

2013 Southeastern Fishes Council State Reports

(including: Alabama, Florida, Georgia, Kentucky, Louisiana, Missouri, North Carolina, Tennessee, Texas, and Virginia)

Alabama: (Brook Fluker, blfluker@ua.edu)

- **Auburn University Museum Projects- Submitted by Jonathan W. Armbruster**
 - The Auburn University Museum moved into its new home in the Biodiversity Learning Center in April/May 2013. The new facility is located near all of the other Biological Sciences Buildings and across the street from the School of Fisheries, Aquaculture, and Aquatic Sciences. The old building is now a grassy knoll.
 - Jonathan Armbruster, Matthew Niemiller, and Pamela Hart are currently undertaking a revision of the Southern Cavefish (*Typhlichthys subterraneus*) and have completed a status survey of populations in Alabama and Tennessee.
 - David Werneke, Malorie Hayes, Carla Stout, Erika Krahl, and Jonathan Armbruster have begun a study on the population genetics of the Broadstripe Shiner, *Pteronotropis euryzonus*.
 - Keith Ray and Jonathan Armbruster continue a study on the population genetics of the Blacknose Dace (*Rhinichthys atratulus*) in Alabama.
 - Keith Ray and Pamela Hart are working on several projects within the *Macrhybopsis aestivalis* complex, including population genetics and timing of daily movements in streams.
 - Ray is continuing work on the biogeographic patterns of *Luxilus zonistius* with Steven Powers and Kerstin Edberg.
 - Carla Stout, Morgan Raley, and Jonathan Armbruster are conducting a phylogenetic and geometric morphometric study of Longnose Minnow (*Notropis longirostris*).
 - Paul Wiczorek and Jonathan Armbruster are using Geometric Morphometrics to understand community dynamics of Alabama minnows and to examine the potential for success of introduced species based on differences in shape with natural communities.
- **Auburn University Fish Biodiversity Lab- Submitted by Carol E. Johnston**
 - Survey for Halloween Darter.
 - eDNA survey for Gulf and Alabama sturgeon.
 - Water availability as a catalyst for fish assemblage change.
 - The effects of noise pollution of the hearing, behavior and stress hormone response of freshwater fishes.
 - The role of acoustic cues in mate choice decisions in Banded Sculpin.
- **Geological Survey of Alabama aquatic biology - Submitted by Pat O'Neil**
 - GSA, USFWS, TVA, AU, and ADCNR completed fish IBI surveys in the Bear Creek (Tennessee River) system.
 - GSA, ADCNR, and USFWS completed fish IBI surveys in the Sipsy River (Tombigbee River) system.
 - Completed a road-stream crossing survey for the Big Canoe Creek Strategic Habitat Unit (SHU) to identify fish passage barriers and sources of sediment to streams in the watershed.
 - Completed a road-stream crossing report for the North River SHU to identify fish passage barriers and sources of sediment to streams in the watershed.

- Completed data collection and prepared draft report of a non-wadeable shoreline electrofishing sampling technique to be used for developing a riverine IBI for Alabama. Will begin evaluating IBI metrics and developing potential scoring criteria in 2014.
- Completed year 20 of water and biological monitoring for the Alabama Cave Shrimp on Redstone Arsenal in north Alabama.
- Initiated a three-year crayfish survey in cooperation with Chris Taylor and Guenter Schuster with regard to producing an Alabama crayfish book in the near future.
- **Jacksonville State University- Submitted by Mark E. Meade**
 - JSU researchers have discovered Asiatic weatherfish, *Misgurnus anguillicaudatus*, in Blue Eye Spring, a tributary located near the Coosa River at Logan Martin Lake. Weatherfish were reported in 2009 at another Logan Martin tributary, Goray Spring of Poorhouse Branch. Weatherfish have also been reported in Lake Logan Martin. Weatherfish have not been observed in other nearby tributaries and springs. USFW and JSU researchers are currently using eDNA to continue surveys for the species.
 - JSU researchers are examining the possibility that Weatherfish might have an abiotic competitive advantage over native fish species. Studies demonstrate that Weatherfish can tolerate temperature fluctuations, particularly elevated temperatures, relative to native fishes.
 - JSU researchers and Munford high school students are conducting fish surveys in small tributaries of Choccolocco creek in the Talladega District of the Talladega National Forest. The high school students will be presenting their data at the 2014 Alabama Academy of Sciences meeting in March.
 - JSU researchers have compared fishes from Snow Creek, a site contaminated with PCBs and mercury for a majority of the 20th Century, with fishes from non-contaminated, relatively pristine sites (Shoal Creek in Talladega National Forest). Contamination of Snow creek was stopped in the 1980s and, based on physiological and morphological analyses, fishes in Snow creek currently do not show signs of PCB and mercury contamination stress.
- **University of Alabama- Submitted by Brook L. Fluker**
 - Brook Fluker continued phylogeographic studies of Gulf Coastal Plain fishes (*Etheostoma parvipinne*, *E. gracile*, and *E. zonifer*) and conservation genetics of the undescribed Blueface Darter (*E. sp. cf. zonistium*). UA undergraduate researchers will continue this work with Brook in 2014.
 - The University of Alabama Ichthyological Collection (UAIC) welcomed Randy Singer as the new collections manager in September.
- **University of North Alabama- Submitted by Jeffery M. Ray.** The upstream dispersal of *Notropis texanus* in the Tennessee River system and its impact on native fish communities continues to be documented by University of North Alabama personnel. At some localities in Cypress Creek (Lauderdale County) it has gone from rare to the most abundant cyprinid sampled since it was first detected in 2010.

Florida: (Noel Burkhead, nburkhead@usgs.gov)

- Lawson, L.L., Jr. J.E. Hill, L. Vilizzi, S. Hardin, and G.H. Copp. 2013. Revisions of the Fish Invasiveness Screening Kit (FISK) for its application in warmer climatic zones, with particular reference to peninsular Florida. Risk Analysis 33: 1414-1431.

- Fuller, P. 2013. Project Summary: Refinement of nonindigenous aquatic species point data in the SARP region. Report to the Southeast Aquatic Resources Partnership, 3pp. (available from pfuller@usgs.gov).
- Fuller, P.L., M. Neilson, and D. Huges. 2013. The NAS Alert System: a look at the first eight years. *Fisheries* 38(3):128-138.
- Fuller, P.L., A.J. Benson, and M.J. Cannister. 2013. Summary Report of Freshwater Nonindigenous Aquatic Species in USFWS Region 4 – An Update. Report to the U.S. Fish and Wildlife Service, Atlanta.
- Fuller, P.L. and M.J. Cannister. 2013. Introduced fishes of the lower Tennessee and Cumberland drainages. Pages 29-42 In Johansen, R., L.D. Estes, S.W. Hamilton, and A.N. Barrass (eds). *Proceedings of the 14th Symposium on the Natural History of the Lower Tennessee and Cumberland River Valleys*. Center for Excellence in Field Biology, Austin Peay State University, Clarksville, TN.
- Goss, C.W., W.F. Loftus, and J.C. Trexler. 2013. Seasonal fish dispersal in ephemeral marshes of the Florida Everglades. *Wetlands* DOI 10.1007/s13157-013-0375-3.
- Johnson PD, AE Bogan, KM Brown, NM Burkhead, JR Cordeiro, JT Garner, PD Hartfield, DAW Lepizki, GR Mackie, E Pip, TA Tarpley, JR Tiemann, NV Whelan, EE Strong. 2013. Conservation status of freshwater gastropods of Canada and the United States. *Fisheries* 38(6): 247-282.
- Kline J.L., W.F. Loftus, K. Kotun, J.C. Trexler, J.S. Rehage J.J. Lorenz, and M. Robinson. 2013. Recent fish introductions into Everglades National Park: an unforeseen consequence of water-management? *Wetlands* DOI 10.1007/s13157-012-0362-0.
- Mahon, A.R., C.L. Jerde, M. Galaska, J.L. Bergner, W.L. Chadderton, D.M. Lodge, M.E. Hunter, L.G. Nico. 2013. Validation of eDNA surveillance sensitivity for detection of Asian carps in controlled and field experiments. *PLoS ONE* 8(3): e58316. doi:10.1371/journal.pone.0058316.
- Rehage, J.S., S.E. Liston, K.J. Dunker & W.F. Loftus. 2013. Fish community responses to the combined effects of decreased hydroperiod and nonnative fish invasions in a karst wetland: are Everglades solution holes sinks for native fishes? *Wetlands* DOI 10.1007/s13157-012-0361-1.
- Schofield, P.J., Slone, D.H., Gregoire, D.R., Loftus, W.F. 2013. Effects of a non-native cichlid fish (African jewelfish, *Hemichromis letourneuxi* Sauvage 1880) on a simulated Everglades aquatic community. *Hydrobiologica* DOI 10.1007/s10750-013-1697-0.
- Schofield, P.J., Pecora, D.J. 2013. Croaking gourami, *Trichopsis vittata* (Cuvier, 1831), in Florida, USA. *BioInvasions Records* (2013) <http://dx.doi.org/10.3391/bir.2013.2.3.12>.
- One project is refining the current distribution, occurrence, abundance, and genetics of the Southern Tessellated Darter *Etheostoma olmstedi maculaticeps*, in cooperation with Howard Jelks (U.S. Geological Survey), Jim Austin (University of Florida), and Mark Barrett (FWC).
- Additional collaborative efforts are with Steve Walsh (U.S. Geological Survey) to find and collect genetic tissues from Bluenose Shiners, *Pteronotropis welaka*, in the St. Johns River system; three individuals were successfully captured in Alexander Springs, but no specimens were found in Juniper Springs.
- FWC biologists Travis Tuten, Drew Dutterer, Eric Nagid, Andy Strickland, Chris Middaugh, Ted Alfermann, John Knight, Kate Herringer, and Dick Krause compared fish communities upstream and downstream of a dam on the Wacissa River, relative to an investigation of the dam's impacts on the fish communities.

- Florida Fish and Wildlife Conservation Commission (FWC) Researchers M.G. Wegener J.R. Knight, and K.M. Harriger- Continuing research on Alligator gar movement and habitat use from the Escambia River Florida. To date, Twenty-two alligator gar *Atractosteus spatula* (TL range: 93 to 190 cm) were captured in gill nets and tagged with external transmitters. Both long term and short-term movement (e.g., daily movement rates) are being investigated. The goal is to use information collected to initiate a mark/re-capture study in spring 2014
- FWC Researchers J.R. Knight, M.G. Wegener, and K. M Harriger- initiated a mark/re-capture study in order to estimate population size of the harlequin darter *Etheostoma histrio*, from Big Escambia Creek. Visual survey methods are being used. The goal is to determine whether 10,000 individuals reside in Florida waters. If the population is determined to be less than 10,000 individuals, then the species will be elevated to state Threatened.
- FWC Researchers J.R. Knight, M.G. Wegener, and K. M Harriger- Continue work trying to determine the distribution and status of the Blackbanded Sunfish *Enneacanthus chaetodon*, in Florida. No new locations were discovered during the previous year. The goal is to determine the status of the species in Florida.
- FWC Researchers J.R. Knight, B. Barthel, M. Tringali continue to work on meristic and morphometric comparisons of an undescribed species of black bass *Micropterus* sp. cf *punctulatus*, endemic to the Florida Gulf Coastal plain. Genetic analysis identified the species as unique, and work is in progress to validate these results using traditional meristic and morphometric traits. Additional research is ongoing to determine age, growth, and diet of the species from the Choctawhatchee river system.
- Florida Chapter of The Nature Conservancy (<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/florida/>)
 - Restoration of steephead streams (spring-like streams issuing from sand and gravel aquifers on the Florida panhandle) includes restoration of headwaters of “Puddin’ Head Lake,” which formally impounded over 90% of a steephead stream, and restoration of Kelly Branch, an Apalachicola River tributary.
 - The Florida TNC Chapter has been working with partners to restore sites on a 322-river kilometer reach of the Yellow River, a beautiful panhandle river that supports a resident population of the Gulf Sturgeon *Acipenser oxyrinchus desotoi*, and anadromous Striped Bass *Morone saxatilis*.
 - “Conservation locking” at Jim Woodruff Lock and Dam, a project shepherded by Steve Herrington that allows passage of the Alabama Shad (*Alosa alabamae*), has contributed to an estimated doubling of population to about 280,000 total shad in the Apalachicola River (see: <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/florida/howwework/apalachicola-river-dams-and-politics-can-migrating-fish-survive.xml>).
- University of Florida, Department of Fisheries and Aquatic Sciences, Gainesville, FL. Doctoral candidate Towns Burgess (otburge@ufl.edu) and his advisor, Chuck Cichra, have been conducting a long-term biological community monitoring in the Lower St. Johns River drainage since 2008. The monitoring of multiple community trophic levels to determine whether discharge of industrial wastewater into the St. Johns River causes adverse effects to biological communities.
- University of Florida, Tropical Aquaculture Laboratory, Ruskin, FL
 - Jeff Hill has been involved non-native fish research and in the development and testing of risk assessment tools for use with non-native freshwater fishes, especially the Fish

- Invasiveness Screening Kit (FISK). Collaborators include Gordon Copp (CEFAS, UK), Scott Hardin (FWC), Larry Lawson (UF), and Lorenzo Vilizzi (Murray-Darling Freshwater Research Center).
- FISK v2.03 is a new decision support tool for screening non-native freshwater fishes now available on the Centre for Environment, Fisheries & Aquaculture (CEFAS) website: <http://www.cefas.defra.gov.uk/our-science/ecosystems-and-biodiversity/non-native-species/decision-support-tools.aspx>. This risk-screening tool has been used in several international projects and published journal articles; it is available online.
 - Research on eDNA detection of African jewelfish *Hemichromis letourneuxi* with Jeff Herod, Greg Moyer, and Edgardo Diaz-Ferguson (USFWS)
 - Investigations of trophic ecology of bullseye snakehead *Channa marulius* and comparative ecology of native bowfin *Amia calva* with Kelly Gestring (FWC)
 - Evaluation of non-native species Best Management Practices for Florida Aquaculture
 - U.S. Fish and Wildlife Service, Panama City Field Office, Panama City, FL
 - Graduate student, Reuben Smit, led by Adam Kaeser (FWS) and colleagues at Auburn University (Jim Stoeckel and Steve Sammons) continued a project to map potential mussel habitat and model the distribution and abundance of Fat Threeridge mussels throughout a 40 km reach of the Apalachicola River.
 - In 2013, a time-lapse, sonar imaging approach to detecting changes occurring to mussel habitat following a 10-yr flood event (Feb-March 2013) was successfully conducted in this river. Bed stability, as determined by sonar imaging, was confirmed in areas known to harbor mussels.
 - Efforts to develop and validate a sonar-based approach to quantifying sturgeon abundance involved intensive mark-recapture and sonar imaging work in the Blackwater River during summer 2013. High precision and accuracy of sonar-based estimates of the number of fish >100 cm (total length) relative to independently derived estimates of abundance provide further support for the technique. Similar work is planned for other Gulf sturgeon rivers.
 - The analysis of data and preparation of a final report for the NRDA assessment of impacts to Gulf sturgeon associated with MC252 contaminants has been a primary focus in 2013.
 - Monitoring of spawning habitat use in the upper Apalachicola was conducted using passive telemetry and fish tagged during the NRDA effort. To support the release of Gulf sturgeon into the Flint River for experimental purposes, a desktop assessment of the availability of spawning substrate relative to flows was conducted by analyzing a previously developed sonar habitat map of the system.
 - A website hosting a variety of tools and training materials associated with sonar habitat mapping was launched; the site includes a fully annotated, 300+ page Guide to Low-Cost Sonar Habitat Mapping also developed in 2013.
 - Four stream restoration projects, led by biologist Chris Metcalf, will be completed in 2014 to restore over 3 miles of habitat on the Chipola River. One project will restore about 1,500 linear feet of perennial stream channel impacted by cattle. Another project will entail replacing a fish passage barrier with a new culvert structure on a spring fed tributary. A stream bank on the mainstem Chipola River will be restored to reduce sedimentation and promote riparian buffer. Additionally, over 13,000 linear feet of stream bank fencing will be installed to eliminate cattle access to tributaries and the Chipola River.
 - Several stream restoration projects are being implemented to reduce sedimentation into the mainstem Spring Creek and its tributaries. Several unpaved roads have been stabilized from

hilltop to hilltop with ditch reshaping and sod planting. Other projects consist of over 10,000 linear feet of cattle exclusion fencing and riparian restoration.

- U.S. Geological Survey, Southeast Ecological Science Center, Gainesville, FL
 - Summary of annual activities pertaining to the USGS Nonindigenous Aquatic Species (NAS) Database (<http://nas.er.usgs.gov/Default.aspx>). The NAS team includes Pam Fuller, Amy Benson, Matt Cannister, and Mathew Neilson. A new bulk up-loader tool is now fully implemented, which facilitates the uploading of large datasets and has resulted in huge amounts of data being added to the NAS in the past year. Uploaded >85,000 records from 17 different data sets, which more than doubled the total number of records in the NAS database; 92% of the data came from large field datasets provided by researchers and museums. Added 17,131 records for the SARP region (see aforementioned report), 95% of which were fish records representing 175 species. Common Carp accounted for 30% of records. Most data were added from Missouri, Florida, and North Carolina.
 - Steve Walsh, Howard Jelks, Nate Johnson, and Zach Martin completed collections of fishes and mussels in headwater streams of the Chipola River (Florida, Alabama) and Spring Creek (Georgia) as part of the USGS WaterSMART (Sustain and Manage America's Resources for Tomorrow) program. This effort is in collaboration with Mary Freeman and colleagues, who are sampling fishes at sites in the mid/upper Flint River and upper Chattahoochee River. Objectives are to evaluate hypotheses concerning effects of hydrologic alteration on stream populations by incorporating new approaches of integrating effects of hydrologic variation into models of ecological responses.
 - Steve Walsh and Margaret Hunter (SESC research geneticist) are pursuing studies in e-DNA detection of invasive armored catfish with funding from the U.S. Fish and Wildlife Service. Additionally, they are beginning studies with grass carp to evaluate variables that influence e-DNA detection under flowing water conditions, in collaboration with Robert Dorazio (SESC biometrician) and Gregory Moyer (USFWS, research geneticist).

Georgia: Brett Albanese (Brett.Albanese@dnr.state.ga.us)

- Conservation Fisheries, Inc. (Pat Rakes)
 - The remaining 72 propagated Conasauga Logperch (*Percina jenkinsi*) spawned in 2011 were transferred to Dr. Robert Bringolf's lab at UGA for endocrine disruption studies.
 - Surveys at 2 sites on the upper Conasauga River in GA failed to detect any of the tagged propagated Conasauga Logperch released in 2012. Nor were any detected anywhere downstream in Tennessee by numerous observers, although 30 adult *P. jenkinsi* were observed at several sites between Minnewauga Creek and the US 411 Bridge in August.
- Georgia DNR-Fisheries Region 3 Fisheries (Rob Weller). In cooperation with the FL FWCC, FWS, COE and TNC, we are in the fifth year of a proactive species conservation grant from NOAA to restore Alabama Shad (*Alosa alabamae*) populations in the ACF. Fish passage at Jim Woodruff Lock and Dam on the Apalachicola River, has provided several hundred miles of additional riverine habitat in the Flint and Chattahoochee Rivers. Yearly population estimates of spawning adults (highly variable) indicate an increase in the number spawning fish, particularly for larger (older) individuals.
- Georgia DNR Region IV (Bert Deener)
 - Removed 4,725 Flathead Catfish, *Pylodictis olivaris*, totaling 3,668 pounds during 2013. As a part of the Satilla River Redbreast Restoration Project started in 2007, more than 70,162 pounds of Flathead Catfish (30,816 fish) have been removed from the river. The size

- structure of the Flathead Catfish population has decreased with the average size fish removed progressively dropping from 5.8 pounds in 2007, to 0.8 pounds in 2013.
- Five Flathead Catfish were sampled from the Ochlockonee River ranging in size from 595-1000 mm TL and 3-13.5 kg. Lapillar otolith ages ranged from 3 to 8 years. This confirms many years of unofficial reports and is congruent with the confirmed presence of Flathead Catfish in Lake Talquin for roughly a decade (FWC). Three additional Flathead Catfish were subsequently collected, and ranged from 305 to 820 mm TL.
 - Bryant Bowen (GADNR) initiated a statewide sampling of fin clips for Largemouth Bass, *Micropterus salmoides*, in cooperation with John Hargrove and Tadao Kitagawa (University of Florida) to evaluate the distribution of Northern and Florida Largemouth Bass alleles in a select number of Georgia systems.
 - Tim Bonvechio (GADNR), Bryant Bowen (GADNR), Jeremy Wixson (GADNR) and Dr. Mike Allen (University of Florida) recently presented an accepted manuscript entitled “Exploitation of Largemouth Bass, *Micropterus salmoides*, in Three Georgia Small Impoundments” at the 67th Annual Southeastern Association of Fish and Wildlife Agencies. Modeling indicates that a protective slot limit could increase the number of trophy bass (i.e., 600 mm TL) in all 3 impoundments.
 - Brandon Baker (GADNR) initiated a comprehensive age and growth study in October 2013 on the Largemouth Bass population in the Ocmulgee River to evaluate the current 14-inch minimum size limit in an effort to increase yield or catch.
 - Nick Porter (Idaho Cooperative Fish and Wildlife Unit), Tim Bonvechio (GADNR), Joshua McCormick (Idaho Cooperative Fish and Wildlife Unit) and Dr. Mike Quist (Idaho Cooperative Fish and Wildlife Unit), recently presented an accepted manuscript entitled “Population Dynamics of Bowfin, *Amia Calva* in a South Georgia Reservoir: Latitudinal Comparisons of Population Structure, Growth, and Mortality. Bowfin in Lake Lindsay Grace exhibited fast growth rates, earlier maturity, and higher mortality (A = 68%) than the northern reference populations compared.
 - Georgia DNR-Nongame Conservation Section (Brett Albanese)
 - We are very happy to report the hiring of an additional mussel biologist, Dr. Andrew GaschoLandis. Andrew is working with Jason Wisniewski on freshwater mussel conservation in the lower Flint River system.
 - We completed our Goldline Darter (*Percina aurolineata*) status assessment, but have continued surveys for Holiday Darters (*Etheostoma brevirostrum*) in the upper Coosawattee. Within this drainage, Holiday Darters are restricted to the Mountaintown Creek and Ellijay River systems and are extremely rare in the latter. In conjunction with this effort, our mussel team documented the first records of Finelined Pocketbook (*Hamiota altilis*) and Alabama Creekmussel (*Strophitus connasaugensis*) upstream of Carters Lake. Chris Skelton has also been surveying for Coosawattee Crayfish (*Cambarus coosawattee*) and Beautiful Crayfish (*Cambarus speciosus*) in the Coosawattee.
 - As part of our effort to assess the status of species petitioned for federal listing, we carried out surveys for Bluestripe Shiners (*Cyprinella callitaenia*) and Broadstripe Shiners (*Pteronotropis euryzonus*) in the middle and upper Chattahoochee River systems. Deb Weiler is compiling data for large numbers of petitioned aquatic species. Catherine Reuter is working on a comprehensive mapping effort for petitioned species and hundreds of species that are being assessed for the upcoming revision of our State Wildlife Action Plan. Catherine also completed monitoring of Oconee River gravel bar habitats for spawning

Robust Redhorse, but none were detected. Anakela Popp is working on a report summarizing monitoring of Etowah and Cherokee Darters in the Raccoon Creek system.

- Georgia DNR-Stream Survey Team (Patti Lanford)
 - 39 streams were sampled in 2013 (in three ecoregions: Blue Ridge — Coosa (1), Savannah (2), and Tennessee (4) river basins; Piedmont— Chattahoochee (6), Flint (3), Ocmulgee (6), Oconee (5), and Savannah (1) river basins; Southeastern Plains—Chattahoochee (1), Flint (4), Ochlockonee (1), Ocmulgee (3), and Suwannee (2) river basins.) for Index of Biotic Integrity purposes, plus an additional 17 streams in conjunction with EPA's National Rivers and Streams Assessment. The total number of streams sampled in 2013 was down considerably from past years due to unusually abundant rainfall across the state.
 - Some of the more interesting projects associated with 2013 IBI sampling include the monitoring of potential reference sites to assess long-term trends, the establishment of sites at bridge crossings with USGS gages in order to compare fish community values at those gages at various flows/discharges, and additional sampling in the Ochlockonee and upper Suwannee river basins in order to develop an IBI for that part of the state.
- Georgia Power Company (Joey Slaughter)
 - GPC helped organize and host Black Bass Diversity: multidisciplinary science for conservation at the 2013 SDAFS meeting as well as a follow-up session at the 2013 AFS Annual meeting. In addition, GPC continues to help lead the SARP Native Black Bass Initiative as well as the NFWF Southeastern Black Bass Initiative. We have also funded a SARP project to align management needs and objectives of these programs with other species needs utilizing the USFWS LCC surrogate species concept. GPC hosted the Black Bass Conservation Committee for a three-day meeting in May to further develop the conservation strategy, marketing strategies, and work on the conference proceedings book, which will be published by AFS Books sometime in 2014.
 - GPC, Auburn University, and the Flint Riverkeeper presented relevant research on black bass conservation to the Shoal Bass Alliance at their annual meeting in Georgia in March.
 - GPC staff conducted fish relocation of numerous species from a construction site on the mainstem Chattahoochee River in conjunction with the Columbus Dam removal project.
 - GPC conducted an experimental sampling for Robust Redhorse in the Wallace Dam tailrace using gill nets. No Robust Redhorse were sampled, despite success with similar methods in the Savannah basin.
 - The Jennings lab at UGA recently completed a GPC funded, two-year research study on the Ocmulgee River between Lloyd Shoals Dam and Juliette Dam to monitor and analyze population levels of Robust Redhorse.
 - GPC is exploring collaborative conservation opportunities to address species included in listing petitions received by the USFWS in the last several years. Currently, we have identified species with aspects of life history and occurrences align with our operations. In conjunction with GADNR and USFWS, we plan to solidify BMPs for our properties and perform surveys where needed to inform the listing process.
- Georgia- Southwestern State University (Tom Lorenz). Planned studies on aggressive interactions between invasive and potentially invasive crayfish species and the state-threatened endemic Muckalee Crayfish, and the natural history of Barbour's map turtle.
- Gerald Dinkins. Gerry had a tough year, but is tougher than a madtom spine and getting back on his feet.

- UGA-Bringolf Lab. Focus on Gulf Sturgeon & mussel interactions in the ACF, efforts to identify intersex fish non-lethally, work to determine factors associated with intersex in impoundments, effects of contaminants on the parasitic interaction between mussels and host fish, and dietary protein substitution for tilapia grown in aquaponics systems.
- UGA-Freeman Lab
 - Carrie Straight finalized a comprehensive report on the migration behavior, spawning habitat, and potential for recruitment of a population of Robust Redhorse (*Moxostoma robustum*) introduced into the Broad River system (Savannah Drainage).
 - Rachel Katz is working on stream fish survival and recruitment dynamics in the Flint and Oconee river systems.
 - Megan Hagler has continued monitoring of water quality and rare fish distributions in the Conasauga and Etowah River systems.
 - Mary Freeman (USGS) is studying stream fish metapopulation dynamics in the Apalachicola-Chattahoochee-Flint drainage.
 - Bud Freeman (GA Museum of Natural History) focus on systematics and taxonomy of the redeye bass species complex in the Chattahoochee, Altamaha, and Savannah systems.
- UGA-Grossman Lab. The Grossman lab co-authored papers on patch use by native and invasive minnows (Ecology of Freshwater Fish 22: 55-65), microhabitat use by Southern Brook Trout (EFF doi: 10.1111/eff.12059, 11 pp), and the effect of rainbow trout on the feeding efficiency and social behavior of Warpaint Shiners (Invasion Biology: DOI 10.1007/s10530-013-0548-2, 16 pp).
- UGA-Jennings Lab
 - The Ogeechee Robust Redhorse telemetry project was completed, which documented the location of a spawning site during 2011 and the potentially devastating effects of drought during 2012. The study was unable to confirm recruitment of juveniles to the population. We also completed a Robust Redhorse study on the Ocmulgee River (See GPC Report).
 - We are studying blue catfish in Lake Oconee. With fieldwork and much of the diet analysis completed, we found that the blue cats are eating a LOT of *Corbicula* and some piscine prey. The fish prey was seasonally variable.
 - We have an ongoing human dimensions study (i.e., creel effort and harvest as well as angler attitudes) for marben public fishing area.
- UGA –Peterson (Doug) Lab
 - Evan Ingram (MS) is completing the final data analysis on a 3 year study of the riverine and intercoastal movements of Atlantic Sturgeon and Shortnose Sturgeon. Atlantic Sturgeon spawn during the fall months (Sept-Oct) in Georgia rivers as water temperatures fall into the preferred range of 16-22C. Shortnose Sturgeon spawn in late Feb and early March. Both species spawn over hard substrates near the confluence of the Ocmulgee and Oconee rivers and in the lower reach of the Ocmulgee River.
 - Phong Nguyen is completing his MS thesis on the effects of fin spine biopsy on the swimming performance of sub-adult white sturgeon.
 - Derek Bahr is analyzing data from his first summer of his MS project that focuses on estimating abundance and population dynamics of Atlantic Sturgeon and Shortnose Sturgeon on the Savannah River.
 - Andrew Marbury (MS) is analyzing mark-recapture data from the first summer of his MS project that is focused on estimating annual recruitment of Gulf Sturgeon on the Apalachicola River.

- Valdosta State University. Dave Bechler and Josh Salter finished up all fieldwork for their Blackbanded Sunfish (*Enneacanthus chaetodon*) project and are now completing a final report. They sampled 72 sites from the Aucilla to St. Marys system, with individual sites sampled on 1-5 occasions. Ashley Barnes is investigating the taxonomic status of topminnows (*Fundulus spp.*) in south and southeast Georgia.

Kentucky: Matt Thomas (matt.thomas@ky.gov)

- U.S. Fish and Wildlife Services, KY Ecological Services Field Office (KFO), Michael Floyd:
 - KFO and the Kentucky State Nature Preserves Commission (KSNPC) are investigating the distribution, status, population size, and habitat use of several imperiled fishes in eastern Kentucky: Blackside Dace (*Chrosomus cumberlandensis*), Cumberland Darter (*Etheostoma susanae*), Kentucky Arrow Darter (*Etheostoma spilotum*), and Cumberland Arrow Darter (*Etheostoma sagitta*). KFO and KSNPC focused on the Kentucky Arrow Darter, which were observed at only 7 of 80 surveyed sites within the upper Kentucky River basin. Analyses are ongoing.
 - Through USFWS-USGS Quick Response funding, Nathaniel Hitt at USGS Leetown Science Center and KFO are working cooperatively to apply spatial statistical modeling techniques to estimate Kentucky Arrow Darter distribution and sensitivity to water quality parameters. Dr. Hitt presented preliminary findings of this research in September at the American Fisheries Society Meeting in Little Rock, Arkansas, which identified fish responses to conductivity and percent disturbed land.
 - The KFO and Kentucky Department of Fish and Wildlife Resources are working with Sherry Harrel and graduate student, Jonathan Baxter, at Eastern Kentucky University (EKU) to develop and implement a movement study, habitat characterization, and population estimate of two Kentucky Arrow Darter streams, Gilberts Big Creek and Elisha Creek (Daniel Boone National Forest), in Clay and Leslie Counties. Mr. Baxter will use PIT-tags and placed antenna systems to monitor intra- and inter-tributary movement patterns and he will be collecting seasonal (spring, summer, and fall) biotic and abiotic data from 17 100-m reaches.
 - Rebecca Johansen and Mollie Cashner at Austin Peay State University (APSU) began work on the first comprehensive assessment of genetic variation and gene flow patterns across the range of the Kentucky Arrow Darter.
 - The Cumberland Arrow Darter became a federal candidate for listing under the Endangered Species Act on 12 June 2012.
 - A new population of Blackside Dace was discovered in Right Fork Maces Creek, a tributary of the North Fork Kentucky River, by Bert Remley (Third Rock Consultants, LLC) in September 2013. Follow-up surveys by KDFWR and USFWS confirmed occurrence at two locations in the Right Fork Maces Creek watershed. Introduction from the upper Cumberland River drainage is suspected. Tissue samples have been sent to APSU for species verification and relationship to upper Cumberland populations.
- Kentucky Dept. of Fish and Wildlife Resources (KDFWR), Matt Thomas and Stephanie Brandt:
 - With Conservation Fisheries, Inc. (CFI), completed fourth year of captive propagation and reintroduction of Cumberland Darter and Kentucky Arrow Darter in two small streams on the Cumberland Plateau of eastern KY. First evidence of natural reproduction in both species was documented in 2013.

- Completed fish faunal surveys in Buck Creek (upper Cumberland River drainage) and Red River (lower Cumberland River drainage) resulting in updated information on populations and distributions of several rare species. Noteworthy among new occurrence records was the discovery of a previously unknown population of Flame Chub (*Hemitremia flammea*) in the Red River drainage.
- A status survey of the undescribed Sheltopee Darter (*Etheostoma* sp. cf. *spectabile*), restricted to the Dix River (Kentucky River), found it to be common throughout middle to upper reaches the drainage.
- Surveys are underway for the Diamond Darter (*Crystallaria cincotta*) in the Green River using a benthic trawl and nocturnal searches using spotlights and seines. The species was last collected in the Green River in 1929; however, a 136 mile section between Mammoth Cave National Park and Greensburg was designated critical habitat (unoccupied) as part of the recent federal listing rule. No Diamond Darters were encountered in 2013, but surveys will continue in 2014.
- Presented information on aquatic biodiversity of the Kentucky River basin to the public at the Annual Kentucky River Day.
- Morehead State University, David Eisenhower:
 - Currently studying Frecklebelly Darter (*Percina stictogaster*) movements in the Red River (Kentucky R.).
 - Contributed a paper addressing impacts of culverts on Blackside Dace movements to the special edition of Southeastern Naturalist featuring Blackside Dace ecology and conservation.
- Kentucky State Nature Preserves Commission (KSNPC), Michael Compton:
 - Educational field day in Lewis County to discuss with local residents the importance of aquatic organisms (fishes and mussels) in Kinniconick Creek, as well as stream stability and hydrology associated with landuse practices. This is a joint project with KY Division of Water and University of Louisville (UL).
 - Monitoring fishes following stream restoration efforts in Slabcamp Creek, Rowan County, Ky. This is a collaborative project among ECU, UL, U.S. Forest Service (USFS), KDFWR, and KSNPC examining the response of fishes, macroinvertebrates, hydrology, and water chemistry to headwater stream restoration.
 - Collected baseline fish community data in White Oak Creek (South Fork Kentucky River drainage) prior to potential stream restoration. This project is a collaboration of The Nature Conservancy, KY Dept. of Transportation, USFWS, USFS, and KSNPC staff.
 - Surveys of the rare Cumberland Papershell (*Anodontoidea denigrata*) in the Upper Cumberland River above the Cumberland Falls. Although most field surveys failed to detect the species, Mud Creek, Whitley County, was found to contain the best known population with nearly 60 individuals within a 150 m reach and another reach with nearly 25 individuals.
 - Mussel surveys in the Little River (lower Cumberland River) drainage, Christian County. Streams were heavily impacted by row crops and channelization. Only nine species were detected from eight surveys.
 - Mussel surveys at one site in the South Fork Kentucky River, Owsley County, identified 26 live species including the federally endangered Snuffbox (*Epioblasma triquetra*). The site was estimated to contain approximately 5,000 individuals, with the Mucket (*Actinonaias ligamentina*) being the most common species.

- Surveyed over 160 stream reaches for the Cumberland and Kentucky Arrow darters Occupancy Modeling Project (2012 and 2013). This is a joint project with USFWS staff.
- Survey of the federally endangered Relict Darter, endemic to Bayou du Chien, Graves and Hickman Counties found species occurrence at 8 of 12 reaches surveyed. All but a single individual were sampled from a continuous 13.4 mile reach of mainstem Bayou du Chien. Estimated population size (95% confidence level) for the mainstem was between 14,587 and 25,431 individuals, which is within the range provided by Piller and Burr (1998).
- Completed annual surveys for rare fishes and mussels in western Kentucky.
- Assisted Steve Ahlstedt with mussel surveys in the Little South Fork Cumberland River, Wayne County, and Sinking Creek, Laurel County.
- Contributed a paper to the special edition of Southeastern Naturalist featuring Blackside Dace ecology and conservation addressing changes in fish community structure following beaver colonization in Davis Branch, Bell County.
- Submitted a report to USFWS on an assessment of host fishes of the Cumberland Elktoe (*Alasmidonta atropurpurea*) and Cumberland Bean (*Villosa trabilis*) in Sinking Creek, Laurel County.
- Fish and mussel sampling in Green River adjacent to the WKU property, approximately 5 miles upstream of the Mammoth Cave NP, was rescheduled for 2014 due to water conditions.
- Murray State University, Michael Flynn Lab:
 - Continued research involving restoration of Alligator Gar in western KY examining juvenile gar movement patterns over seasons, diet, and best sampling methods.
 - Research on Bighead and Silver Carp in Kentucky Lake and their influence on primary production in reservoir systems.

Louisiana: Martin T. O'Connell (moconnel@uno.edu)

- David Camak of Kyle Piller's lab at Southeastern Louisiana University recently finished his thesis project in which he assessed the impacts of life-history and low head dams on the genetic structure of three sympatric Etheostomatine darters in the Pearl River. His data suggest that life-history plays a substantial role in genetic structure such that all species don't respond similarly to dam fragmentation. Manuscript currently in review.
- Luke Bower also recently completed his thesis in Dr. Piller's lab. His study focused on using body shape to assess niche position within a fish community in the Tickfaw River, Louisiana (Lake Pontchartrain Basin). Luke just started his Ph.D. work with Kirk Winemiller at Texas A&M University this fall.
- Kyle Piller and Aaron Geheber are working on a manuscript to summarize the recovery of the Pearl River fish community following the fish kill in 2011.
- Martin and Meg O'Connell at the University of New Orleans with Christopher Schieble at Louisiana Department of Wildlife and Fisheries published a paper in the journal *Estuaries and Coasts* titled "Response of Lake Pontchartrain Fish Assemblages to Hurricanes Katrina and Rita". The major conclusion of this research was that while the overall composition of Lake Pontchartrain fish assemblages remains stable, the significant decline of some species and changes in certain environmental variables are cause for concern.
- A Notice of Intent was passed by the Louisiana Wildlife and Fisheries Commission on October 4, 2013. It intends to change the regulations of the LA Scenic and Historic Streams program to prohibit the public use of off-road vehicles with 100 ft. of the low-flow mid-

channel line in all of the State's listed scenic streams (~3,000 miles throughout the state). It is highly likely to be voted into law during the February commission meeting.

- Several publications dealing with fisheries, available tools, and methods:
 - Alford, J.B. and M.R. Walker. 2013. Managing the flood pulse for optimal fisheries production in the Atchafalaya River Basin, Louisiana (USA). *River Research and Applications* 29(3):279-296
 - Jenkins, J.A, S.B. Hartley, J. Carter, D.J. Johnson, and J.B. Alford. A geographic information system tool for aquatic resource conservation in the Red and Sabine River watersheds of the Southeast United States. *River Research and Applications* 29(1):99-124
 - Kaller, M.D., C. E. Murphy, W.E. Kelso, and M.R. Stead. 2013. Basins for fish and ecoregions for macroinvertebrates: different spatial scales are needed to assess Louisiana Wadeable streams. *Transactions of the American Fisheries Society* 142(3): 767-782

Missouri: Robert A. Hrabik (Robert.Hrabik@mdc.mo.gov). From reports provided by Doug Novinger (Missouri Department of Conservation), Nick Sievert (University of Missouri-Columbia), Emily Pherigo (University of Missouri-Columbia), and Craig Paukert (Missouri Cooperative Fish and Wildlife Research Unit).

- Range-wide monitoring for Niangua Darters *Etheostoma nianguae* based on summer snorkeling surveys and an occupancy modeling approach was performed during 2011 and 2012. In this design, we visited 75 habitat patches in eight Osage River basin watersheds once every two years and sampled each patch at least twice during a visit. Niangua Darters maintained a broad distribution in Little Niangua River watershed with occupancy probability 0.73 to 0.87 depending on habitat covariates. Distributions in four other watersheds were widely-spaced but moderately to exceedingly sparse and occupancy was < 0.28. We did not detect Niangua Darters in three watersheds, all tributaries of the Sac River. The number of co-occurring darter species had a consistent, positive influence on occupancy. Extensive drought and record heat degraded habitat quality in streams sampled during 2012
- We continued monitoring populations of the Neosho Madtom, *Noturus placidus*, during mid-August, 2012, in the Spring River of southwestern Missouri. We evaluated dynamic occupancy models that estimated changes in probabilities of occupancy, colonization, extinction, and detection based on spatial replication of samples in 80 patches of suitable habitat. Occupancy models determined the distribution of Neosho Madtom declined from 57% of sites occupied during 2010 to 49% during 2012. There was a strong longitudinal trend in the probability of occupancy, with downstream sites most likely to be inhabited though the upstream and downstream extents of the distribution were relatively unchanged. Occupancy probability was influenced positively by mean current velocity and negatively by increased depth. Despite a reduced distribution, the Neosho Madtom population appeared to be demographically diverse and represented by a typical range of sizes including juveniles spawned during 2012. Drought that was particularly extreme during 2012 likely played a significant role in the decline.
- Annual monitoring of Topeka Shiners, *Notropis topeka*, in the Moniteau Creek watershed of central Missouri continued during fall, 2012. Multiple drag seine samples in 25 study sites were used to describe fish communities and habitat characteristics were measured for use in dynamic occupancy models. Severe drought related with dry or fishless reaches that affected several sites. The probability of a site being occupied by Topeka Shiners declined from 0.58 during 2011 to 0.21. The probability of local extinction was high, 0.72, and far out-paced

colonization (0.11). Several pools suffered degraded water quality, indexed by high conductivity and silt coverage, and likely had experienced extreme temperatures that would have killed fish. In addition, dispersal would have been impeded by the lack of rainfall and persistent low flows. Overall species richness and dominance scores for most species were greatly reduced indicating that negative impacts were not restricted to Topeka Shiners.

- A study done by MO Department of Conservation, MO State University, and funded by USFWS, “Ozark Cavefish Distribution Related to Mining and Water Quality in the Tri-State Mining District of Jasper and Newton Counties, Missouri”, described strong spatial patterns in the distribution of groundwater organisms, mining-associated contaminants, and other water quality characteristics in relation to designated mining-impacted areas. Ozark Cavefish, *Amblyopsis rosae*, were found in four new sites, and Cave Crayfish, *Cambarus sp.*, in six new sites. There was a distinct absence of aquatic troglobites in groundwater sample sites inside mined areas where several samples were marked by high concentrations of cadmium, lead, and zinc, dissolved and in sediments, as well as sulfate. Other major forms of water quality impairment inside mined areas included a lack of nutrients (low nitrate+nitrite), low dissolved oxygen, elevated ammonia, and high temperatures. Overall, nutrient concentrations including nitrate+nitrite (positive) and total phosphorous (negative) were the best range-wide predictors of aquatic troglobite presence. However, even if environmental water quality factors were optimal it is unlikely aquatic troglobites could persist at most sites inside mined areas due to high metals concentrations. The positive relationship between the occurrence of aquatic troglobites and nitrate+nitrite may reflect benefits to groundwater fauna from moderate nutrient enrichment and a correlation with landuse in agricultural and urban areas.
- An Evaluation of Stream Fish Vulnerability and Missouri’s Conservation Networks: We evaluated the vulnerability of Missouri’s stream fish species to habitat degradation, stream warming, and predicted alterations to the flow regime using two approaches; one based on species traits and the other based on measured species responses. We also quantified species rarity, range, dispersal ability, and the connectivity of occupied habitat in order to determine vulnerability scores for 133 of Missouri’s stream fish species. We also evaluated three of Missouri’s conservation networks (Priority Watersheds, Conservation Opportunity Areas, and the Existing Conservation Network) for aquatic biodiversity conservation in wadeable streams. We defined conservation value as a measure of unique stream fish representation (obtained from species distribution models), vulnerability (from our vulnerability assessment), and upstream habitat integrity (calculated based on information from the Missouri Department of Conservation Resource Assessment and Monitoring Program). We found that the value of stream reaches within each network and the network units themselves varied substantially. We also found that certain areas outside each of the conservation networks consistently had the highest complementary value.
- Seasonal fish community in two Ozark tributaries of the Lower Missouri River, including the Osage and Gasconade. 98 species were collected between February 2012 and August 2013; 78% were captured in both the Osage and Gasconade rivers. 84 species were collected in the Osage River – unique species included American Eel (*Anguilla rostrata*; 1 adult) and Skipjack Herring (*Alosa chrysochloris*; 8 adult, 4 juvenile) American eel –captured by electrofishing immediately below low head dam in June 2013. 89 species were collected in the Gasconade River – unique species included Alabama Shad (*Alosa alabamae*; 26 juvenile) and Crystal Darter (*Ammocrypta asprella*; 3 individuals). Thesis will focus on linking longitudinal

patterns of the fish community, specifically the big river fish guild, to water temperature and discharge to help understand seasonal tributary connections with the larger Missouri River.

North Carolina: Bryn H. Tracy (bryn.tracy@ncdenr.gov)

- American Eel, *Anguilla rostrata*, Passage in the Roanoke River Basin (Fritz Rohde, NOAA). As part of the FERC relicensing for Roanoke Rapids and Gaston dams on the lower Roanoke River, Dominion Generation installed two fish passage structures for American Eels at Roanoke Rapids Dam by 2010. Over one million eels passed upstream during 2010-2012, with large April and November runs occurring in response to water temperatures. Sampling was initiated at the base of Gaston Dam to measure the upstream movements of the eels and determine when eelways will be built at this dam.
- Projects of Morgan Raley (Research Curator of Conservation Genetics, North Carolina State Museum of Natural Sciences).
 - A genetic parentage analysis of the American Shad, *Alosa sapidissima*, in North Carolina coupled with a broader southeastern regional analysis (sharing data with the South Carolina's Marine Resources Research Institute in Charleston, SC (i.e., Tanya Darden's lab) and Greg Moyer's laboratory with US Fish & Wildlife Service) is underway. A similar study is being developed for Blueback Herring, *Alosa aestivalis*, which are stocked by the NCWRC and have been illegally introduced by fishermen in several North Carolina reservoirs.
 - A population genetics study of the undescribed Carolina Redhorse, *Moxostoma sp. cf. erythrurum*, has been completed, analyses are being run, and a paper is being developed.
 - A population genetics study with Bill Poly (SC DNR) of the Fieryblack Shiner, *Cyprinella pyrrhomelas*, is hunting funding. To date, coverage of material is good, but could benefit from additional samples from the Coastal Plain in South Carolina. Morphometrics and genetic datasets are being developed and will include complete mitogenomes representative of the diversity recovered.
 - Sickelfin Redhorse, *Moxostoma sp. cf. breviceps*, project with Dr. Tom Kwak (NCSU) & Tomas Ivasauskas (NCSU PhD candidate) is beginning the laboratory phase of DNA barcoding larval fishes to match to adults vouchered in the NCSM collection.
- Chowanoke Crayfish and Fish Surveys in the Chowan River Basin (Tyler Black and Rob Nichols, NCWRC). In December, Wildlife Diversity Program staff finished a distributional survey for Chowanoke Crayfish (*Orconectes virginienensis*) and other crayfishes within the Chowan River basin. 130 surveys during 2011-2012 resulted in six crayfish species sampled, of which five were native species and one was a non-native species. They found Chowanoke Crayfish in 8 of 57 streams and 19 of 117 survey sites, some of which represent new occurrence records. Two species, an undescribed crayfish species (*Cambarus sp. C*) and non-native Red Swamp Crayfish (*Procambarus clarki*), possibly represent new species records for the basin. In addition, they also made noteworthy collections for five species of fish, including Bridle Shiner (*Notropis bifrenatus*), Ironcolor Shiner (*Notropis chalybaeus*), Blackbanded Sunfish (*Enneacanthus chaetodon*), Banded Sunfish (*Enneacanthus obesus*), and Roanoke Darter (*Percina roanoka*). Future work includes analysis of data collected during the last two years and launching additional surveys for crayfishes in the Roanoke River basin. These surveys will provide baseline information to determine the status of Chowanoke Crayfish.
- Stopping the Spread of *Hydrilla* in Lake Waccamaw (Columbus County, Lumber River Basin). NCWRC Wildlife Diversity Program staff and other state, federal, and local agencies,

municipalities and organizations are working to stop the spread of *Hydrilla* in Lake Waccamaw. *Hydrilla* was discovered this past winter in the lake and ~600 acres are infested. Models predict that much of the lake could become infested within the next five years. The first application of Sonar[®] will take place early this summer and the fish and mussels will be monitored to determine what effects, if any, the herbicide will have.

- Eno River Baseline Aquatic Community Surveys Conducted (Neuse River Basin). The Eno River has a widespread, high density, and established population of the invasive aquatic weed, *Hydrilla*. The Eno River also has a diverse aquatic community that includes several listed aquatic species and some species that biologists do not know much about, e.g., freshwater snails. A collaborative partnership between state agencies and local authorities decided to chemically treat the *Hydrilla*. Fisheries biologists began an examination of the aquatic community responses to *Hydrilla* treatment, which focused on fish, crayfish, mussels, and snails. NCWRC Wildlife Diversity Program staff assisted fishery biologists with fish, crayfish, and mussel surveys, and hope to conduct surveys for freshwater snails and mussels in the last quarter of 2013 and if the rainy season slows down.
- Restoration Efforts Conducted on the Cheoah River (Little Tennessee River Basin). Following restoration of minimum flows in 2005 to the Cheoah River downstream from Santeetlah Dam, NCWRC Wildlife Diversity Program staff has cooperated with the U.S. Fish & Wildlife Service and others to restore native fishes and mussels to the river in Graham County. The federal and state-listed threatened fish species Spotfin Chub, *Erimonax monacha*, and the mussel species Wavy-rayed Lampmussel, *Lampsilis fasciola* (Special Concern in North Carolina) and Rainbow, *Villosa iris* (Threatened in North Carolina) are target species in that effort. Surveys performed in the Cheoah River in early June produced positive results for each species, with Spotfin Chubs occupying more than four miles of river and evidence of recruitment and both mussel species were found to be surviving and healthy at two release sites.
- Long-term Monitoring of the Spotfin Chub, *Erimonax monacha*, a Threatened Species (Little Tennessee River Basin). The Little Tennessee River in Macon and Swain counties supports perhaps the healthiest and most abundant population of the federal and state threatened Spotfin Chub, but long-term monitoring is required. With assistance from cooperators from the U.S. Fish & Wildlife Service, Conservation Fisheries, Inc., and others, personnel, wearing masks and snorkels, conducted visual surveys using both area and time defined searches as a part of this long-term monitoring effort. Data from year six of this effort is being analyzed and so far fluctuations in the population have been observed over time with an overall trend of relative stability and abundance.
- Monitoring was conducted for an important spawning population of Sicklefin Redhorse (*Moxostoma* sp. cf. *macrolepidotum*, Little Tennessee River Basin) by NCWRC Wildlife Diversity Program staff. For the past six years, partners from the U.S. Fish & Wildlife Service, Conservation Fisheries, Inc., and Eastern Band of Cherokee Indians have cooperated with the Commission to sample a spawning population in the Little Tennessee River in Macon County to assess and monitor population size, demographics, and genetic structure, and to collect eggs and milt for a captive breeding program to support reintroduction of the species to the upper Tuckasegee River and the Oconaluftee River. All Sicklefin Redhorse samples are implanted with Passive Integrated Transponder tags. Population estimates from recapture of tagged fishes and effective population size calculated from genetic samples indicate a large and healthy breeding population.

- Robust Redhorse, *Moxostoma robustum*, surveys were conducted in the Pee Dee River (Pee Dee River System) by the Robust Redhorse Conservation Committee, NCWRC Wildlife Diversity Program staff to assess and to collect brood fish for a pilot propagation study. This spring, 15 Robust Redhorse (including recaptures) were captured, several females were spawned, and the eggs were hatched at the NCWRC's McKinney Lake State Fish Hatchery. Trials are being conducted to determine the best way to raise this species. Beginning in the Spring of 2014, the NCWRC staff will begin augmenting this very small population of Robust Redhorse downstream of Blewett Falls Dam.
- Cape Fear Shiner, *Notropis mekistocholas*, augmentation of small populations in designated Critical Habitat in the Rocky River above Woody's Mill Dam in Chatham County (Cape Fear River Basin) (Brena Jones, NCWRC). 97 fish were captured from the confluence of the Rocky and Deep rivers, Bear Creek, and Rocky River below the Rocky River Hydropower Dam populations and released above Woody's Mill Dam; tissue biopsies were taken from a subset of individuals. One translocated individual was recaptured during a monitoring event in the late summer of 2013. A second translocation effort of 100 individuals is planned for October of 2013.
- NCWRC Wildlife Diversity Program survey for dwindling Ironcolor Shiners, *Notropis chalybaeus*, along North Carolina's Southeastern Coastal Plain (Brena Jones, NCWRC). Statewide surveys in the 1960s indicated the species was widespread, but uncommon. Recent surveys revealed that the shiner is absent from many previously recorded locations. Individuals were found at just two sites in 2010 (one from the Lumber River and one from the White Oak River) and in 2012 none were sampled from 35 sites in the lower Cape Fear River and Lumber River drainages, but were captured at scattered sites in the Chowan River drainage in the northeastern Coastal Plain. Surveys continued in 2013, with searches planned for new sites in hopes of locating a few remaining populations.
- Taillight Shiner (*N. maculatus*), Thinlip Chub (*Cyprinella* sp. cf. *zanema*), Golden Topminnow (*Fundulus chrysotus*), and Spotted Sunfish (*Lepomis punctatus*) surveys in North Carolina's Coastal Plain (Brena Jones, NCWRC). During 2012-2013 surveys, a new northernmost locality for the Golden Topminnow was recorded from White Marsh in Columbus County. Four sites held Thinlip Chubs and six held Spotted Sunfish (*Lepomis punctatus*). Of 20 sites in the Cape Fear River and Lumber River basins 3 sites contained Thinlip Chubs, 2 sites contained Spotted Sunfish, and 10 contained Taillight Shiners.
- Demolition of the Lassiter Mill Dam on the Uwharrie River (Pee Dee River Drainage) excerpts from an article by Peter Raabe, American Rivers, Jacob Leech, Piedmont Conservation Council, and Laura Fogo, US Fish & Wildlife Service. In August 2013, the Uwharrie River is being restored back to the free flowing conditions. The Lassiter Mill dam was 12 feet high and 200 feet long, historically blocked migrating American Shad from reaching spawning habitat in the upper Uwharrie River and tributaries. It also blocked and fragmented local fish populations. Removing Lassiter Mill Dam opened up almost 15 miles of potential spawning habitat for fish on the mainstem of the river and almost 190 river miles, including tributary streams. This project is part of a much larger watershed restoration initiative within the Greater Uwharrie Conservation Partnership focal area, and is the third dam removed from the Pee Dee River drainage. Once completed, all five projects will reconnect aquatic life passage on more than 50 miles of river, 10 miles of creek, and 320 miles of perennial tributaries.
- An article entitled "History of Fish Investigations in the Yadkin-Pee Dee River Drainage of North Carolina and Virginia with an Analysis of Nonindigenous Species and Invasion

Dynamics of Three Species Of Suckers” was authored by Tracy, B. H., Jenkins, R. E., and W. C. Starnes. 2103. Journal of the North Carolina Academy of Science. 129 (3):82-106.)

- An article entitled “Bluehead Chub, *Nocomis leptcephalus* (Girard 1856), the First Species of Freshwater Fish Scientifically Described From North Carolina (Cyprinidae)” was authored by Tracy, B. H. 2013. American Currents. 38:5-11)
- New Division of Water Resources (formerly known as Division of Water Quality) Distributional Records for 2011 and 2012 (i.e., those not shown in Menhinick (1991) and collected for the first time by DWQ staff from a particular county in the Yadkin-Pee Dee River drainage and the Catawba and French Broad River systems) (submitted by Bryn H. Tracy): *Campostoma anomalum*, Central Stoneroller, Little Yadkin River, Stokes County; becoming more wide-spread in the upper part of the Yadkin- River system from Watauga County eastward to Surry County; Pott Creek, Lincoln County; *Carassius auratus*, Goldfish, Mitchell River, Surry County; *Chrosomus oreas*, Mountain Redbelly Dace, Glade Creek, Alexander County; *Luxilus coccogenis*, Warpaint Shiner, Beaver Creek, Wilkes County; *Notemigonus crysoleucas*, Golden Shiner; Beaver Creek, Wilkes County; *Moxostoma pappillosum*, V-lip Redhorse, Mulberry Creek, Caldwell County; *Esox niger*, Chain Pickerel, Bent Creek, Buncombe County; *Lepomis gibbosus*, Pumpkinseed, Boylston Creek, Henderson County; *Lepomis marginatus*, Dollar Sunfish; Mill Creek, Anson County; *Lepomis microlophus*, Redear Sunfish, North Muddy Creek, McDowell County; *Micropterus punctulatus*, Spotted Bass, North Little Hunting Creek, Iredell County, Little Yadkin River, Stokes County, South Deep Creek, Yadkin County, South Fork Muddy and Muddy creeks, Forsyth County

Tennessee: Pat Rakes (xenisma@gmail.com)

- In August 2013, the journal Southeastern Naturalist published a special issue on *Chrosomus Cumberlandensis* (Blackside Dace), a federally listed stream fish that occurs in Kentucky, Tennessee and Virginia. The volume contains 12 research articles by approximately 30 authors plus a foreword by Wayne Starnes. SFC folks can request pdf reprints of selected articles or print copies of the whole volume from Hayden Mattingly (HMattingly@tntech.edu). The table of contents and first pages of each article can be found at the journal’s website: <http://www.eaglehill.us/programs/journals/sena/southeastern-naturalist.shtml>
- The University of Tennessee Etnier Ichthyological Collection is proud to announce the creation of the Etnier Ichthyology Endowment. This endowment will be used for the continued growth and maintenance of the Etnier Ichthyological Collection. The Initial seed of \$25,000 was made possible with the help of generous donations from a few forward thinking and fish-loving individuals as well as contributions from the UT Department of Ecology and Evolutionary Biology. If anyone would like to financially contribute to the Endowment, please contact the current curator, Darrin Hulsey (chulsey@utk.edu).
- Blotchside Logperch (*Percina burtoni*) filmed by Ed Scott in Emory R. at Oakdale, July 2.
- Mark Cantrell reports that USFWS, TWRA, and TNACI have partnered to deploy and range test an array of acoustic monitoring receivers in the upper Tennessee River to monitor 42 tagged Lake Sturgeon. The array covers important junctions and tributaries across more than 270 river miles
- Tennessee Aquarium Conservation Institute (TNACI; www.TNACI.org)
 - 665 Barrens Topminnow (*Fundulus julisia*) propagated at the Tennessee Aquarium have been released in springs so far in 2013 as part of a restoration project with our partners, 300 have been transferred to Wolf Creek NFH for further grow out.

- 1,075 Lake Sturgeon (*Acipenser fulvescens*) raised to an average of 5.8 inches by TNACI were released into the French Broad River as part of a restoration project with our partners. TNACI is also involved with monitoring the population in the Tennessee River system, capturing 52 specimens in fall 2012 with our partners, and we are leading creating a Lake Sturgeon Management Plan for the Southeastern U.S.
- Monitoring of Laurel Dace (*Chrosomus saylori*) populations on Walden Ridge was performed in 2013 and will be continued in 2014. TNACI has completed a draft of a Recovery Plan for the species.
- 255 Southern Appalachian Brook Trout (*Salvelinus fontinalis*) propagated by TNACI were released into Hampton Creek, the source of the brood stock. This is the first time SABB have been raised in a recirculating system. This project will continue in 2014 and hopefully expand in the future. 53 broodstock were collected for use in the 2013 spawning in addition to 48 individuals carried over from 2012.
- The Johansen Fish Lab at Austin Peay State University:
 - Dr. Mollie Cashner joins lab as Senior Research Scientist
 - Two new graduate students, Zachary Wolf and Shawn Settle join lab
 - Lab receives funding from TWRA to conduct status surveys of imperiled Tennessee fishes
 - Graduate student Aaron Ross has been investigating the status of *Noturus fasciatus* and gathering data to examine variation in night versus day detection, abundance, and density estimates.
 - Graduate student Kristen Pilcher recently completed a survey of the ichthyofauna of the Rutherford Fork (Obion River) and documented 20 species not previously known from this river; she also examined how woody debris is related to the presence and abundance of several madtom species.
 - Graduate student Erin Bloom has been investigating the taxonomic status and phylogenetic relationships of a possibly new species of crayfish from the Red River system.
 - Undergraduate Zachary Holtel is continuing examination of microstructure variation in darter scales using confocal microscopy.
 - Rebecca Johansen and Mollie Cashner began an investigation of genetic diversity in the imperiled Kentucky Arrow Darter with support from the KY Department of Fish and Wildlife Services.
 - Rebecca Johansen and John Johansen (TTU) are describing and investigating relationships of a new species of crayfish from the Caney Fork River.
 - Rebecca Johansen, Larry Page (UF), and Samantha Hilber (UF) published a paper on the phylogeography and evolution of *Noturus exilis*.
 - Rebecca Johansen co-authored, with collaborators Carol Johnston (AU) and Winston Baker, a study investigating variation in *Micropterus coosae*, resulting in description of four new species.
- Aquatic News from the Cherokee National Forest (Jim Herrig):
 - The Cherokee National Forest is partnering with TWRA, Tennessee Aquarium, Trout Unlimited, and Back Country Horsemen to restore Southern Appalachian brook trout to a portion of its historic range in east Tennessee.
 - The Cherokee National Forest has been operating an educational snorkeling program for 14 years. The program is self-supporting with participants paying for the experience. The goal of the program is to introduce the public to the rich diversity of aquatic species in Southern Appalachian streams. While we will accommodate any group, our focus is directed at

underprivileged kids from both inner cities and rural areas. About 700 people go through the program each year.

- The Tennessee Field Office of the FWS has completed five-year reviews for the Boulder Darter, Smoky Madtom, Yellowfin Madtom, Pygmy Madtom, Snail Darter, and Duskytail Darter. --*Stephanie Chance*
- Conservation Fisheries, Inc. (CFI) www.conservationfisheries.org:
 - Continues to propagate, stock, and monitor Smoky and Yellowfin Madtoms, Citico Darters, and Spotfin Chubs in Tellico River. Monitoring found evidence of reproduction and good numbers of Smokies & Citico Darters, but the only Yellowfins observed were dispersal age early juveniles in a remnant nest. Spotfin Chubs were observed at numerous sites spanning five river miles, two miles above and below the stocked reach, a dramatic increase over all prior years' observations. Monitoring of Citico Creek detected no significant population changes of the darter and madtoms.
 - Monitoring restored Citico Darter and Smoky and Yellowfin Madtom populations in Abrams Creek was continued a second year with Great Smoky Mountains National Park.
 - Efforts to propagate and restore Emory River Spotfin Chubs and Elk River Boulder Darters to Shoal Creek continue. TVA has provided support for monitoring the darter as well as controlled hatchery experiments at CFI exposing Boulder Darter eggs and larvae to temperature regimes closely mimicking cold tailwater releases of Tims Ford Dam in the Elk River.
 - None of the 336 juvenile Conasauga Logperch propagated, tagged, and released last year to the Conasauga River were detected (with certainty) during surveys conducted this year. Suspiciously "familiar" individuals were observed (based on unusual pigment patterns), but were either imposters or had lost their VIE tags. In aquaria, the tags are still visible on siblings of the released fish, but we wonder whether sunlight might degrade the tags on fish in the wild.
 - Hatchery spawning and rearing included the following additional species/populations in 2013: Greenside Darter (to serve as imperiled mussel hosts), Blackside Dace (see below), Marbled Darter, Barrens Topminnow, Wounded Darter, Ashy Darter, Slackwater Darters, Spring Pygmy Sunfish, Kentucky Arrow Darter, Cumberland Darter, upper Allegheny R (PA) Gilt Darters, and Diamond Darters (again unsuccessful!).
 - CFI contributed to the special issue of Southeastern Naturalist on Blackside Dace, *Chrosomus cumberlandensis*, including the cover photo of spawning dace at the hatchery: <http://www.eaglehill.us/SENAonline/articles/SENA-sp-4/01-Front%20Cover-sp-4.shtml>. We also conducted controlled toxicity tests on eggs and larvae in the hatchery with waters reconstituted to evaluate the effects of fracking wastewater components.
- Updates for the Pigeon River Recovery Project in NC/TN.
 - Re-introduced 20 species of fish, more than 39,000 individuals in TN/NC
 - Established populations of six species of fish: TN - Gilt Darter, Stripetail Darter, and Mountain Brook Lamprey; NC - Silver Shiner, Telescope Shiner, and Tennessee Shiner
 - Reproduction occurring in three additional species: TN – Mountain Madtom; NC – Gilt Darter and Banded Darter
 - Re-introduced fish species are found in 30 miles of the Pigeon River and in four tributaries (Richland Cr., Crabtree Cr., Jonathan Cr., Fines Cr.)
 - Established two genera of snails, *Leptoxis* spp., *Pleurocera* spp., in TN covering 11 miles

- Re-introduced one species of mussel, Wavyrayed Lampmussel, (listed as State Special Concern in NC) propagated by NCWRC in NC; nine species of mussels, Mucket, Purple Wartyback, Kidneyshell, Pimpleback, Cumberland Moccasinshell, Rainbow, Spike, Pocketbook, and Wavyrayed Lampmussel in TN since 2010. None are state or federally listed species.
- A Caney Fork River endemic darter was described and named after one of the founding members of SFC, *Nothonotus starnesi*: Keck, B.P. and Near T.J. 2013. A New Species of *Nothonotus* Darter (Teleostei: Percidae) from the Caney Fork in Tennessee, USA. Bulletin of the Peabody Museum of Natural History 54(1):3–21.
- Morgan Douglas in the Hulsey Lab at U. Tennessee, Knoxville, in cooperation with CFI found a correlation between pelagic larval drift duration in darters and extinction risk: Douglas M., Keck, B.P., Ruble, C., Petty, M., Shute, J.R., Rakes, P., and Hulsey, C.D. Pelagic larval duration predicts extinction risk in a freshwater fish clade. *Biology Letters* 9: 20130672.
- The first broadly inclusive phylogeny for darters estimated without the use of mitochondrial DNA was published: Near, T.J. and B.P. Keck. 2013. Free from mitochondrial DNA: Nuclear genes and the inference of species trees among closely related darter lineages (Teleostei: Percidae: Etheostomatinae). *Molecular Phylogenetics & Evolution*. 66(3); 868-876
- North American cyprinids have diversified rapidly following a shift in water column use: Hollingsworth, P.R. Jr., A.M. Simons, J.A. Fordyce, and C.D. Hulsey. 2013. Explosive diversification following a benthic to pelagic shift in freshwater fishes. *BMC Evolutionary Biology*. 13:272.

Texas: Steve Magnelia (stephan.magnelia@tpwd.texas.gov)

- Texas Parks and Wildlife Department (TPWD) Habitat Conservation Branch
 - A Guadalupe bass restoration initiative continues in the South Llano River watershed. This includes riparian and instream habitat improvements, stocking of pure Guadalupe bass to decrease genetic introgression, research on Guadalupe bass habitat associations, a BMP demonstration site at the Texas Tech University Junction campus, a public paddling trail and removal of several fish passage barriers.
 - A dam removal project on the San Marcos River is slated to begin in spring or summer of 2014. This is the first government sanctioned dam removal in Texas and is being led by Mike Montagne from the USFWS San Marcos, TX office.
 - Tracking Study of Blue Sucker – TPWD River Studies staff and the consulting firm BIO-WEST, Inc. completed a radio-tracking study of blue sucker, a state threatened species, in the lower Sabine River.
 - Texas Instream Flow Program - River Studies staff participated in field data collection related to Texas Instream Flow Program (TIFP) priority studies: Middle and lower Brazos River, Lower San Antonio River, Middle Trinity River, Lower Guadalupe River
 - A project looking at the feasibility of reintroducing Rio Grande cutthroat trout in McKittrick Creek is underway.
 - A study looking at habitat availability under different flows for the Devils River minnow in a portion of the Devils River in the Devils River State Natural Area is underway.
 - Wichita River Desalinization Discharge – The project was designed to assess potential influences on fish assemblages and water quality from a desalinization project that discharges into the Wichita River near Wichita Falls, Texas.

- Endangered Species Monitoring – TPWD staff are conducting quarterly monitoring of Pecos pupfish in Salt creek, the last remaining water body with pure Pecos Pupfish left in Texas.
- A Guadalupe bass re-introduction project continues in a portion of the Blanco River. Much of the river was dry in summer 2011 and fish were confined to a few small remaining pools throughout much of the river. Re-introduction of pure Guadalupe bass took place in spring 2012 and 2013. Follow up population and genetic surveys are planned to begin in spring 2014.
- A Guadalupe bass re-introduction is being attempted on the Mission reach of the lower San Antonio River.
- Native Prairie Fish Conservation – In response to the drought and in partnership with Texas Tech University and the Possum Kingdom State Fish Hatchery, populations of endemic Brazos River minnows were held to ensure those candidate species would be available for reproductive studies and repatriation efforts.
- A study looking at the economic impact of angling for Guadalupe bass in rivers throughout its native range entitled “Recreational and economic impact of Guadalupe bass in Hill Country streams” was presented as part of the Native Black Bass Symposium at the 2013 Southern Division AFS meeting.
- An economic impact study looking at the impact of angling on the Guadalupe River trout fishery was completed. The study looked specifically at the economic impact of Guadalupe River Trout Unlimited members.
- An alligator gar study on the lower Guadalupe River entitled “Alligator gar in Texas’ coastal zone: Setting the scale for management of populations and habitats” is currently underway.
- Mussels surveys are continuing on the Lower Sabine River in 2014. This is a cooperative effort with the Texas Water Development Board.
- The utility of using an unmanned aerial vehicle for providing high quality river imagery continues to be evaluated. A workshop reporting on the utility of this technology was held in March 2013.
- TPWD Fisheries Management, Research and Hatchery Programs – Research Studies
 - Dan J. Daugherty and Nathan G. Smith - Title: Modeling effects of year-class frequency and life history on sport fishery metrics
 - Nathan G. Smith, Dan J. Daugherty, David L. Buckmeier, and Kerry S. Reeves - Title: Relation between reservoir hydrology and year-class strength of sport and forage fishes
 - Nathan G. Smith - Title: Striped bass stocking evaluation of Lake Livingston and Livingston Tailrace
 - Dan J. Daugherty- Title: Determination of critical habitat characteristics for age-0 flathead catfish
 - David L. Buckmeier, Dan J. Daugherty, and Peter Sakaris (Southern Polytechnic University) - Title: Validation of daily ring deposition in the otoliths of age-0 blue and flathead catfish
 - Warren Schlechte, Dave Buckmeier – contract with Kevin Hunt (Mississippi State University). Title: Survey of Texas’ catfish anglers. Determine angler types and management preferences of Texas’ catfish anglers
 - David L. Buckmeier, Nathan G. Smith, Dan J. Daugherty, and Clint Robertson - Title: Seasonal movement and habitat use of alligator gar and striped bass in the Trinity River
 - David L. Buckmeier - Title: Gar age validation and tag retention. Document retention of PIT (passive integrated transponder), CWT (coded wire tag), and Floy T-bar tags in gar for at least one year.

- David L. Buckmeier, Nate Smith, Paul Fleming and Kris Bodine - Title: Importance of river-reservoir transition zones to river and reservoir fish communities
- Doyle Mosier, David L. Buckmeier, Warren Schlechte, and Tim Bonner - Title: Evaluation of stream flow and habitat availability for Devil's River minnow in Pinto Creek
- Dan Daugherty, Kris Bodine, and Greg Binion - Title: Characterization of alligator gar spawning stock abundance, spatial distribution, and exploitation in Choke Canyon Reservoir, Texas.
- Kris A. Bodine and Paul Fleming - Title: Evaluation of an alternate technique for attaching external radio transmitters to catfishes
- Dan Daugherty and Todd Driscoll - Title: Patch characteristics of artificial, structural habitat enhancement and effects on fish community use.
- Hugh Glenewinkel - Title: Effects of two pond-filling strategies on production of channel catfish fingerlings.
- Aaron Barkoh, Steven Hamby, and Warren Schlechte - Title: Short-term preservation of striped bass milt for fingerling production. Effects on fertilization rates
- Jvonne Lalla, Chris Thibodeaux, and Hugh Glenewinkel - Title: Effect of temperature on largemouth bass *Micropterus salmoides* egg incubation time, hatch rate and fungus *Saprolegnia* spp. colonization.
- Carl Vignali and Hugh Glenewinkel - Title: Effects of acute and chronic elevated pH exposure on survival of koi fry.
- Dale D. Lyon, Aaron Barkoh, and Weber Pires, Jr. - Title: Enumeration of Florida largemouth bass fry: an index for gravimetric estimation of numbers.
- Staff - Title: Performance of wild stock and Imperial stock channel catfish fingerlings in hatchery ponds.
- Staff - Title: Evaluation of two strategies using ammonium sulfate to control *Prymnesium parvum* in striped bass fingerlings production ponds.
- Dale D. Lyon and Aaron Barkoh - Title: Evaluation of smallmouth bass spawning performance at two stocking densities in indoor concrete raceways.
- Dale D. Lyon, Aaron Barkoh, John Paret and Ryan Rogers - Title: Evaluation of the functional potential of ozone-treated water for fingerling fish culture in plastic-lined ponds.
- Aaron Barkoh and Thomas Wyatt - Title: pH tolerance by striped bass fry and fingerlings in hard water.
- Gerald L. Kurten, Aaron Barkoh, Thomas Wyatt, Hugh Glenewinkel, and John M. Paret - Title: Effect of water exchange on fish production and water quality in nine-inch channel catfish fingerling production ponds.
- Thomas Wyatt, Aaron Barkoh, and J. Warren Schlechte - Title: Ammonia tolerance by striped bass fry and fingerlings in hard water.
- Aaron Barkoh, Drew C. Begley, Dennis G. Smith, Gerald L. Kurten, Loraine Fries, and Warren Schlechte - Title: Evaluation of SolarBee® solar-powered water circulation (SPC) to control *Prymnesium parvum* blooms and toxicity in fish hatchery ponds
- Drew C. Begley, Gerald Kurten, Aaron Barkoh, and Loraine T. Fries - Title: Combined nitrogen and phosphorus fertilization for controlling *Prymnesium parvum* toxicity in fish culture ponds.
- Drew Begley and Ryan Rogers - Title: Standardization of aluminum sulfate (alum) treatments to control pH in *Morone* spp. fingerlings production ponds.

- Jim Matthews and Tony Owens - Title: Refinement of alkalinity-adjustment strategies for a recirculating raceway system.
- Juan Martinez and Tony Owens - Title: Efficacy of supplemental feeding and inoculation of Florida largemouth bass fingerling pond with zooplankton to increase growth and survival.
- Staff - Title: Comparison of three stocking densities for production of advanced Florida largemouth bass *Micropterus salmoides floridanus* fingerlings.
- Loraine T. Fries, Greg Southard, and Dijar J. Lutz-Carrillo - Title: Statewide survey of Texas for golden alga *Prymnesium parvum*.
- Dijar Lutz-Carrillo and Greg Southard - Title: Detection of zebra mussels in the absence of veliger formation. Develop genetic markers for the detection of zebra mussel-specific dissolved DNA from water samples.
- Pamela Hamlett and John Tibbs - Title: Organic screening of blue catfish for pharmaceuticals in liver and brain tissue.
- Michael Baird, Tim Bister, Mukhtar Farooqi, Tom Hungerford - Title: An evaluation of growth of selectively-bred largemouth bass in six Texas reservoirs.
- John Findeisen - Title: Comparison of catfish catch and harvest among three angling gear types at Choke Canyon Reservoir.
- Spencer Dumont - Title: Assessment of population genetic composition of Age-0 versus adult largemouth bass.
- Ben Neely and Spencer Dumont - Title: Determination of angler attitudes and perceptions on blue catfish management and implications for system-specific management.
- Robert Cole - Title: Seasonal distribution and movement of saugeye in Kirby Reservoir, Texas.
- John Dennis - Title: Stocking sub-adult northern largemouth bass in a power plant reservoir.
- John Clayton - Title: Seasonal association between surface water quality, climate variables, and cell counts of *Prymnesium parvum* in the Jim Bertram Lake system (Lubbock).
- Charlie Munger - Title: Harvest and survival of channel catfish in community fishing lakes.
- Randy Myers - Title: Depressurization illness in tournament-caught largemouth bass at Amistad Reservoir and comparison of treatment methods.
- Mandy Scott, John Taylor and Jeremy Leitz - Title: Effectiveness of a constituent-led marketing campaign targeting non-traditional anglers in an urban area.
- Greg Binion and Dan Daugherty - Title: Comparison of lighted and unlighted trap nets for increasing efficiency of crappie sampling.
- Bruce Hysmith - Title: Largemouth bass exploitation in Amon G. Carter Reservoir, Texas: would changing harvest regulations be successful?
- Brian L. Bartram - Title: Factors affecting blue catfish populations in Texas reservoirs.
- John Tibbs, Rick Ott, and Tom Hungerford - Title: Evaluation of an experimental 30"-45" slot length limit for blue catfish in three Texas reservoirs.
- Mark Howell - Title: Wichita River monitoring in response to microfiltration/reverse osmosis plant discharge.
- Stephan Magnelia - Title: Survival and movement of recently-stocked and resident rainbow trout in the Canyon Reservoir tailrace.
- Todd Driscoll - Title: Annual economic value of recreational angling at Sam Rayburn Reservoir with emphasis on black bass tournaments.
- Kevin Storey - Title: A case history of Lake Fork: Texas' premier trophy largemouth bass fishery.

- Mark Webb - Title: Texas Parks and Wildlife habitat establishment initiative. Objectives: 1) Determine aquatic plants suitable for habitat enhancement in Texas reservoirs; 2) develop techniques for establishing founder colonies in Texas reservoirs; and 3) monitor survival, growth and spread of founder colonies.
- Dan Ashe - Title: Contribution, growth, and diet of stocked largemouth bass in two aquatic vegetation types in Toledo Bend Reservoir. Objectives: 1) Estimate percent contribution, growth, and diet of stocked largemouth bass fingerlings in two aquatic vegetation types.
- Dan Bennett - Title: Estimating harvest and catch rates of alligator gar (*Atractosteus spatula*) from Trinity River bow fishing tournaments. Objectives: 1) Estimate tournament effort, harvest rate, size distribution and harvest of alligator gar from bow fishing tournaments on the Trinity River. 2) Collect contact information, fish aging structures, and fish tissue samples provided by anglers targeting alligator gar.
- Craig Bonds, Juan Martinez, Tony Owens, and Allen Forshage - Title: Comparison of growth, diet and survival of 6" pellet-reared versus minnow-reared LMB. Objectives: 1. Determine survival rates of 6-inch largemouth bass (OWR) reared on synthetic diet (pellets) and natural diet (minnows) and stocked (25/acre, minimum; 50/acre, maximum) in a 20 acre lake. 2. Determine performance (growth, body condition, food habits, and vulnerability to angling) of 6-inch pellet-reared and minnow-reared largemouth bass and stocked (25/acre) in a 20 acre lake. 3. Determine cost to raise 6-inch largemouth bass using either pellets or minnows.
- Aaron Jubar - Title: The Lake Fork trophy bass survey. Objectives: 1) To annually monitor angler catches of trophy-size largemouth bass (> 7 pounds and/or 24 inches) at Lake Fork Reservoir through a volunteer angler reporting program held in cooperation with the Lake Fork Sportsman's Association and Lake Fork Chamber of Commerce; 2) Foster cooperative work relationships between sponsoring organizations, area businesses, local fishing guides, and Lake Fork anglers; 3) Use angler catch data to help publicize, promote, and educate anglers about trophy bass fishing opportunities at Lake Fork Reservoir; and 4) Use angler catch data, in conjunction with results of standardized population and creel surveys, to monitor trends in Lake Forks Largemouth bass fishery and to help management actions.
- Texas Tech University, Dr. Timothy Grabowski
 - Matthew Acre - "Do river-reservoir interface habitats to serve as surrogate nursery habitats for floodplain-dependent riverine fishes?"
 - Brandon Cheek - "Evaluating habitat associations of a fish assemblage at multiple scales in a minimally disturbed stream on the Edwards Plateau."
 - Qingman (Abby) Chen - "The mating system of red drum – video and acoustic assessment of a captive breeding population."
 - Jillian Groeschel - Guadalupe bass habitat use at a landscape scale."
 - Jessica Pease - "Variation and plasticity and their interaction with urbanization in Guadalupe bass populations on and off the Edwards Plateau."
 - Elizabeth Roesler - "Development of Pecos assimineae *Assimineae pecos* monitoring methods and effects of habitat restoration at Bitter Lake National Wildlife Refuge."
- Texas Tech University, Dr. Gene Wilde
 - Current research is directed toward understanding the ecology of Great Plains fishes, particularly cyprinids, and how environmental factors survival of age-0 fish. Currently in the final year of a five-year study of the reproductive ecology of Brazos River fishes. Results of

efforts are being used to develop population dynamics models for the most common members of the assemblage and will be used to assess effects of water development projects.

- Wichita River Stream Fish Studies - During the past few years stream fishes, stream bed and riparian habitat features in the Wichita River, Texas, and its major tributaries have been assessed: the North Wichita River, Middle Fork Wichita River, and South Fork Wichita River. This study is funded to assess potential effects of chloride control projects on fishes and their habitats in the Wichita Basin.
- Texas Tech University, Dr. Reynoldo Patino, Environmental factors influencing the spread, growth and toxicity of golden alga
- Texas Tech University, Drs. D. Ragowski and B. Bosman, Freshwater mussel conservation in Texas: a joint venture between the Dallas Aquarium and Texas Tech University
- Texas Tech University, Dr. Tom Arsuffi, Zach Thomas - Recreational and economic impact of Guadalupe bass in Hill Country streams
- Texas State University, Dr. Timothy Bonner
 - Spatial and temporal patterns of biological communities and instream habitats of the Llano River
 - Focal larval fish species distribution and habitat use in the San Antonio River
- Texas State University, Dr. Thom Hardy, Application of unmanned aerial vehicle technology in support of TPWD conservation goals
- Texas State University, Drs. Chris Nice, L. Lucas, & Z. Gompert, Genetic demography of endemic and endangered taxa in springs of the Edwards Plateau
- Texas State University, Dr. Yixin Zhang, Bigclaw River Shrimp in the San Marcos River: Invasive Species' Impact
- University of Texas at Austin, Dr. Dean Hendrickson
 - Expansion and Continued Development of the Fishes of Texas Database
 - Data compilation, distribution models, conservation planning, and status survey for selected fishes of concern in Texas and region
- University of North Texas, Dr. Jim Kennedy, Habitat Requirements for *Quadrula aurea* (Golden Orb) in the Lower San Antonio and Guadalupe River Drainages
- University of Texas at Tyler, Dr. Neil Ford, Surveys for threatened and endangered mussels and fishes in rivers of Northeastern Texas
- University of Texas at Tyler, Dr. J. Placyk, Identification of important fish hosts for East Texas freshwater mussels using genetic and ecological niche-modeling methods
- University of Texas at Tyler, Dr. Lance Williams, Using ecological niche modeling to predict the probability of occurrence of rare fish and mussel species in East Texas
- The University of Texas at Arlington, Dr. Robert F. McMahon, Determination of the presence of freshwater mussels within the *Dreissenidae* Family in select Texas waters
- University of Texas Pan American, Dr. Bob Edwards, Monitoring of the status of repatriated Rio Grande silvery minnows (*Hybognathus amarus*) in the Big Bend region
- Texas A&M Agrilife Research, Genetics of *Dionda* in the Big Bend Region
- Texas A&M Agrilife Research, Dr. Charles Randklev
 - Freshwater mussel survey of the lower Brazos River
 - Freshwater mussel survey of the lower Sabine River between river miles 100 and 10
- Texas A&M Agrilife Research, Dr. Kirk Winemiller, Flow dependent species: Life history and habitat associations in Texas gulf coast rivers

- Sam Houston State University, Dr. Chad Hargrave, Assessment of the current conservation status of the endangered Comanche Springs Pupfish and Pecos Gambusia in the cienegas at Balmorhea State Park, Texas.
- Lehigh University, Drs. M. Itzkowitz & P. Samollow, Habitat expansion, genetic characterization, and population assessments of the highly endangered Leon Springs Pupfish, *Cyprinodon bovinus*
- Nueces River Authority, Management and control of giant reed, *Arundo Donax*, located in the defined areas within Nueces basin
- Trinity River Authority, Supplementing existing biological data in the middle Trinity R.
- Environmental Conservation Alliance, Dr. Tom Hayes, Riparian productivity along the lower Brazos River and assessment on the Guadalupe and Brazos rivers
- South Llano Watershed Alliance, Development of a watershed conservation plan for the upper Llano River watershed
- East Texas Woods and Waters Foundation. Lake Palestine catfish study
- Guadalupe Blanco River Authority. Supplementing existing biological data in the lower Guadalupe River study area
- Texas Nature Conservancy, Ryan Smith. An evaluation of the relationship between streamflow and habitat availability for the devils River minnow (*Dionda diaboli*)
- Bio-West, Ed Oberney (Project Manager). Radio Tracking of Blue Sucker in the Lower Sabine River
- USFWS San Marcos Aquatic Resources Center
 - The San Marcos Aquatic Resources Center (SMARC) is maintaining San Marcos (N = 379) Texas blind (N = 114) and Barton Springs (727) salamanders in refugia. The refugia are comprised of wild-caught and hatchery produced individuals, and have produced 50 San Marcos, 20 Texas blind, and 635 Barton Spring salamander eggs.
 - P. Diaz (TXFWCO), J. Fries, Dr. M. Alexander, and Dr. W. Nowlin (Texas State University [TSU]) examined the relationship between submerged aquatic vegetation and the diet of the San Marcos salamander. Salamanders were associated with gravel/cobble substrates and aquatic moss, and consumed primarily ostracods and hyalella in the wild.
 - J. Fries and V. Cantu have completed a study examining the reproductive success of San Marcos salamanders subjected to thermal stress. While the results are still preliminary the salamanders appear to be highly sensitive to very small changes in water temperature.
 - J. Fries, D. Davis (TSU), Dr. C. Gabor (TSU) and M. Edwards (TSU) are examining Mosquitofish predation on salamander eggs and young. Mosquitofish consume eggs with difficulty due to its relatively tough outer membrane. Mosquito fish readily consume larval salamanders 14 mm or smaller in total length, but appear to be gape limited.
 - 623 wild stock Fountain Darters are maintained in refugia. These fish are from the upper, middle, and lower San Marcos River and from Landa Lake and the Comal River.
 - Two wild stocks of Devils River minnows (DRM) are maintained in refugia, one from San Felipe Creek (N = 162) and another from Pinto Creek (N = 145). The SMARC also maintains F1(N = 2,500) offspring for research and restocking purposes. Genetic analysis of wild stock San Felipe Creek and Pinto Creek DRM is ongoing at the Dexter SNARRC. As the genetic information becomes available it will be incorporated and used to support a draft propagation/genetic management plan for the Pinto Creek stock. A plan has been outlined and drafted by the TXFWCO and SMARC staff.

- Comal Springs Riffle Beetle- Approximately 38 adult wild stock Comal Springs riffle beetles and 500 larvae are being maintained in refugia. R. Gibson and L. Lucas (TSU) are exploring the population genetics funded by a TPWD Section 6 grant. R. Gibson, TXFWCO, and TPWD conducted a mark/recapture and of 159 beetles retrieved during January, only one was marked and it had moved to a spring source 1.7 m upstream of original location, while in February of 274 captured one was marked and it was recaptured at the original release site.
- Currently 187 pots of Texas wild rice plants are being maintained in the SMARC refugia and Uvalde NFH. Plants within each pot are collected from different San Marcos River reaches that are defined by a particular stand's genetic make-up. In addition the ARC also maintains a seed bank. The number of Texas wild rice seeds stored at the SMARC totals 15,367 (N2009 = 715, N2010 = 910, and N2011 = 2,448, N2012 = 10,133, N2013 = 491). W. Wilson (Dexter SNARRC) and Dr. J. Hutchinson are conducting a genetic analysis of Texas wild rice that is comparing wild, refugia, and historical stands of Texas wild rice. Dr. R. Shaw (Texas A&M's S.M. Tracy Herbarium and Department of Ecosystem Science and Management) in collaboration with Dr. J. Hutchinson obtained type specimens and have begun examining the morphology of Texas wild rice.
- The SMARC is responsible for the removal of the 5% residual exotic plant *Cryptocoryne beckettii* from the San Marcos River that Dredge America was not required to remove.
- The SMARC in collaboration with BIO-WEST, Inc. is examining if baits elicit a response from Red-rim Melania snails, an intermediate host for a gill parasite to the Fountain Darter, toward bait within a trap. In addition, we are determining if water turbulence can be great enough to remove cercariae tails from the gill parasite. These studies are intended to determine the utility of suggested management methods for the exotic gill trematode. D. Huston (TSU) and Dr. K. Ostrand are examining the effect of gill parasite load on swimming performance of spring fish given that respiratory impairment will increase the likelihood of piscivory.

Virginia: Steve Powers (powers@roanoke.edu)

- Steve Powers at Roanoke College is working with Katie Bockwoldt, an RC student, to computerize and georeference the RC fish collection. The ultimate goal of this work is a fully georeferenced, computerized, and web-searchable database available to researchers. Life-history studies on *Thoburnia rhothoeca* and *Moxostoma cervinum* are currently navigating peer-review and should soon be published. Other life-history studies of local species are under way in collaboration with RC students.
- Jamie Roberts, a postdoc at Virginia Tech, is conducting a range-wide status assessment of Roanoke Bass populations. Fish collected throughout VA and NC will be studied using genetic and meristic methods, to determine the effective size of and relationships between Roanoke bass populations and degree of introgression with invasive rock bass. He also has upcoming projects to develop eDNA methods for monitoring various cryptic species in Virginia, including Roanoke Logperch, *Chrosomus daces*, and paddlefish. Finally, he is working on various recovery-related projects for Roanoke Logperch, including population viability analysis, developing an augmentation plan, and identifying candidate streams for habitat restoration.
- For the 1st time since 2000 CFI was thwarted from collecting Yellowfin Madtom nests to rear from Powell River and Copper Creek due to high waters during the entire breeding season. Collection of Yellowfin Madtom fin clips/tissue samples was completed from all extant

populations for genetic analyses to guide decision making (this winter) for potential North Fork Holston River (NFHR) restoration of the species. Middle Fork Holston River and NFHR surveys for Spotfin Chubs failed to find any in the former at several historic sites, but found a number of localities occupied in the latter from River Mile 0 to 28.3 during 2012 and 2013. These efforts will continue in 2014. Yellowfin Madtoms were again observed in the Clinch River this fall from St. Paul down to Burton's Ford (where several Ashy Darters were also spotted). Greenside Darters and Logperch were propagated at CFI and provided to the Aquatic Wildlife Conservation Center (AWCC) at Buller Hatchery in Marion to serve as mussel hosts.

- During the 2013 field season, Virginia Department of Game and Inland Fisheries (VDGIF) Aquatic Biologist Mike Pinder conducted several projects to further the conservation and recovery of Virginia's ichthyofauna. Although heavy rains and high water made for a very difficult field season, we were able to assess the distribution and habitat use of Greenfin Darter (*Etheostoma chlorbranchium*). In Virginia, Greenfins are state threatened and restricted to Laurel Creek and its tributaries, Washington and Smyth counties. Using snorkeling techniques, staff sampled 40 habitat units and found Greenfins equally in pools, riffles and runs. Beaverdam Creek, which originates in Tennessee and empties into Laurel Creek at the Town of Damascus, Virginia, appears to be the species' core population center and the most impacted by urbanization. Other work included stream surveys in the Roanoke, Powell and New River drainages, collection of Roanoke fishes for a permanent display in the City of Roanoke, Virginia, a Blackside Dace (*Chrosomus Cumberlandensis*) status survey, and development of an educational program for schools in the Virginia's Big Sandy drainage promoting good water quality and conservation of the Variegated Darter (*Etheostoma variatum*).
- Additional contractual research funded and partnered by VDGIF includes:
 - Comparison of habitat suitability among sites supporting strong, localized, and extirpated populations of Candy Darter (*Etheostoma osburni*). Contractors: Corey Dunn and Dr. Paul Angermeier, Virginia Tech.
 - Survey of Spotfin Chub (*Erimonax monachus*) in the North and Middle Fork Holston River, Virginia. Contractors: Pat Rakes and J.R. Shute, CFI.
 - Assessment of Ashy Darter (*Etheostoma cinereum*) presence and habitat suitability in the Powell River, Virginia. Contractors: Pat Rakes and J.R. Shute, CFI
 - Assessment of apparent survival and abundance of Roanoke Logperch (*Percina rex*) in response to short-term changes in river flow. Contractors: Gregory Anderson and Dr. Paul Angermeier, Virginia Tech
 - Cost-effectiveness of riparian restoration as a recovery tactic for Roanoke Logperch (*Percina rex*) Contractors: Dr. Paul Angermeier, Amy Villamagna, Dr. Jamie Roberts, Virginia Tech
 - Status survey for Bridle Shiner (*Notropis bifrenatus*) in Virginia. Contractor: Dr. Wayne Starnes, North Carolina Museum of Natural Resources.
 - Distribution of *Chrosomus* dace with respect to status of Clinch Dace (*Chrosomus* sp. cf. *saylori*) in the upper Clinch River System, Virginia. Contractor: Michael Moore and Dr. Don Orth, Virginia Tech.