2012 Annual Meeting

Georgia Chapter of the American Fisheries Society

February 7-9, 2012
Macon, Georgia

2012 GA-AFS Annual Meeting
Sponsors

Sustaining (≥$500)

Ecological Solutions

GEORGIA POWER
A SOUTHERN COMPANY

Conserving ($250-500)

Aquatic Environmental Services, Inc.

WWW.LAKEWORK.COM

Protecting ($100-$250)

Lake Specialist

MLES
Midwest Lake Electrofishing Systems

Raffle/Silent Auction Contributors

Capt. Bert Deener
Winge's Bait and Tackle
Satilla Marine
The River Pirate (Randy Vining)
Henry Cowen Quality Flies and Guide Service
River Through Atlanta Guide Service
Steven Patrick
Dr. Steve Sammons
Tennessee Aquarium
SEDCO, Inc.

2012 GA-AFS Annual Meeting
Program

Tuesday, February 7, 2012		
11:00-12:30	Registration	
12:30-1:00	Welcome/Opening Comments	Joey Slaughter
1:00-1:30	State of the state CRD	Carolyn Belcher
1:30-2:00	State of the state WRD	Matt Thomas
2:00-2:30	SARP Update	Scott Robinson
2:30-3:00	Break	
3:00:3:20	Use of hierarchical occupancy models to estimate seasonal distribution of stocked robust redhorse in the upper reaches of the Ocmulgee River, GA	Will Pruitt*
3:20-3:40	The possible presence of Ciguatoxin in red lionfish from the Cayman Islands, BWI	Katherine Cabanillas*
3:40-4:00	Endocrine disruption in juvenile fathead minnows *Pimephales promelas* exposed to cyanobacteria	Jamie Morgan*
4:00-4:20	Estuarine Residence and Movements of Tripletail within the Ossabaw Sound Estuary, Georgia	Matthew Streich*
4:20-4:40	Comparison of the precision of ages and growth from three traditional techniques used for introduced blue catfish	Michael Homer*
4:40-5:00	Critical thermal maxima of adult shortnose sturgeon	Daniel Watrous*
5:15-6:00	GA-AFS Mentoring Program Kick-off	
6:00-8:00	Welcome Social	UGA Subunit

*Student presentation

2012 GA-AFS Annual Meeting
Program

Wednesday, February 8, 2012		
8:00-8:20	Shoal bass retention and spawning aggregation abundance in the lower Flint River, Georgia	Andrew Taylor*
8:20-8:40	Effects of agricultural and industrially contaminated sediment on freshwater mussels	Peter Hazelton*
8:40-9:00	Influence of multi-scale factors on fish structural indices in freshwater impoundments: implications for successful fisheries management	Britney Trushel*
9:00-9:20	Influences of drought on shortnose sturgeon in the Altamaha River, Georgia	Michael Bednarski*
9:20-9:40	Understanding a trophy striped bass *Morone saxatilis* fishery	Ryan Lothrop*
9:40-10:00	Break	
10:00-10:20	Sources and effects of estrogens in the Upper Conasauga River	Whitney Jacobs*
10:20-10:40	Using otolith microstructure to evaluate the impacts of hydro-peaking operations on redeye and Alabama bass in the Tallapoosa River, AL	Laurie Earley*
10:40-11:00	Assessment of diets and seasonal feeding patterns of the invasive Asian swamp eel in South Florida waters	Peter Sakaris
11:00-11:20	Intersex fish influenced by factors other than municipal wastewater effluent	Kristen Kellock*
11:20-11:40	Pond mapping	Greg Grimes
11:40-12:00	The life and times of bubba bass	Albanese/Wisniewski
12:00-1:00	Banquet Luncheon	
1:00-2:00	Awards Ceremony	
2:00-3:20	Business Meeting	
3:20-3:40	Break	
3:40-4:00	American shad update	Don Harrison
4:00-4:20	Alligator gar culture	Haile Macurdy
4:20-4:40	Using volunteer labor in fisheries research	Patrick O'Rouke
4:40-5:00	Flathead catfish removal on the Satilla River	Tim Bonvechio

2012 GA-AFS Annual Meeting
Program

Thursday, February 9, 2012		
8:00-8:20	Natural channel design stream restoration project	Steven Patrick
8:20-8:40	Freshwater mussel survey of the lower Flint River	Jason Wisniewski
8:40-9:00	Size structure and spawning location of robust redhorse stocked in the Ogeechee River, Georgia	Patrick Ely
9:00-9:20	An evaluation of largemouth bass populations in three coastal plain Georgia reservoirs	Tim Bonvechio
9:20-9:40	Abundance and growth patterns of juvenile Atlantic sturgeon in the Altamaha River, Georgia: are we on the road to recovery?	Doug Peterson
9:40-10:00	Staying alive: summer behavior and habitat use of large adult striped bass in Lake Martin, Alabama	Steve Sammons
10:00-10:20	Break	
10:20-11:20	Raffle and Silent Auction	
11:20-11:30	Closing Remarks	Tim Barrett
11:30	Adjourn	

Influences of drought on shortnose sturgeon in the Altamaha River, Georgia

Michael S. Bednarski and Douglas L. Peterson

Warnell School of Forestry and Natural Resources, University of Georgia

Based on recent mark-recapture estimates, the Altamaha River appears to host the largest population of shortnose sturgeon south of the Deleware. In recent years, however, the Altamaha River has suffered from severe prolonged drought, yet the impacts on shortnose sturgeon are unknown. The objectives of this study were to assess the effects of reduced flow on 1) age-1 recruitment, 2) habitat quality, and 3) apparent annual survival of the Altamaha River population. From May-August, 2004-2010, we sampled shortnose sturgeon in the Altamaha River using anchored entanglement gear. Recruitment was estimated from annual mark-recapture estimates of age-1 abundance.. The impacts of flow on temperature and dissolved oxygen were assessed using a hierarchical modeling approach. The Cormack-Jolly-Seber approach was then used to assess the influences of drought-induced stress on apparent survival of age-1 shortnose sturgeon. In total, we captured 1582 shortnose sturgeon (143 recaptures). Estimates of age-1 recruitment varied from 30-2,976 and were positively correlated with high flow during each cohort's young-of-year period. Low flow was associated with increased temperature, which appeared to result in a ~50% decrease in juvenile survival. Our results suggest that future reductions in flow could jeopardize the long-term viability of shortnose sturgeon in the Altamaha River

Flathead Catfish Removal on the Satilla River

Timothy F. Bonvechio and Jason S. Mitchell
Georgia Department of Natural Resources, Wildlife Resources Division
P.O. Box 2089, Waycross, Georgia 31502-2089, USA

The presence of illegally introduced flathead catfish (*Pylodictis olivaris*) was first observed in 1996. During the mid-2000's, observed declines in abundances of redbreast sunfish and bullhead catfishes (*Ameirus spp*.) coincided with significant increases in the abundance of flathead catfish. In an effort to negate the impacts on native fish populations, existing Wildlife Resources Division (WRD) Waycross Fisheries staff began aggressive removals via electrofishing in 1996 as time allowed. Despite these removal efforts, the number and size of flathead catfish per hour of electrofishing had continued to increase since their introduction. In 2006, the Georgia legislature appropriated funding for three new positions. These personnel were assigned the task of reducing the flathead catfish population levels through direct removal while searching for a long-term population control. This new crew hit the river running in April 2007. Thankfully, in the past 5 years, (2007-2011), 69 volunteers supplied 579 volunteer hours towards the removal project. For the 2011 sampling season (May-October), the crew removed 3,134 flathead catfish totaling 8,058 pounds. Since the implementation of the full time flathead management program in 2007, more than 61,729 pounds of flathead catfish (22,895 fish) have been removed from the river in 5 years. The size structure of the flathead population has been affected with the average size fish removed dropping from 5.8 pounds in 2007, to 2.9 pounds in 2008, to 1.4 pounds in 2009, but has increased to 1.8 pounds in 2010 and 2.6 pounds in 2011. Biomass per effort showed a similar trend and had also declined from 57.1 kg/hr in 2007, to 23.6 kg/hr in 2008, to 19.9 kg/hr in 2009, but increased to 31.1kg/hr in 2010, but declined to 22.6 kg/hr in 2011. Catch per effort has fluctuated from 18.5 fish/hr in 2008 to a high of 38.7 fish/hr in 2010, down to a low of 18 fish/hr in 2011. Maintenance control of flathead catfish in the Satilla River may be possible given our reported changes in the size structure and biomass of the population, but intensive harvest needs to be maintained to prevent the flathead population from rebuilding, especially during high water years, where strong recruitment has been demonstrated by the introduced flathead population.

An Evaluation of Largemouth Bass Populations in Three Coastal Plain Georgia Reservoirs: Is exploitation still a concern?

Timothy F. Bonvechio[1], Micheal S. Allen[2], Bryant R. Bowen[1] and Jeremy Wixson
1Georgia Department of Natural Resources, Wildlife Resources Division
P.O. Box 2089, Waycross, Georgia 31502-2089, USA
[2]Program in Fisheries and Aquatic Science, School of Forest Resources and Conservation, University of Florida 7922 NW 71st Street, Gainesville, Florida 32653, USA.

The coastal plain of Georgia is considered a top fishing destination in North America due to the legendary 10.1 kg. World Record largemouth bass *Micropterus salmoides* caught on June 2nd, 1932 in Montgomery Lake, an oxbow lake of the Ocmulgee River. We evaluated the relative abundance, growth, mortality and exploitation of largemouth bass in three Georgia coastal plain reservoirs that lie within the region of this world record catch. Largemouth bass were tagged with hallprint dart tags in the spring of 2010 on Lake Lindsay Grace (LLG) and Hugh M. Gillis Public Fishing Area (HGPFA) and in the spring 2011 on Dodge County Public Fishing Area (DCPFA), respectively. Monetary rewards were either $5 or $105 per fish. An age sample was collected during tagging and total annual mortality (*A*) was estimated from catch catch-curve analysis and ranged from 38% on Lake Linsday Grace (*N*= 456) to 42% on HGPFA) (*N*= 512) and 55% on DCPFA (*N* = 2,502). Tag returns were exceptionally high for the high reward tags ($105) and ranged from 30 to 47%. Tag returns on the low reward tags ($5) ranged from 12% to 25%. As a result, Total Fishing Mortality (U) was estimated from high reward tag returns at 10% on DCPFA, 27 % on HGPFA and 30% on LLG. Leaving estimates of Total Natural Mortality (V) at 8% on LLG, 15% on HGPFA, AND 45% on DCPFA. Despite high rates of voluntary catch release documented across much of North America's black bass fisheries, it does appear that exploitation is a concern in South Georgia for atleast a few of these populations. All populations will be modeled for various length limit scenarios once one angling year (March 2011) is completed for DCPFA.

The possible presence of Ciguatoxin in Red Lionfish from the Cayman Islands, BWI

Katherine Cabanillas and Bill Davin
Dept. of Biology
Berry College
2277 Martha Berry Hwy
Mount Berry, GA 30149
706-290-2663
bdavin@berry.edu

The red lionfish, native to the western region of the Pacific Ocean, was introduced into the Caribbean about 10 years ago and since has spread to most all coral reefs within the Caribbean This invasive species is highly carnivorous and either feeds directly on smaller reef fish or competes for the food of the larger fishes. Without natural predators, one of options being tried in some regions of the Caribbean and Florida Keys is to promote the species as a food fish and encourage anglers to harvest as many as possible. Little consideration has been given to secondary problems that might be associated with the consumption of lionfish by humans, namely Ciguatera. There is now a concern that the red lionfish might harbor harmful levels of ciguatoxin. Researchers have tested 76 lionfish from the waters around the US Virgin Islands and Puerto Rico and found that 26% had harmful levels of ciguatoxin. In this study, 22 red lionfish from the Cayman Islands were tested for the presence of ciguatoxin. The process involved freeze drying and lipid extractions, followed by a bioassay run in triplicate using 12-hour-old brine shrimp nauplii. Any samples yielding positive results from the shrimp assay will then be subsequently tested using the mouse assay. Extraction and testing are ongoing.

Using otolith microstructure to evaluate the impacts of hydro-peaking operations on Redeye Bass and Alabama Bass, in the Tallapoosa River, Alabama.

Earley, L.A. and S.M. Sammons
Department of Fisheries and Allied Aquaculture, 203 Swingle Hall, Auburn University, Auburn 36849 USA 334-844-4058

Located in east-central Alabama, the Tallapoosa River has been extensively impounded for flood control, navigation, hydropower and water supply. The most upstream dam, Harris Dam, was constructed in 1983, and is operated as a hydro-peaking facility. This alteration in the flow regime has not been fully investigated. To examine the impact of growth on black bass species, 100 Alabama Bass and 50 Redeye Bass were collected from three areas: Horseshoe Bend-Germany Ferry (moderately impacted), Wadley-Price Island (highly impacted), and an unregulated portion above Harris Dam (not impacted). This allowed for the effects of flow variation to be examined across a gradient of flow variability. All fish collected were measured (TL), weighed (g), sexed, and the sagittal otoliths were extracted. Otoliths were than broken through the nucleus, mounted onto slides using thermoplastic cement and ground until a thin section was present. Using an image-analysis system otoliths were aged and measured from the focus to the outer edge of each annuli. Growth increments were than calculated for each growth year. River discharge information was obtained from the corresponding USGS gauges. Mean daily flows and the rate of change were examined by growth year and quarterly for each year. A multiple regression analysis was used to examine the relationship between river flow and length increments. Results on the impacts of hydro-peaking flows on the incremental growth of these species will be presented.

Size structure and spawning location of robust redhorse stocked in the Ogeechee River, Georgia.

Patrick Ely

Department of Fisheries and Allied Aquaculture, 203 Swingle Hall, Auburn University, Auburn 36849 USA 334-844-4058

Pond mapping

Greg Grimes

Greg Grimes, Aquatic Environmental Services, Inc., 2050 Howell Bridge Rd., Ball Ground, GA 30107

An Update on American Shad Populations and Management Activities in Georgia

Don Harrison

Georgia Department of Natural Resources, Wildlife Resources Division

Historically, all five of Georgia's Atlantic-slope rivers supported a commercial fishery for American shad with state wide landings peaking at approximately 1 million lbs. a year in the early 1900's. However, in recent years, commercial landings of American shad have been reported from only three (Altamaha, Savannah, and Ogeechee) of these five rivers and averaged approximately 34,000 lbs. over the last 5 years. GADNR has annually estimated the size of the adult American shad population and exploitation rates in the Altamaha Rivers since 1982. Spawning stock abundance has ranged from a low of 70,396 shad in 1990 to a high of 284,442 fish in 1996 while exploitation has ranged from a high of 52.1% in 1982 to a low of 13.7% in 2004. Concerns over coast wide population declines prompted the Atlantic States Marine Fisheries Commission to develop the Interstate Fishery Management Plan for Shad and River Herring in 1985. Since being implemented in 1988 the fishery management plan has been amended twice and American shad are currently being managed under provisions outlined in Amendment 3, which was adopted in 2010. This Amendment required increased monitoring efforts and the development of a sustainable fishery plan in order to maintain commercial and/or recreational shad fisheries. During 2010, the Georgia Board of Natural Resources adopted new commercial shad fishing rules based on a recommendation from GADNR. These changes modified the temporal and spatial components of commercial shad fishing effort in Georgia's Atlantic-slope rivers, both to provide the basis for American shad sustainability plans and to address shortnose sturgeon by-catch issues.

Title: Effects of Agricultural and Industrially Contaminated Sediment on Freshwater Mussels

Authors:
Peter Hazelton and Robert Bringolf, University of Georgia, Interdisciplinary Toxicology Program, Warnell School of Forestry & Natural Resources, 180 East Green Street, Athens, GA 30602

Peter Lasier and Matthew Urich, USGS Patuxent Wildlife Research Center, Athens, GA 30602

Abstract:

Freshwater mussels (order Unioniformes) are among the most critically imperiled taxa worldwide. Georgia has the third highest species richness of freshwater mussels among all states and provinces in North America, although greater than 14% of the native species are listed as endangered or threatened at the state or federal level. Environmental pollution is often cited as a major contributor to this loss of mussel diversity. We used existing technology from *Hyalella azteca* sediment toxicity tests to investigate the effects of agricultural and industrial contaminated sediments on the growth and survival of juvenile fatmucket (*Lampsilis siliquoidea*). Sediments were collected from sites along the Conasauga River (northwest Georgia) with known agricultural runoff and perfluorinated compound (PFC) pollution. A reference sediment from outside of the watershed was also included. In a separate experiment we examined growth and survival of juvenile southern rainbow (*Villosa vibex*) exposed to laboratory-prepared sediments spiked with PFCs in a dose dependent approach. There were no consistent trends in the effects of agriculturally polluted sediments; however, comparison of fatmucket growth in sediments collected above and below the confluence of a few tributaries may indicate changes in habitat suitability caused by agricultural inputs. Juvenile growth tended to decrease with increased PFC sediment concentrations, which may be indicative of reduced habitat quality in the Conasauga River from industrial pollution. Results of these studies indicate that existing standardized toxicity test methods may be adapted for freshwater mussels and that the methods may be sensitive for detecting site-specific toxicity from polluted rivers.

Comparison of the Precision of Ages and Growth from Three Traditional Techniques Used for Introduced Blue Catfish

Michael D. Homer Jr.[1]
Georgia Cooperative Fish and Wildlife Research Unit
Warnell School of Forestry and Natural Resources
The University of Georgia
180 E. Green Street
Athens, GA 30602
homerm@warnell.uga.edu

Cecil A. Jennings
U.S. Geological Survey
Georgia Cooperative Fish and Wildlife Research Unit
Warnell School of Forestry and Natural Resources
The University of Georgia
180 E. Green Street
Athens, GA 30602
jennings@uga.edu

James T. Peterson
U.S. Geological Survey
Oregon Cooperative Fish and Wildlife Research Unit
Department of Fisheries and Wildlife
Oregon State University
176 Nash Hall
Corvallis, OR 97331
jt.peterson@oregonstate.edu

Abstract:

Age and growth information is used to understand populations' life history and ecology and monitor their trends. Such information is useful for evaluating the success of establishment of introduced populations. Prior studies have validated age determination methods for various catfishes, but none have been validated for blue catfish. We compared precision of age estimates and back-calculated growth after using one lethal and two non-lethal, traditional age determination techniques for introduced blue catfish in Georgia. Blue catfish (n=153) were collected by experimental gillnets set overnight at 12 standardized stations at Lake Oconee, Georgia. Two non-lethal techniques requiring the pectoral spines (articulating process and basal

recess) and one lethal technique requiring lapilli were used to determine the ages of the fish. Two readers independently assigned ages, and conflicts were resolved by a concert read. The Frasier-Lee method was used to back-calculate length-at-age for each fish. Hierarchical models we used to compare precision in back-calculated length estimates and growth among the three techniques. Two readers found the highest precision for otolith-based age assignments (83.5%) and lowest for basal recess cross-sections (71.4%). The hierarchical model indicated that back-calculated length was variable among fish from ages 1-3 for all three techniques compared. Back-calculated length was variable between the otolith and basal recess at age-4 and age-8. Our study suggests the articulating process and otolith techniques yielded the highest precision and are adequate for age determination of blue catfish. The techniques compared should be validated for blue catfish in a future study.

Sources and effects of estrogens in the Upper Conasauga River

Whitney Jacobs[1], Peter Lasier[2], Sayed Hassan[3] and Robert Bringolf[1]

[1]Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA
[2]USGS, Patuxent Wildlife Research Center, Athens, GA
[3]College of Agricultural and Environmental Science**s,** University of Georgia, Athens, GA

Abstract

Recently, populations of rare and endangered fish have been declining in the Upper Conasauga River (UCR), a reach widely recognized for its high biodiversity. Concurrently, agricultural activities such as row crops, dairy and poultry production have increased in the watershed. In a preliminary contaminant survey we measured high concentrations of estrogens in sediments throughout the UCR watershed. Estrogens have been associated with endocrine disruption and reduced reproductive fitness in fish, amphibians and other wildlife, raising questions about role of elevated estrogens in the species declines in the UCR. Our goal is to determine source(s) of estrogens and their effects on fish in the UCR. Specific objectives are to: 1) determine the effects of estrogen exposure on native fish reproductive parameters such as egg production, fertilization rate, and development and hatching success of eggs, 2) determine incidence and severity of intersex in a survey of multiple species of fish in the UCR, 3) assess vitellogenin induction in caged fish to determine if estrogenic compounds are present in UCR water and identify sources of estrogen inputs, and 4) assess the estrogenic potency of UCR sediments by measuring vitellogenin induction in sediment-exposed fish. Testing is scheduled to begin in February 2012.

Title: Intersex fish influenced by factors other than municipal wastewater effluent

Kristen A. Kellock[1], Cecil A. Jennings[2], Patrick Ely[2], Brittany Trushel[2] and Robert B. Bringolf[1]

[1] Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA
[2] Georgia Cooperative Fish and Wildlife Unit, Athens, GA

Abstract

Recent reports of intersex fish (males with oocytes in their testicular tissue) in water bodies around the world have stimulated widespread concern about the effects that chemicals are having in the environment. Estrogens and estrogen mimics in the aquatic environment are known to induce intersex and other forms of endocrine disruption in fish. Intersex fish can have decreased sperm production, decreased sperm motility, and decreased fertilization success compared to histologically 'normal' male fish. Recently, high incidences of intersex fish were reported in the southeastern U.S. but to date a systematic evaluation of the extent, severity, and causes of intersex fish has not been completed in Georgia. Therefore, our objectives were to (1) assess intersex condition in black bass collected from rivers and impoundments across Georgia, and (2) determine estrogenic potency (a measure of the estrogens and estrogen-like substances) of surface waters where fish were collected. Fish (n = 15-35) and water samples were collected near municipal wastewater effluent discharges in each of five rivers and from a river that does not receive major wastewater effluent discharges. Potency of estrogens in surface waters was determined by use of an *in vitro* yeast-based reporter gene (YES) assay. Fish and water were also sampled from 11 impoundments without major wastewater inputs to determine if a natural 'background' rate of intersex could be established for fish from relatively unpolluted water bodies. Gonads from all male fish were examined and the incidence and severity of the intersex condition were compared among sites. The overall percentage of intersex for male bass collected in rivers was 30%, whereas 40% of male fish collected from impoundments were intersex. Incidence of intersex varied substantially (0-85%) among impoundments and surface area of the impoundment was a strong predictor of incidence; the smallest impoundments had the highest rates of intersex fish. The specific mechanism(s) causing intersex remain unknown, but the high incidence of intersex males in small impoundments suggests that factors other than municipal wastewater are involved.

Understanding a trophy striped bass *Morone saxatilis* fishery

Lothrop, R.L.[1], T. Hanson[1], and S. Sammons[1]

Auburn University, Department of Fisheries and Allied Aquaculture, 203 Swingle, Auburn, AL 36849

Lewis Smith Lake is an 8,853 ha recreational fishery within the Black Warrior River basin near Jasper, Alabama. A recent study found that striped bass *Morone saxatilis* do not significantly impact largemouth bass *Micropterus salmoides* and Alabama bass *M. henshalli* through competition and predation, though many anglers still believe this to be true. Alabama Division of Wildlife and Freshwater Fisheries annual stocking of striped bass in Lewis Smith Lake costs are compared with the regional economic gain from the existence of this fishery. Objectives of this study were to: 1) estimate effort expenditures by species; 2) estimate distribution of striped bass expenditures and tax revenue; 3) estimate striped bass angler consumer surplus; and 4) understand the socioeconomic characteristics of striped bass anglers. Multiple survey methods were conducted and applied the travel cost method to place an economic value on the striped bass fishery. Effort was estimated at 233,756 hours for all species. Anglers primarily targeted largemouth and Alabama bass for 66% of the total effort, striped bass with 23%, and crappie *Pomoxis* spp. with 10%. Striped bass anglers went on 10,206 trips during the 12 month sample period and had the highest expenditures on a per visit basis. A cost-benefit analysis revealed that annual stocking costs were justified when compared with state and local tax revenue generated from striped bass angler expenditures.

Endocrine disruption in juvenile fathead minnows (*Pimephales promelas*) exposed to cyanobacteria

Jamie Morgan, James Herrin, Kristen Kellock, Rebecca Haynie, Susan Wilde, and Robert Bringolf

Warnell School of Forestry and Natural Resources, The University of Georgia, Athens, Georgia, 30602

Early-life exposure of male fish to estrogens such as natural and synthetic hormones in treated municipal wastewater is known to cause endocrine disruption, including intersex (oocytes in testicular tissue). Recent data from our lab indicated that intersex fish are also found at a high rate in small impoundments (ponds) that do not receive wastewater and have no other known source of estrogens. However, another recent study suggested that the cyanobacteria *Microcystis aeruginosa* may produce phytoestrogens. Cyanobacteria blooms are common in eutrophic ponds so our goal was to determine if cyanobacteria are estrogenic to fish. In a lab study, juvenile fathead minnows (*Pimephales promelas*) exposed to live and dead *Microcystis* were stimulated to produce vitellogenin, a protein biomarker of estrogen exposure, while other common algal species did not induce this estrogen-sensitive response. We then measured vitellogenin in juvenile fish exposed to a range of *Microcystis* concentrations to determine the dose-response characteristics. Results of a preliminary field study were less conclusive but indicated that vitellogenin is up-regulated in some eutrophic ponds. Our work indicates that environmentally relevant concentrations of *Microcystis* caused an estrogenic response in fish which may, at least in part, explain the high levels of intersex found in ponds.

Using Volunteer Labor in Fisheries Research

In situations where managers may deal with reduced or limited staffing, volunteers can be a significant resource for the ability to implement research projects. Two recent Georgia WRD research projects on the Chattahoochee and Satilla Rivers have heavily utilized volunteer labor. The use of volunteers for these projects creates a number of challenges that are not typically found when working with other fisheries professionals. However, there are also benefits from the public interaction that results from these programs. While volunteers are not a replacement for fisheries technicians or biologists in the field, they bring unique value in appropriate scenarios and can help complete research projects that would not have otherwise been feasible.

Patrick O'Rouke

Georgia Department of Natural Resources, Wildlife Resources Division,2150 Dawsonville Hwy Gainesville, GA 30501

Natural Channel Design Stream Restoration Project

Steven Patrick

University of Georgia Cooperative Extension, Habersham County - Northeast District

Abundance and growth patterns of juvenile Atlantic sturgeon in the Altamaha River, Georgia: are we on the road to recovery?

Doug Peterson
Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA

Use of hierarchical occupancy models toestimate seasonal distribution of stocked robust redhorse in the upper reaches of the Ocmulgee River, GA

William A. Pruitt, Cecil A. Jennings, James T. Peterson

Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA

Endocrine disruption in juvenile fathead minnows (*Pimephales promelas*) exposed to cyanobacteria

Jamie Morgan, James Herrin, Kristen Kellock, Rebecca Haynie, Susan Wilde, and Robert Bringolf

Warnell School of Forestry and Natural Resources, The University of Georgia, Athens, Georgia, 30602

Early-life exposure of male fish to estrogens such as natural and synthetic hormones in treated municipal wastewater is known to cause endocrine disruption, including intersex (oocytes in testicular tissue). Recent data from our lab indicated that intersex fish are also found at a high rate in small impoundments (ponds) that do not receive wastewater and have no other known source of estrogens. However, another recent study suggested that the cyanobacteria *Microcystis aeruginosa* may produce phytoestrogens. Cyanobacteria blooms are common in eutrophic ponds so our goal was to determine if cyanobacteria are estrogenic to fish. In a lab study, juvenile fathead minnows (*Pimephales promelas*) exposed to live and dead *Microcystis* were stimulated to produce vitellogenin, a protein biomarker of estrogen exposure, while other common algal species did not induce this estrogen-sensitive response. We then measured vitellogenin in juvenile fish exposed to a range of *Microcystis* concentrations to determine the dose-response characteristics. Results of a preliminary field study were less conclusive but indicated that vitellogenin is up-regulated in some eutrophic ponds. Our work indicates that environmentally relevant concentrations of *Microcystis* caused an estrogenic response in fish which may, at least in part, explain the high levels of intersex found in ponds.

Assessment of diets and seasonal feeding patterns of the invasive Asian swamp eel in South Florida waters.

Peter C. Sakaris, Southern Polytechnic State University, Department of Biology, Chemistry, and Physics, 1100 South Marietta Parkway, Marietta, GA 30060, psakaris@spsu.edu

John Galvez, U.S. Fish and Wildlife Service, Peninsular Florida Fish and Wildlife Conservation Office, 1339 20th Street, Vero Beach, FL 32960, John_Galvez@fws.gov

Jeffrey Herod, U.S. Fish and Wildlife Service, Southeast Regional Office, 1875 Century Boulevard, Ste 250, Atlanta, Georgia 30345, Jeffrey_Herod@fws.gov

Thomas Callier, Southern Polytechnic State University, Department of Biology, Chemistry, and Physics, 1100 South Marietta Parkway, Marietta, GA 30060

Abstract: The Asian swamp eel *Monopterus albus* is an introduced species in south Florida waters and is considered to be a potential threat to native biota and ecosystems in the region. This species has strong invasive potential as a protogynous hermaphrodite that can travel short distances over land and tolerate abrupt shifts in salinity (0-16 ppt). In this study, our main goal was to evaluate the potential impact of the Asian swamp eel as a predator on native fish assemblages and other biota. Our specific objectives were to: 1) analyze the stomach contents of introduced Asian swamp eels from canals located near Everglades National Park and 2) evaluate changes in food habits with season and body size (age). Previous studies have indicated that Asian swamp eels are opportunistic predators, consuming a wide range of prey including aquatic invertebrates (e.g., insect larvae, snails, shrimp, etc.), various fish species, frogs and frog eggs, and tadpoles. We dissected 752 Asian swamp eels (107 – 833 mm TL), with 46.8% (N = 352) of the samples having stomach contents for analysis. Analyses (frequency of occurrence, %) indicated that dragonfly nymphs (33.24%), amphipods (27.56%), fish (21.02%), grass shrimp (16.48%), true bugs (15.34%), and unidentified insects parts (13.35%) were the most common prey items observed in the stomach contents. Darters and juvenile Asian swamp eels were the most common fish prey eaten by the Asian swamp eel. Other less common prey items included frogs, snails, isopods, damselfly nymphs, beetles, and spiders. Amphipods and dipterans were most often observed in the stomachs of small and medium sized Asian swamp eels, with these prey items becoming much less prevalent in the stomachs of larger eels. In the stomachs of larger eels, fish, dragonfly nymphs, and true bugs were more commonly identified. Asian swamp eels became increasingly piscivorous with size. Dragonfly and damselfly nymphs occurred more often in diets during Spring, while fish and amphipods occurred more often in diets during Fall. As an opportunistic predator consuming a wide range of prey, the Asian swamp eel is likely having its greatest impact as a competitor with native fishes for food resources.

Staying Alive: Summer Behavior and Habitat Use of Large Adult Striped Bass in Lake Martin, Alabama

Steven M. Sammons
Department of Fisheries and Allied quacultures
Auburn University
(334) 844-4159
sammosm@auburn.edu

Lake Martin is a large, oligo-mesotrophic, tributary storage reservoir on the Tallapoosa River in east-central Alabama that supports an important fishery for large, trophy striped bass. However, periodic summer mortalities of adult striped bass have been reported on Lake Martin, consisting primarily of fish > 5 kg. Thirty-six striped bass ≥ 4.78 kg were implanted with radio and sonic tags and tracked from July to October in 2009 and 2010 to identify summer habitat use. To estimate striped bass habitat availability, temperature and dissolved oxygen (DO) profiles were collected every two weeks during this same time period each year. Striped bass generally moved deeper as the summer progressed in both years, presumably seeking cooler water temperatures. Fish were generally found either near the thermocline, or in the hypolimnion until most or all habitat disappeared from the reservoir, whereupon they moved into the upper thermocline and epilimnion. Striped bass in Lake Martin generally selected for cooler temperatures when dissolved oxygen concentrations were > 3.2 mg/L, but when dissolved oxygen concentrations were lower, the fish began selecting for warmer temperatures, possibly seeking areas with higher dissolved oxygen concentrations. By the beginning of July each year, quality striped bass habitat still composed 40-50% of the total habitat available in Lake Martin. However, in 2009 all quality habitat was gone from the reservoir by August 1, and marginal habitat rapidly decreased until there was no striped bass habitat found in Lake Martin by September 16. Quality habitat did not decline as rapidly in 2010, but was completely gone from the reservoir by the end of August. Similarly, marginal habitat did not decline as rapidly in 2010 as in 2009, and was not completely eliminated during that summer, although habitat availability was very low in late September into early October. As turnover began in the reservoir in early October of each year, restoring at least some volume of marginal habitat to the reservoir. Availability of striped bass habitat was correlated more with precipitation and water flow data than with air temperature data, and it appeared that the amount of water flowing through the system during the spring and summer were key determinants of striped bass habitat availability by late summer.

Estuarine Residence and Movements of Tripletail within the Ossabaw Sound Estuary, Georgia

Matthew K. Streich, streichm@uga.edu, 404-429-4101
Chris Kalinowsky, Chris.Kalinowsky@dnr.state.ga.us, 912-258-2637
Doug Peterson, sturgeon@uga.edu, 706-542-2944

Streich, M. K.[1], Chris Kalinowsky[2], and Douglas L. Peterson[1]
[1]Warnell School of Forestry and Natural Resources, University of Georgia, Athens, Georgia, 30602, USA

[2]Georgia Department of Natural Resources, Coastal Resources Division, Richmond Hill, Georgia, 31324, USA

Tripletail support a popular recreational fishery along the coast of Georgia; however, no studies have been conducted regarding tripletail residency and movements within Georgia estuaries. The objective of our study was to describe the estuarine movements and residency of tripletail in the Ossabaw Sound Estuary in Georgia. In summer of 2010 and 2011, adult tripletail were captured using angling methods and surgically implanted with ultrasonic transmitters. Tagged tripletail were detected within the estuary via a stationary array of acoustic receivers, which monitored the estuary continuously from June 2010 through December 2011. Tripletail were detected in the estuary from April through November at sustained water temperatures above 21°C; outside of this time, tripletail were absent from the stationary array. Movements were highly correlated with tidal stage; 100% of the tagged fish moved upstream with flood tides and returned to the Sound with the ebbing tide on a daily basis. During these movements, we observed tripletail as far upstream as rkm 18. Our study provides the first information on the spatial and temporal habitat utilization of tripletail. Our results suggest tripletail exhibit a high degree of residency in Georgia estuaries and utilize a large portion of the estuary during their daily movements.

Shoal Bass Tag Retention and Spawning Aggregation Abundance in the Lower Flint River, Georgia

Authors: Andrew Taylor[1], Travis Ingram[2], Josh Tannehill[2], Rob Weller[2], and Douglas Peterson[1]

Affiliations: [1] Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA 30602. [2] Georgia Department of Natural Resources, Wildlife Resources Division, Fisheries Management Region 5, Albany, GA 31701.

Shoal bass (*Micropterus cataractae*) are a popular game fish endemic to the Apalachicola-Chattahoochee-Flint Basin of Alabama, Florida, and Georgia. Several concerns for the long-term conservation of the species have recently been identified, illustrating the need for quantitative population assessments. The objectives of our study were to 1) quantify retention of internal anchor tags used in mark-recapture studies, and 2) estimate the abundance of adult shoal bass in a major spawning aggregation. We used a double-tagging study to assess tag retention while concurrently using robust design to estimate spawning aggregation abundance. Over several months, 100 % of PIT tags and 63% of internal anchor tags were retained in adult shoal bass. Estimates of abundance and apparent survival in the spawning aggregation suggest that adult shoal bass moved into and out of the aggregation area in discrete pulses, illustrating the importance of large shoal complexes as spawning habitat for this species. We suggest that the methods and results provided in this study should be applied to future efforts to provide quantitative data as the basis for assessment of at-risk shoal bass populations throughout their native range.

Influence of Multi-scale Factors on Fish Structural Indices in Freshwater Impoundments: Implications for Successful Fisheries Management

Trushel, B. E.[1], C. A. Jennings[2], J. T. Peterson[3]
[1]Georgia Cooperative Fish and Wildlife Research Unit, Warnell School of Forestry and Natural Resources, University of Georgia, Athens, Georgia 30602; 410-733-4623; trushelb@warnell.uga.edu

[2]U.S. Geological Survey, Georgia Cooperative Fish and Wildlife Research Unit, Warnell School of Forestry and Natural Resources, University of Georgia, Athens, Georgia 30602; 706-542-4837; jennings@uga.edu

[3]U.S. Geological Survey, Oregon Cooperative Fish and Wildlife Research Unit, Department of Fisheries and Wildlife, Oregon State University, Corvallis, Oregon 97331; 541-737-1963; jt.peterson@oregonstate.edu

Fisheries managers provide quality fishing experiences to the public. Biologists may manage waterbodies similarly, but the fish communities within these waterbodies can differ across locations. The disparity in fish condition among waterbodies creates uncertainty as to which management strategies produce desirable fish communities. To examine how waterbodies and fish communities differ, we investigated the influence of multi-scale factors on fish condition. We sampled fish via electrofishing in 26 impoundments throughout Georgia. For each impoundment, we obtained measurements for multi-scale factors including mean depth, surface area, land cover, and climate. To reflect the productivity of each impoundment, we calculated structural indices, such as relative weight for sportfishes. We then used information theory, with hierarchical linear regression to evaluate the relationship between factors and fish condition. We found largemouth bass condition was predicted by both lake- and watershed-level factors. We also found multi-scale factors can interact to affect condition. Management actions based on multi-scale factors may optimize fish condition and stock composition in reservoirs. Because many landscape-level parameters (e.g., land cover, watershed area) that influence these systems cannot be realistically manipulated, we present managers with activities that can be employed in an economical and practical manner to successfully manage freshwater fisheries.

Freshwater Mussel Survey of the Lower Flint River

Jason M. Wisniewski
Georgia Department of Natural Resources
Wildlife Resources Division
Nongame Conservation Section
Social Circle, GA

Considerable efforts have been made to monitor freshwater mussels in tributaries of the Lower Flint River Basin. However, few surveys have been conducted on the Flint River proper. In 2006, researchers rediscovered the federally endangered Fat threeridge, which had not been collected in the basin since 1988. Additionally, in 2009, the Winged spike, which was presumed extinct, was rediscovered in the Flint River. These rediscoveries suggested that insufficient effort has been placed on surveying the Flint River. In summer 2011, we sampled 110 km of the Flint River from Albany Dam downstream to Lake Seminole. Eighteen freshwater mussel species, including 3 federally listed species were collected live during the survey. The most commonly encountered species were the Gulf slabshell (77% of sites), Elephantear (74% of sites), and Florida sandshell (72% of sites). The federally threatened Purple bankclimber was encountered at 41% of sites, whereas the federally endangered Shinyrayed pocketbook and Fat threeridge were collected at 3 and 1 site, respectively. Additionally, we collected the Southern elktoe at 3 sites, which one site likely producing the largest single collection of this species known presently or historically. Our results suggest that the Flint River harbors high species richness and dense populations of both rare and more common species.