckasegee River in Jackson County in 2009. The Dillsboro Dam was constructed in 1913 to supply hydroelectric power and impounds almost 5.7 ha. In 2007, the Federal Energy Regulatory Commission issued an order decommissioning it. Its removal will restore the impounded reach (with a length of over 1.5 km), re-establish a river continuum, and allow for the unimpeded access to an additional 15 km of river upstream to the Cullowhee Dam. As one part of the 401 Water Quality Certification process, Duke Power Company staff will evaluate the Tuckasegee River fish assemblage, both upstream and downstream of the dam, for one year prior to and three years post-dam removal. Sampling will be by a variety of boat and tote-barge or backpack electrofishing methods during May and October of each year. It is anticipated that dam removal will benefit fish and mussel species such as the sicklefin redhorse, (*M. sp. cf. macrolepidotum*) and the Appalachian elktoe mussel (*Alasmidonta raveneliana*) in the river.

Josh Schiering and David Eisenhour (Morehead State University) surveyed Kinniconick Creek, Lewis County, Kentucky in the summer and early fall of 2007 for longhead darters (*Percina macrocephala*). This survey, along with a detailed habitat analysis of *P. macrocephala*, is Josh's M.S. thesis. Prior to this survey, *P. macrocephala* was only known from Kinniconick Creek from three specimens collected by Lew Kornman in the early 1980s. In a 55 km stretch of the stream, 41 sites (most sites were about 120 m) were snorkelled and at 10 of these sites seining and backpack shocking were also used. *Percina macrocephala* appears to be doing fairly well in Kinniconick Creek: a total of 98 individuals were observed, including both adults and YOY. Most specimens were found in the lower part of the Creek, below the mouth of Laurel Fork. There the species is locally common with a few sites containing over

10 individuals. Almost all individuals were encountered while snorkeling, suggesting that *P. macrocephala* successfully avoids seining and shocking. Populations in the Green-Barren River drainage appear to be declining while the Kinniconick Creek population may be the healthiest in Kentucky. Audrey Richter, a “new” graduate student at Morehead, is continuing the survey this summer. Eisenhour also reports that work on the Kentucky Fish Book is progressing. He now has a contract with the University of Kentucky Press, although a manuscript is still several years away. Matt Thomas has joined Brooks Burr and Eisenhour in developing the book. Matt is particularly good at photography and will be contributing a large number of high-quality photos.

Matt Thomas of the Kentucky Department of Fish and Wildlife completed a status survey of the Cumberland darter (*Etheostoma susanae*) in the upper Cumberland River drainage of Kentucky. Prior to this survey, Cumberland darters had been collected from a total of 23 localities, three of which are in Tennessee (O’Bara 1988, Shoup and Peyton 1940). Between 23 May 2006 and 26 April 2007, 45 sites were sampled qualitatively including historic localities and additional sites having potentially suitable habitat that might have resulted in range extensions. A total of 45 specimens were collected from 13 localities, including 12 substantiated historic records and one new occurrence record. An additional historic occurrence in TN (Jellico Creek drainage) was not investigated. The 13 current records are distributed in 12 different streams. These streams lie within six different watersheds, each of which likely contains multiple population fragments isolated from one another by poor quality habitat or natural barriers. The six watersheds containing population fragments include Bunches Creek, Indian Creek, Marsh Creek, Jellico Creek, Clear Fork, and Youngs Creek. Males were observed in spawning condition in two streams between mid-April to late May, although spawning was not observed and no nests or eggs were found. Previous records of *E. susanae* reported from the Poor Fork Cumberland River were determined to be Johnny darters (*E. nigrum*). Because of apparent declines during the past two decades, including possible extirpation from 9 streams and 10 historic collection sites, a proposed rule is being drafted that will add *E. susanae* to the federal list of endangered species.

In 2007, the Kentucky Department of Fish and Wildlife Resources began a long-term (20+ year) plan to restore lake sturgeon (*Acipenser fulvescens*) to Kentucky. The primary goal is to re-establish a self-sustaining population within its native range in the upper Cumberland River drainage. The Cumberland River drainage below Cumberland Falls was chosen as the focal area for *A. fulvescens* restoration efforts in Kentucky because of its relatively good water quality and potentially suitable habitat conditions. This section of the Cumberland River also includes two large free-flowing tributaries, the Rockcastle River and Big South Fork, which may be utilized by the

sturgeon as they undergo long-distance movements in search of feeding and (eventually) spawning areas.

Last April, the Department’s Pfeiffer Fish Hatchery in Frankfort received fertilized eggs from Wisconsin Department of Natural Resources taken from the upper Mississippi River drainage. The eggs hatched in 5 to 7 days, after which the young were fed a variety of natural and commercially prepared foods. At present, 296 *A. fulvescens* averaging approximately 180 mm in length are ready to be released into the Cumberland River between Lake Cumberland and Cumberland Falls. About 270 of these fish will be released in the Cumberland River near Noe’s Dock at the mouth of Laurel River during mid-April 2008. They will be marked using a scute removal protocol to identify year classes. The remaining 20 to 30 fish will be retained in the hatchery for another year allowing them to grow large enough to be implanted with radio transmitters to monitor movement and habitat utilization. The Pfeiffer Hatchery anticipates receiving an additional allotment of eggs from Wisconsin that will be hatched and reared over the next year. The hatchery and staff are now prepared to handle a larger number of fish to be released in 2009.

A valiant effort (a veritable Slender Chub Blitz) over two days in May 2007 at several historic localities in the Clinch River by CFI, USFWS, TVA, and UTK failed to locate the elusive Slender chub (*Erimystax cahni*). The group did have some other significant finds, including a record number of pygmy madtoms (*Noturus stanauli*) at several sites in the past few years. Last spring, five specimens of this federally endangered fish were collected at a single site with minimal effort. Several of these fish spawned at CFI. Plans are being made to put forth more effort to collect *E. cahni* in May and June 2008 in the Clinch and Powell Rivers.

Jim Herring of the US Forest Service reported on the Citico Creek Buffalo Spawning Run, a natural phenomenon enjoyed by a choice few at Citico Creek on the Cherokee National Forest, during 2007. This event is quite spectacular to see approximately 50,000 fish that are from 400 mm to over 500 mm in length, weighing from 1 to 3 kg congregated in a 400 m stretch of stream. Whether you watch the fish from the bridge or get in the water with them (snorkeling in a wetsuit), it is worth the trip to Citico Creek to view firsthand. Every year in April, the buffalo fishes make their spawning runs into Citico Creek (as well as other streams). J.R. Shute (CFI) points out that at least two species of buffalo are present: the black buffalo (*Ictiobus niger*), and the smallmouth buffalo (*I. bubalus*). In 2007, carpsuckers (*Carpiodes* spp.) and several redhorses (mostly *Moxostoma anisurum*) joined these spawning runs. According to Herring, water temperature and moon phase did not seem to have an effect on the timing of the Citico Creek buffalo spawning run in 2007. There were large temperature fluctuations (4.4° C to 17.2° C) in Citico Creek prior to the run. The run occurred when the water temperature was 8.3° C to 15.5° C. The 2006 run occurred during a full moon while the 2007 run occurred during a new

moon. Rather, Herrig suspects that day length and the relatively warm water temperatures in Tellico Reservoir stimulate the buffalo fishes to stage at the mouth of Citico Creek in early April. Once they are staged at the mouth of Citico Creek and day length is adequate, the buffalo fishes will wait for a significant flow event and move upstream as the water is dropping. It is suggested to look for the fishes from the Lower Citico Creek Bridge to the mouth of Duncan Branch. They will remain in the Lower Citico Creek for only 5 days.

Conservation Fisheries Incorporated (CFI) had an extremely busy year in 2007, with more news than can be discussed in a reasonable amount of space. Newsletters at CFI's website provide additional information, along with photos and video. Field work was initiated unusually early during a bizarre warm spell in mid-March, with a trip to southern Tennessee to collect endangered boulder darter (*Etheostoma wapiti*) brood stock and survey for threatened slackwater darters (*E. boschungii*). Eight *E. wapiti* were collected to add to the captive population, along with a bonus: two ashy darters (*E. cinereum*). These were the first collected from the Elk River since 1981 and only the second and third from that stream in Tennessee. The darters were given to Steve Powers, who is re-describing the species and elevating two populations to new species.

Surveys of numerous potential *E. boschungii* sites near Lawrenceburg were unsuccessful with the exception of the first site visited, a historic (1976) locality on Chief Creek, a tributary of the Buffalo River. Here, in a scour hole below a culvert, filled with leaves and trash (including a toilet), six *E. boschungii* were collected with fine-mesh dipnets. Because the site was the last remaining pool in a dry creek bed and about to dry up (the 2007 drought was already underway) all were returned to CFI to maintain as an 'ark population'.

April is when many species begin to spawn at CFI and when several species are 'stocked out' in order to have an opportunity to spawn in the wild, as well as to create space for new fishes. During this period, 46 tangerine darters (*Percina aurantiaca*) were released to the Pigeon River at Denton (the first ever). Also released were 277 endangered smoky madtoms (*Noturus baileyi*), 419 threatened yellowfin madtoms (*N. flavipinnis*) and 295 threatened spotfin chubs (*Erimonax monachus*) to Tellico River. In Shoal Creek south of Lawrenceburg, 628 endangered boulder darters (*Etheostoma wapiti*) were also released.

May through July required the usual juggling of hatchery spawning and rearing (spotfin chubs, boulder darters, logperch, blueface darters, etc.) combined with collection of wild nests to rear endangered duskytail darters (*E. percunurum*) from Citico Creek and Little River (TN). Wild nest collections of *N. baileyi* and *N. flavipinnis* were also made from Citico Creek, Copper Creek (VA), and the Powell River (TN and VA). Survey work ranged from central Tennessee (Kelley Creek, a tributary of Harpeth River), to north Georgia (Etowah River and Conasauga River tributaries), to western Virginia (Clinch River near Cleveland).

Pygmy madtoms (*N. stanauli*) collected from the Clinch River produced several spawns and, ultimately, several progeny, despite numerous problems with the incubation of eggs. Propagated *N. flavipinnis* were released in the Powell River near Jonesville for only the second time, but not before monitoring by snorkeling located three tagged individuals that had been stocked during the first (i.e., previous) year, one of which was a male defending a clutch of eggs. These were collected and taken to CFI to rear for 2008 stocking, along with other nests collected from the main population many kilometers downstream.

Typically, the period from August until the end of the field season is the primary snorkel monitoring and survey season for CFI, during normally low flows and optimal visibility. Due to the ongoing drought in 2007, water was so low that some smaller streams were too low to survey many habitats effectively, except pools. More positively, however, many larger rivers (particularly the Clinch River) were at levels and visibilities more optimal than had ever been experienced, permitting ideal snorkel conditions. Some of the results of this survey work (as briefly as possible) are:

- Abrams Creek: restored populations of *N. baileyi* and *N. flavipinnis* continue to thrive, while *E. percunurum* appear to be more numerous than in the source population in Citico Creek. Keith Gibbs and Jason Throneberry (TTU students) did the bulk of the monitoring for thesis work.
- Citico Creek: minimal monitoring, but the three latter species appear to be at least stable.
- Tellico River: *N. baileyi* and *E. percunurum* populations are reproducing while *E. monachus* were observed, but did not appear to have reproduced this year (due to low flows). This is despite notable recruitment in 2006. It is hoped that additional releases of >1200 *E. monachus* in 2007 will offset this low recruitment year.
- Little Tennessee River: Populations of *E. monachus* have recovered somewhat at most survey sites from worrisome lows observed in 2006.
- Clinch River (VA): The known distribution of *N. flavipinnis* doubled from approximately 24 km to 40 km while *E. cinereum* distribution (not collected from VA from 1964 to 2006) expanded to 24 rkm.
- North and South Toe Rivers (NC): Surveys of these rivers produced observations of blotchside logperch (*Percina burtoni*), olive darter (*P. squamata*), sharphead darter (*Etheostoma acuticeps*), and blotched chub (*Erimystax insignis*).
- Shoal Creek: 14 stocked and tagged *E. wapiti* observed at their release site, but none were observed in the shoals or other potential habitat downstream. Also, approximately 600 *E. monachus* were released (first release for the species in this Creek).

- Little River: No *E. percnurum* were observed at two stocking sites, so the fall release of approximately 90 darters will be at a new site. Surveys revealed a robust new local population.
- Conasauga River: While population of blue shiners (*Cyprinella caerulea*), holiday darters (*E. brevisrostrum*), and bridled darters (*Percina kusha*) appear to be expanding, no endangered Conasauga logperch (*P. jenkinsi*) were observed.
- Little Chucky Creek: Three checks of PVC pipe traps set out in March failed to produce any Chucky madtoms (*N. crypticus*). Either the technique is unproductive or the species increasingly appears to be extinct.

After successfully producing more than 1,200 logperch to serve as mussel hosts, CFI collected *P. burtoni* from the Little River to attempt propagation in 2008. The goal is to restore *P. burtoni* to Tellico River, Citico Creek, and Abrams Creeks. Endangered Roanoke logperch (*P. rex*) were collected from the Roanoke River (VA) to develop propagation protocols and hopefully produce life history information critical to population viability analysis. The goal is to promote the conservation of this fragmented and highly imperiled species.

Finally, CFI hatchery technician, Meredith Penland, left to pursue graduate work at Coastal Carolina University (on, of all things, sharks...but maybe we will get her back in freshwater someday). We welcomed her able replacement, Becky Franklin, from Appalachian State, as well as UTK graduate student and part time worker, Russ Bohl. Missy Petty joined the crew in early 2008. Many thanks are also deserved by all the volunteers that assisted this year, particularly UTK students and state and federal agency staff too numerous to list.

– Mark Cantrell

REGION IV- SOUTH CENTRAL

Mark Peterson and Todd Slack have initiated juvenile Gulf sturgeon (*Acipenser oxyrinchus desotoi*) research on the lower Pascagoula River (USFWS funds) and a project on habitat delineation and reproduction of saltmarsh topminnow (*Fundulus jenkinsi*) through SWG funds. Part of the latter project will also develop a diagnostic guide and key to many estuarine members of the Family Fundulidae based on spawning of known adults. Mark is also working with Rich Fulford at the Gulf Coast Research Laboratory on a northern GOM NOAA initiative on mapping the lower Pascagoula river water quality and CPUE of juvenile spot (*Leiostomus xanthurus*) in order to test a spatially-explicit model of habitat use. Work is winding down on oyster restoration trajectories and food web tracking with stable isotopes in the Grand Bay NERR. Finally, both Mark and Todd are collaborating with Pam Schofield of USGS in Gainesville on some Nile tilapia (*Oreochromis niloticus*)

eradication (see paper reference below) and salinity-temperature tolerance experiments. Some recent papers include:

- Partyka, M.L. and M.S. Peterson. (2008). Habitat quality and salt marsh species assemblages along an anthropogenic estuarine landscape. *Journal of Coastal Research* (in press).
- McDonald, J.L., M.S. Peterson, and W.T. Slack. (2007). Morphology, density, and spatial patterning of reproductive bowers in an established alien population of Nile tilapia, *Oreochromis niloticus* Linnaeus. *Journal of Freshwater Ecology* 22(3):461-468.
- Schofield, P.J., W.T. Slack, M.S. Peterson, and D.R. Gregoire. (2007). Assessment and control of an invasive aquaculture species: an update on Nile tilapia (*Oreochromis niloticus*) in coastal Mississippi after Hurricane Katrina. *Southeastern Fishes Council, Proceedings* 49:9-15.

Bernie Kuhajda at the University of Alabama reports that graduate students are working on several projects. Brook Fluker is continuing his work on the population genetics of spring darters in Alabama, where he is finishing work on watercress darters (*Etheostoma nuchale*) and has started examining rush darters (*E. phytophilum*) and cold-water darters (*E. ditrema*), as well as two Tennessee River species, the slackwater darter (*E. boschungii*) and the Tusculumbia darter (*E. tuscumbia*). He is also looking at the status of *E. nuchale* and the Turkey Creek population of *E. phytophilum* during recent drought conditions. Mike Sandel is continuing his work on relationships and phylogeography of *Elassoma* and has finished a status survey of the spring pygmy sunfish (*E. alabamiae*) in the Tennessee River drainage. Grey Hubbard continues his work on the population genetics of *Pteronotropis*. Former undergraduate student Micah Bennett (now at Saint Louis University) has finished life history studies on the black madtom (*Noturus funebris*) and the frecklebelly madtom (*N. munitus*), with publication due out soon. Undergraduate Heath Howell continues his work on a survey of lower Shades Creek, an urbanized tributary to the Cahaba River. He has surprising found two federally listed fishes, the endangered Cahaba shiner (*Notropis cahabae*) and the threatened goldline darter (*Percina aurolineata*), as well as a recently-dead shell of a listed mussel, the fine-lined pocketbook mussel (*Hamiota altilis*), in a stream that was considered too impaired to support such sensitive species.

– Bernie Kuhajda

REGIONS V AND VI – NORTHWEST AND SOUTHWEST

Bob Hrabik of the Missouri Department of Conservation and his colleagues from Nebraska (Steve Schainost, Ed Peters, and Rick Stasiak) are nearing completion of “A Field Guide to Nebraska Fishes” which is to

be published by the University of Nebraska in 2009. The book will be illustrated by Justin Sipiowski and will include a dichotomous key, family and species accounts, distributional maps, and more. The authors are viewing this book as a fairly rapid production to introduce students and enthusiasts to some fishes of the Great Plains. It is written in anticipation of a "more scholarly" textbook on the fishes of the Central Plains. The authors hope to live long enough to write the Central Plains book and before global warming and dewatering extirpate fishes from this region. Bob also provided the following detailed reports on regional studies of a failed reservoir, restoring riverine habitats, and the reintroduction of alligator gar (*Atractosteus spatula*).

On the morning of 14 December 2005, a triangular section on the northwest side of a pump-storage reservoir in southeastern Missouri failed, releasing one billion gallons of water in twelve minutes and sending a 20 foot (7 m) crest of water down the East Fork Black River. This wall of water decimated the lower elevations of Johnson Shut-Ins State Park and deeply scoured and reconfigured the channel of the East Fork. This most unfortunate event will have long-lasting impact on the aquatic resources of this river. However, amidst this tragedy, biologists from the Missouri Department of Conservation's Open Rivers and Wetlands Field Station (ORWFS) and regional staff were fortunate that in June 2005, an extensive fishery survey was conducted by this team to establish a fish assemblage baseline. Since that fateful day, ORWFS and regional staffs have been monitoring the recovery of the fish assemblage. Two sampling designs are being employed at present. One is a fixed point sampling design carried out by one crew and the second is a stratified-random design carried out by another. To date, several subsequent surveys have been completed with one more year of post-failure data collection scheduled. Preliminary data analysis suggests that benthic fishes (darters and madtoms) suffered dramatic initial losses, as well as a large population of bigeye chub (*Hybopsis amblops*). Subsequent surveys suggest that the benthic fishes are rebounding, but *H. amblops* has not. This may be due to a lack of potential *H. amblops* founders to re-colonize the area because many of the benthic species can move from downstream to upstream locations, but the largest *H. amblops* population was between the lower reservoir (which did not fail) and the upper reservoir (which failed). Downstream populations of *H. amblops* cannot pass the lower dam and there may not be a large population of this species above the area that was impacted by the flood. Bob and staff are currently analyzing the data for an interim report.

The staff of ORWFS have long been involved in restoration planning for the Middle Mississippi River (MMR). Some rehabilitation projects conceived by MMR partners have been assimilated into the Navigation Environmental Sustainability Project (NESP) for the Upper Mississippi River. One such project, the restoration of Buffalo Island, located between river miles 24.7 and 26.1 (right descending bank), is designed to improve connectivity between the

main and side channels, improve water quality, and diversify water depths and substrate with the goal of improving species richness and heterogeneity. Field Station personnel are completing three years of pre-construction monitoring in the chute (side channel) and have established a baseline for fish assemblage structure and water quality (including nutrients). Water quality is being monitored using data loggers, especially during low flow periods, and the fish assemblage is being sampled specifically when the communities become isolated during low flows. The hypothesis is that greater connectivity (thus shorter periods of isolation) will be reflected by higher species richness and water quality values indicative of the main channel of the river (e.g., elimination of dissolved oxygen sags).

Alligator gar (*A. spatula*) were reintroduced to Mingo NWR. The goal of this project is to monitor with radio transmitters the movement and habit use of *A. spatula* in Mingo NWR. This project is being performed by Southeast Missouri State University (SEMO) graduate student Levi Solomon, with assistance from another SEMO graduate student, Liz Brothers, and from ORWFS and regional fisheries personnel. The project is being conducted under the guidance of Mike Taylor (SEMO), Chris Kennedy (MDC), and Bob Hrabik (ORWFS). In a progress report, Dr. Taylor writes that 19 juvenile *A. spatula* were stocked randomly into Monopoly Marsh, located in Mingo NWR on 25 May 2007. Beginning on 29 May, *A. spatula* were monitored on a daily basis for the first 30 days to track dispersal patterns into the marsh. During this 30 day period, each tagged individual was located every other day during daylight hours. After this 30 day period, the monitoring effort was reduced to two days per week with a goal of recording the location of each tagged gar once per week. While monitoring the dispersal patterns of *A. spatula*, 222 locations were obtained during the first 30 days with an average of 12 locations per day. The location of each tagged individual was well established within the first seven days. During the six months from July through December 2007, 270 gar locations were recorded. Initial results indicate one of two movement patterns. Some individuals have shown little movement since their first recorded location following introduction. Most movement is restricted to less than 100 m of their previous locations. In comparison, other individuals have moved considerable distances during a short time span and then remained sedentary for long periods, followed by another long distance movement to a new location. For example, one individual was initially located in Ditch 5, moved north overnight nearly 1.6 km to a new position in Monopoly Marsh and then remained at this new location for nearly three months. This individual subsequently moved south 640 m to a new and still current location.

To facilitate accelerated learning, *A. spatula* were also placed in a 140 ha floodplain lake near Cape Girardeau, Missouri. This objective has two goals. The first is to determine the dietary composition of juvenile *A. spatula* introduced into Marquette North Lake. The second goal is

to monitor movement of radio-tagged gar. This objective is being performed by SEMO graduate student Elizabeth Brothers, with assistance from Levi Solomon, from MDC personnel, and from SEMO undergraduate students. Twelve radio-tagged juvenile *A. spatula* were released in Marquette North Lake in 2007: six in May, and six in November. In July 2007, each individual was monitored four times per week, once for each time of the following time periods: dawn, day, dusk, and night. Dawn and dusk locations of the *A. spatula* are determined in the hour preceding and succeeding sunrise and sunset.

In general, *A. spatula* were mostly sedentary during the summer, exhibiting little to no movement. Two exceptions to this observation included the long distance movements of one individual (tag #23) in early July and another individual in late August. These movements lasted less than one week before they returned to their prior sedentary behavior. During this time individual #23 presumably left the Lake through the outflow at the northeast side. This individual has not been located during any subsequent tracking events. Another individual (tag #563) was located in a small slough connected to the Lake. This slough was surrounded by trees and water temperatures may have been cooler in this area than in Marquette North Lake. In fall, rain events and artificial flooding raised water levels and juvenile alligator gar began to exhibit sporadic movements including both short and long distances. Five of six radio-tagged *A. spatula* released in November initially moved to the inflow area, which is characterized by greater flow and warmer water temperatures. After a short period of time these individuals dispersed out to different areas of the Lake. Some of these individuals seemed to establish territories quite readily and then become sedentary, while others exhibited sporadic long distance movements. In winter, *A. spatula* exhibited variable movement patterns. Most individuals have remained sedentary, exhibiting only occasional short distance movements. In contrast, three others exhibited short to moderate distance movements more regularly, or are sedentary for a few weeks followed by sporadic long distance movements. Winter movement patterns of *A. spatula* may be complicated by variable and, at times, unseasonably warm temperatures. A recent rain event followed by a string of warm days has prompted a formerly sedentary individual (#744) to make a long distance movement out of the Lake and into an adjacent, shallow, flooded field.

The fish assemblage in Mingo NWR has been surveyed annually for the last three years to document annual variation in fish assemblage structure (relative changes in species richness and heterogeneity) in anticipation of potential trophic changes in the fish assemblage in response to reintroductions of *A. spatula*. The survey design incorporates the methods of occupancy sampling to determine capture probabilities of species that are *and those that are not* sampled using a multi-gear approach. Much of the first three years of data collection has been used to fine-tune the sampling design. We think this

acceptable because we assume that impacts to the fish assemblage by *A. spatula* are minimal due to their small size and very low stocking rate (1 fish per 1.2 ha). We feel that a good fish assemblage baseline has been established and includes a few species not previously recorded from the Basin (mostly Ozarkian waifs). Nearly 80 species of fishes can be found in the Mingo Basin, many of which represent some of the farthest northern distributions for the species, such as taillight shiner (*Notropis maculatus*), banded pygmy sunfish (*Elassoma zonatum*), bantam sunfish (*Lepomis symmetricus*), and flier (*Centrarchus macropterus*). This work is being lead by Bob Hrabik, Chris Kennedy, and Steve Sheriff, all of MDC.

Steve Filipek of the Arkansas Game and Fish Commission (AGFC) reports that the Arkansas Stream Team program (a citizen's based effort managed by the AGFC supported by dozens of state, federal, local agencies, and NGOs that works with the US Army Corps of Engineers and local landowners) continues to improve aquatic habitat for fishes, invertebrates, and amphibians. On both the Eleven Point and Current Rivers in north central and northeastern Arkansas, AGFC biologist Stephen O'Neal is working with herpetologist Kelly Irwin and COE employee Louis Clarke to both mitigate for environmental disturbance while at the same time enhancing the aquatic environment using large slab rock at the end of stream bank remediation structures. This large, flat, and irregular rock is preferred substrate and habitat for the imperiled Ozark hellbender (*Cryptobranchus alleganiensis bishopi*), a very large endemic salamander that inhabits clear, rocky-bottomed Ozarkian streams in Arkansas and Missouri. In addition, this slab rock is good habitat for various invertebrates including numerous crayfish species, which not only hellbenders, but also smallmouth bass (*Micropterus dolomieu*) and Ozark bass (*Ambloplites constellatus*), another Ozark endemic, feed on. This work is a "win-win" situation for the landowner, who gets his or her streambank erosion controlled and the aquatic biota, including some species of greatest conservation need in the Ozark ecoregion, get improved feeding and cover habitat.

Henry Robison, Southern Arkansas University, will retire 30 June 2008. He and Tom Buchanan are still feverishly working on the completion of the second edition of "Fishes of Arkansas" by autumn so they can take the manuscript to the University of Arkansas Press for publication. Rob and Keith Crandall are working on the crayfishes of Arkansas for an eventual book treatment. Currently, they are collecting statewide and getting DNA information for all state crayfish species.

In July 2007 following the ASIH meetings, Wayne Starnes and Morgan Raley made a foray through Missouri and Arkansas with the principal aim of filling in sampling gaps for the long ongoing study of the redbfin shiner (*Lythrurus umbratilis*) complex in that region. This study is an outgrowth of an investigation of a form having much reduced melanistic fin pigmentation in breeding

specimens that occurs above the fall line in the Ouachita River system which Wayne discovered some 28 years ago and, about every decade, has the opportunity to further explore. Wayne, Henry Robison, Dick Bryant, and Morgan have been collaborating to study Ouachita populations and those in adjacent basins via a combination of morphological and molecular techniques, coupled with careful analysis of breeding coloration documented photographically. Like so many other investigations that initially present themselves as straightforward, this one has quickly blossomed into a perplexing problem, especially once exposed to some genetic scrutiny. There is evidence of interaction between the upper Ouachita form and related taxa in adjacent basins that must be sorted out and, to complete the regional investigation, sampling areas critical to investigating the status of the two currently recognized subspecies of *L. umbratilis* needs to be accomplished, especially in tributaries to the Arkansas River in northwestern Arkansas. Attempts to sample a few of these tributaries in July were not fruitful and more effort will have to be brought to bear in this area, hopefully facilitated by better information on recent occurrences of this minnow. Once that is accomplished, hopefully publication of at least a molecular based analysis of the regional problem will be forthcoming. Despite the incomplete success with *Lythrurus* sampling, there were some nice bonus collections of other species taken along the way. Perhaps most significant among these was the collection of pallid shiner (*Hybopsis amnis*) in the lower mid reach of Strawberry River in Arkansas which, according to Henry Robison, may constitute only the second record of this species in that region of the state and the sole record in the past 40 or 50 years.

Bobby Reed of the Louisiana Department of Wildlife and Fisheries (LDWF) reports that the Inland Fish Division, District 5, continues to monitor streams and rivers of southwest Louisiana as part of the post Hurricane Rita recovery efforts. Indications are that area fisheries resources are well on the way to recovery and this year's focus is on the Calcasieu River and Lacassine National Wildlife Refuge. While low levels of salinity are still present in the freshwater pool of the refuge, centrarchids, especially redear sunfish (*L. microlophus*) and largemouth bass (*M. salmoides*) are growing and reproducing well. In addition to age, growth, and genetic studies of *M. salmoides*, LDWF biologists will be conducting a creel survey during the open fishing season to assess harvest effort, catch rates, and angler satisfaction. The information is used to manage the fisheries resources on the refuge and a cooperative venture with the USFWS (the landowner). District 5 fisheries biologists are also assessing the life history of *A. spatula* in Louisiana, with this year's focus of developing a reliable method to age these large, long-lived species. Otoliths are being examined under differing techniques in order to determine reliability and precision of aging. Other information being collected include: lengths, weights, sex, maturity, and fecundity.

Pallid sturgeon (*Scaphirhynchus albus*) continue to

be studied in and around the Old River Control Complex (ORCC) near Simmesport, Louisiana, in an effort to assess populations and seasonal movements in the Atchafalaya River. Studies using mark and recapture techniques, identification of sex and stage of maturity, and morphometric analyses continue as part of a three year project involving Louisiana's only endangered fish species. In a cooperative venture involving the USFWS, LDWF, the US Army Corps of Engineers, and Mississippi State University, *S. albus* are being implanted with sonic tags and actively tracked (MSU personnel) and passively tracked, utilizing VR-2 receivers positioned on bridge abutments and other useful structures along the River.

Neil Douglas, professor emeritus at the University of Louisiana at Monroe, continues work on the re-organization, consolidation, and expansion of the university's museum collections. After over 50 years of having natural history items and research collections scattered throughout several buildings and departments, the University of Louisiana at Monroe, Museum of Natural History is finally housed under one roof. The move was recently completed and all facets of the zoological, botanical, archeological, and paleontological collections now reside in the 8000 square foot (743 square meters) third floor of Sandel Hall. Exhibits occupy approximately one third of the area while the fluid research collections of fishes, amphibians, and reptiles plus the herbarium fill the remainder of space. The vertebrate and plant collections are among the largest in the world with a primary focus on southern North America. but important collections from Africa, Asia, Micronesia, and the Neotropics are also present. The archeological collections contain the largest number of excavated Archaic mound artifacts from the oldest mounds in North America.

Biologists at the US Army Engineer Research and Development Center (ERDC) Waterways Experiment Station are assisted by Neil Douglas, in the field and in the laboratory, and by commercial fisherman William Lancaster, in the field. Together, the team is studying fish assemblage ecology of several drainages. In collaboration with Henry Robison, Jan Hoover is compiling results from a comprehensive study of the White River basin – including field surveys of Ozark stream fishes and the paddlefish (*Polyodon spathula*) population in the lower White River, AR. The ERDC team is also studying fishes in Big Cypress Bayou, TX, prior to and following restoration of a gravel bed intended to provide spawning habitat for *P. spathula*. Jack Killgore is taking the lead on experimental field studies to assess fish passage in the New Madrid floodway. Most of the group's work, however, is focused on the Mississippi River. Bradley Lewis is using videography and field data to assess importance of dike-notching and secondary channels as fish habitat. Krista Varble is continuing studies of silver carp (*Hypophthalmichthys molitrix*) in floodplain wetlands. Catherine Murphy is completing analysis of a long-term study of delta stream fish assemblages and their ecological stressors. Phil Kirk conducted

surveys of fishes for a proposed water diversion structure to restore habitat at Lake Maurepas. Jay Collins designed, constructed, and began trials of a new swim tunnel that can accommodate large, fast swimming species. The entire team continues work with pallid sturgeon (*S. albus*) including assessments of demography, morphological variation, and entrainment risk. ERDC biologists recently collaborated with Steve Hernandez-Divers, a professor of veterinary medicine at the University of Georgia. Steve trained members on surgical techniques requisite for an interagency telemetry study and for ERDC studies of sturgeon reproduction. Members of the ERDC team are also working with Ron Nassar and the Lower Mississippi River Conservation Committee (LMRCC) to refine a multi-level decision support model to prioritize habitat restoration projects in the Lower Mississippi Basin.

Marty O'Connell with the Nekton Research Laboratory (NRL) at the University of New Orleans (UNO) reports that fish research activities continue in post-Katrina southeastern Louisiana. While Bob Cashner retired from UNO and moved to North Carolina in 2008, he still plans on taking breaks from his numerous travels to pursue some longtime fish projects, including work in Arkansas and Oklahoma. Senior Biologist Chris Schieble continues his research at the Chandeleur Islands, Louisiana's oldest and most remote barrier island system. Chris also led a team of UNO researchers in analyzing the fishery impacts of releasing Mississippi River flood waters into the estuarine habitats of Lake Pontchartrain via the Bonnet Carre Spillway. While no fish kills have been reported as of early July 2008, there is anecdotal photographic evidence that many non-native silver and bighead carp (*Hypophthalmichthys molitrix* and *H. nobilis*, respectively) were transported from the River to the Lake. Senior Biologist and Database Manager Meg Uzee O'Connell continues her work with the Coastal Conservation Association of Louisiana to geo-reference their large database of angler-tagged fishes. This database includes recapture data for hundreds of fishes collected along the Louisiana coast. Meg and Marty also continue to work on their status survey for the rare blackmouth shiner (*Notropis melanostomus*) in southern Mississippi. This work began last year and will go on through the end of 2008 with the help of NRL Laboratory Manager Jeff Van

Vrancken, graduate student Chad Ellinwood (M.Sc.), and undergraduate student worker Ashley Walker. In early summer 2008, with the help of Becky Stowe at the Mississippi Chapter of the Nature Conservancy (TNC) and Todd Slack at the Mississippi Museum of Natural Science, NRL researchers were allowed access to TNC property in the Pascagoula River drainage to survey for *N. melanostomus*. This will be the first time these areas will be surveyed for *N. melanostomus* and the hope is to discover more populations of shiners in these protected regions.

Other NRL projects include the recent completion of Tom Lorenz's dissertation research on the invasive Rio Grande cichlid (*Herichthys cyanoguttatus*), a non-native fish that has become established in southeastern Louisiana and continues to expand. Within the last year, *H. cyanoguttatus* was reported for the first time on the west bank of the Mississippi River in the Barataria Basin and there have been more confirmed collections of this species within estuarine habitats of Lake Pontchartrain. For example, in May 2008 Chris Schieble and a team of NRL researchers collected a pair of *H. cyanoguttatus* at a regular sampling site in Lake Pontchartrain near the Inner Harbor Navigational Canal. This site has been sampled monthly for over eight years, yet this was the first time in that period that *H. cyanoguttatus* had been collected. Graduate student Scott Eustis (M.Sc.) continues his thesis work on the impacts of bycatch on coastal fish assemblages. His preliminary data suggest that over the last half century there has been an increase in the biomass of Lake Pontchartrain catfishes such as hardhead (*Ariopsis felis*) and gafftopsail (*Bagre marinus*) catfishes. It is possible these omnivorous scavengers are benefiting over other species as a result of consuming discarded bycatch from commercial fishing activities. Graduate Student Sunny Brogan (M.Sc.) continues her thesis research on restoring red drum (*Sciaenops ocellatus*) to an urban fishery in Bayou St. John. Her preliminary tracking data confirmed that reintroduced fish could survive in the urban system and she hopes to further define which habitats reintroduced fish prefer within the Bayou.

– Jan Hoover