

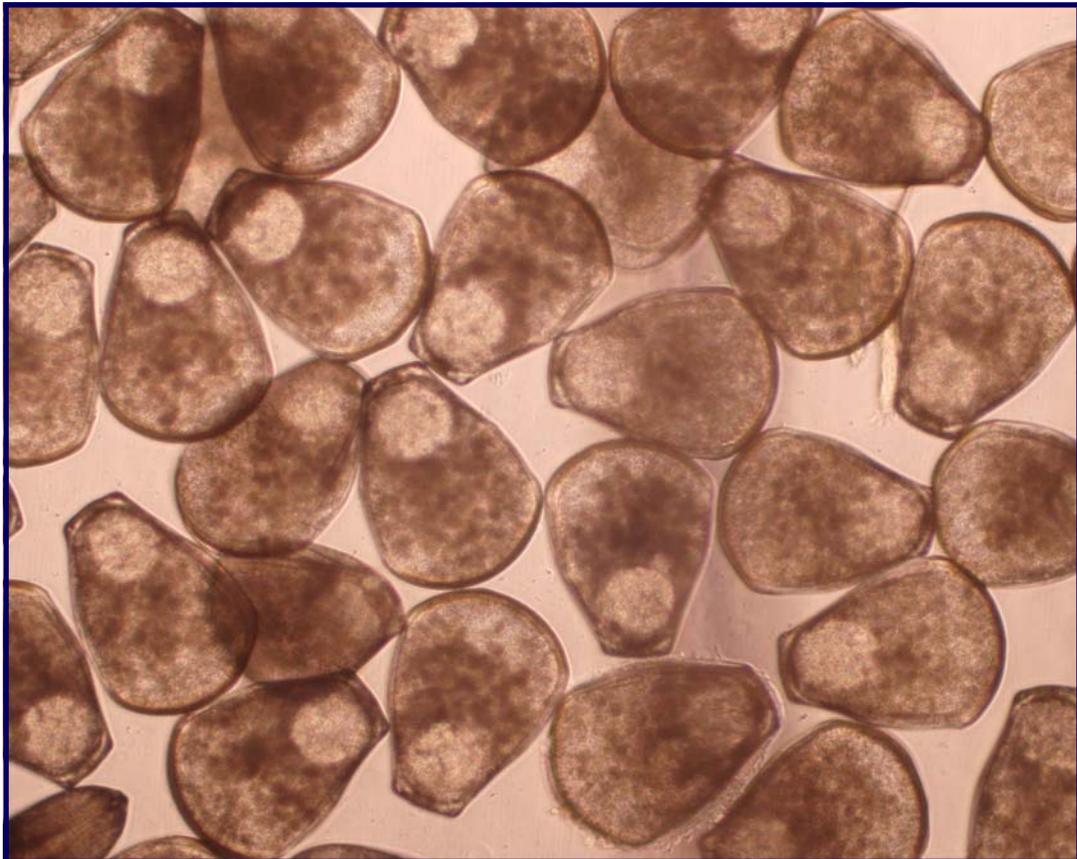


# Warm Springs Fish Technology Center

## July/August 2011 Activity Report

William Wayman, Center Director.  
 Chester Figiel Jr., Supervisory Fish Biologist.  
 Gregory Moyer, Regional Geneticist.  
 Jaclyn Zelko, Fish Biologist.  
 Ashantye' S. Williams, Geneticist.

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*Ellipsaria lineolata* (Butterfly) glochidia. Credit: USFWS Photo.

The Fish Technology Center (FTC) is a component of the Warm Springs Regional Fisheries Center (RFC) and was developed to improve and enhance fisheries management. We provide consolidated technical operational support to regional fisheries operations and technical assistance to the public. The Fish Technology Center is comprised of a cryopreservation laboratory, conservation genetics laboratory, and the National Fish Strain Registry at Warm Springs, Georgia, and a field station in Wadmalaw Island, South Carolina.

#### Goals:

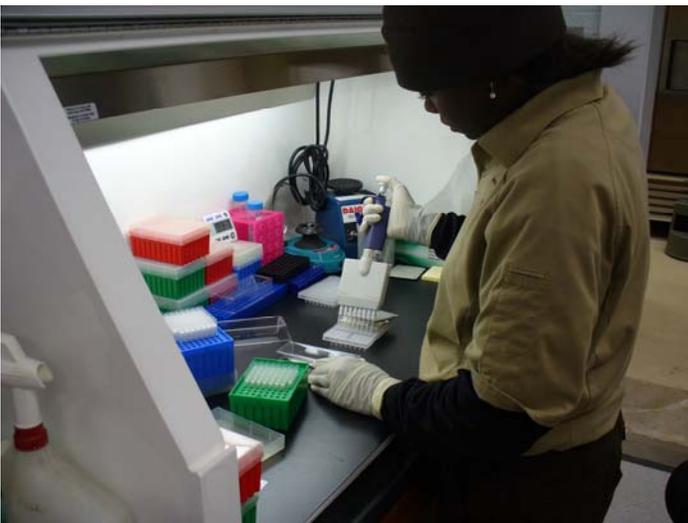
- Provide management support of interjurisdictional coastal and riverine fishes such as robust redhorse, shortnose sturgeon, Atlantic sturgeon, Gulf sturgeon, American shad, and Gulf striped bass.
- Provide conservation genetics support for regional fishery programs.
- Maintain the National Fish Strain Registry for dissemination of information and support of private, state and federal broodstocks.
- Develop cryopreservation techniques for imperiled fish, freshwater mussels, and amphibians.
- Develop hatchery product evaluation techniques.

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### Cryopreservation

Cryopreservation is a process in which a living cell is frozen, stored, and thawed and remains viable. Cryopreserved sperm assists reproductive efforts by allowing spawning to take place whenever females are ready, reduces the need to hold males, and can increase flexibility and genetic diversity in spawning protocols.

Currently, the Warm Springs FTC is working on numerous species of fish, including threatened or endangered species. The program has expanded to include other aquatic species such as freshwater mussels and amphibians for conservation efforts.



Ashantye' Williams is preparing DNA for genetic analysis.  
Credit: USFWS Photo.

### Conservation Genetics

The Conservation Genetics lab primarily works with biologists and managers of the region to design and implement genetic research on imperiled aquatic organisms.

Current Projects include estimating genetic diversity from: alligator gar, Gulf Coast striped bass, robust redhorse, freshwater mussels, and threatened and endangered species such as spotfin chub.

### National Fish Strain Registry

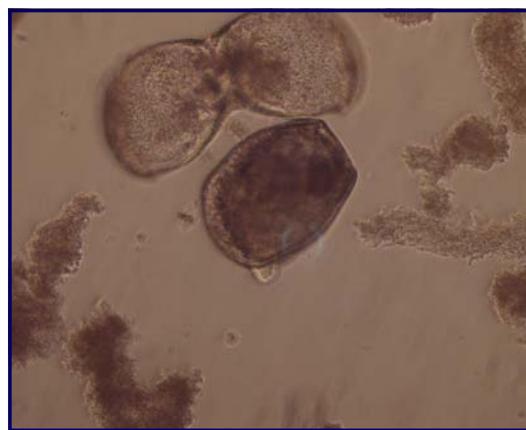
The National Fish Strain Registry (NFSR) is an internet-based program that assembles information on life history, genetics, reproduction, and behavior of wild populations and domestic fish strains throughout the United States. The NFSR database is available for use by public and private producers as well as resource managers of federal, state, and tribal governments through a registration process. Once registered, users are able to search, create new records, edit records, and request information. The NFSR's vision is to provide a broad collaborative program that provides access to data and information on our Nation's aquatic resources. You must be a registered user to access the NFSR website; please contact [chester\\_figiel@fws.gov](mailto:chester_figiel@fws.gov) or [nicole\\_rankin@fws.gov](mailto:nicole_rankin@fws.gov) to become a registered user.

## In-Vitro Culture of Freshwater Mussels



*Ellipsaria lineolata*.  
Credit: Auburn University Photo.

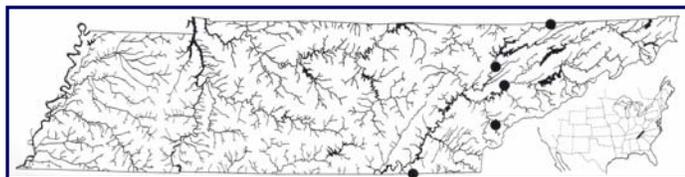
Studies are currently underway on the cryopreservation of freshwater mussel glochidia, a potential method for the preservation and recovery of imperiled unionid species. We are also investigating the effectiveness of transforming glochidia in a culture media, without the use of a host fish. Two common mussel species, the *Lampsilis floridensis* (Florida sand shell) and *Ellipsaria lineolata* (Butterfly) are being used as surrogates for the studies. Glochidia were collected from several mussels and placed in 6-well plates and incubated in a CO<sub>2</sub> incubator at 22° C. In our first study, only a few *L. floridensis* glochidia apparently survived the cryopreservation procedure. However, 200 juveniles were collected from the culture media trials. A second study is currently being evaluated using glochidia from *E. lineolata*.



(Left) Cleaning and transferring glochidia into a beaker. (Right) A juvenile *L. floridensis*. Credits: USFWS Photo.

## Development of genetic markers to aid in conservation of madtom species

Ashantye' Williams and Dr. Greg Moyer received news from the scientific journal *Conservation Genetics*, that their manuscript on "Isolation and characterization of 21 microsatellite loci for the federally threatened yellowfin madtom (*Noturus flavipinnis*) with cross species amplification in *N. baileyi* was accepted for publication in their next issue. They isolated 21 microsatellite loci from *N. flavipinnis*, a federally threatened freshwater fish. Nine loci were polymorphic with an average of 1.48 alleles and an average observed and expected heterozygosity of 0.092 and 0.096, respectively. All loci conformed to Hardy-Weinberg expectations, and all pairs of loci showed no signs of genotypic disequilibrium. Three of these loci were found to cross amplify in *N. baileyi*. These markers should prove useful in the conservation efforts and genetic monitoring of these rare fish species.



Map of yellowfin madtom's range in Tennessee.  
Credit: Etnier and Starnes 1993



Yellowfin madtom. Credit: Conservation Fisheries, Inc.

## National Fish Strain Registry—Operational Analysis

The National Fish Strain Registry (NFSR) application in the USFWS's IT Investment Portfolio was updated and validated in the DOI Enterprise Architecture Repository and meets our reporting requirement for the FY 2011 DOI Internal E-Gov Scorecard. This profile includes level of compliance within the FWS enterprise architecture, security and privacy certifications, customer base information, performance metrics, and other types of project compliance.

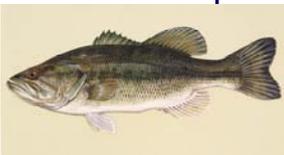
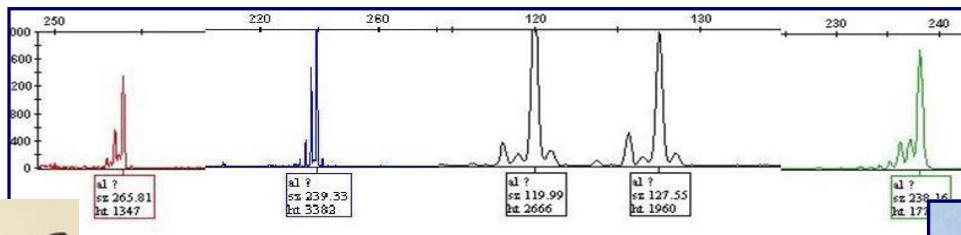
## National Fish Strain Registry—ECOS

Chester R. Figiel, Jr. is working with programmers from ASRC Management Services for the transfer of the National Fish Strain Registry to the Environmental Conservation Online System (ECOS). This includes modifying and transferring application code, migrating existing users and data into ECOS databases, and creating public-access pages. ECOS is a gateway web site that provides access to applications that manage data regarding threatened and endangered species, fisheries, and habitat conservation.

## Aquatic Species Conservation and Management

### Genetic Assessment of the hybridization of largemouth bass

The Conservation Genetics Lab (CGL) assisted the Tennessee Wildlife Resource Agency (TWRA) in the management and conservation of largemouth bass subspecies in the Chickamauga Reservoir in Tennessee. Florida bass (endemic to peninsular Florida) and the northern largemouth bass (native to mid-west and northeast US) co-exist in a natural zone of introgression (repeated backcrossing of hybrid with its parental population) that extends through the southeastern and mid-Atlantic coastal states. Stocking activities and subsequent introgression have led to an extended range for each subspecies, and an expansion of the hybrid zone, which has created difficulties for TWRA in quantifying the success of stocking events or resolving the identity of individuals. CGL established a rapid screening technique to identify largemouth bass with the use of genetic markers. The genetic markers would aid TWRA in genetically distinguishing samples into one of three respective categories: Florida bass, northern largemouth bass, or a hybrid between the two. Results indicated that TWRA has successfully integrated 15% of Florida bass genes into the current population's genome.



(from Left to Right) A northern largemouth bass Credit: Duane Raver/USFWS; largemouth bass genetic markers Credit: USFWS Photo; a Florida bass Credit: USGS;

Nicole Rankin and Chester R. Figiel, Jr. attended the Apalachicola-Chattahoochee-Flint (ACF) Rivers' Freshwater Fish and Mussel Identification Workshop at the Joseph Jones Ecological Research Center in Newton, Georgia on August 2 – 4, 2011. The workshop provided background information on life history, taxonomy, habitat requirements, and fish host species of freshwater mussels in the ACF River Basin. Over 25 people from two states were in attendance and participated in the workshop which consisted of hands-on identification exercises in the classroom and two days in the Flint River surveying for fish and mussels. This workshop provided valuable information for identifying and surveying for freshwater mussels in the ACF River Basin.



Credit: Kevin Wang/JMIH

Chester Figiel, Jr., attended the 2011 Joint Meeting of Ichthyologists and Herpetologists in Minneapolis, Minnesota on July 6 – 10, 2011. Chester gave an oral presentation titled “Experiments on the Cryopreservation of Sperm from the Axolotl, *Ambystoma mexicanum*” during the symposium Assisted Reproductive Technologies and Genetic Resource Banking: Tools for Conserving Declining Amphibians.

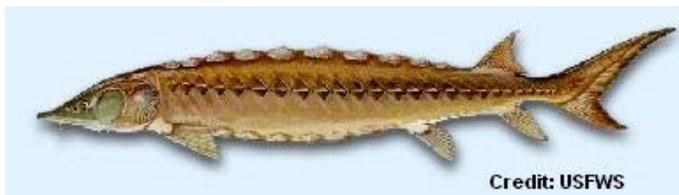
## Striped Bass Strategic Decision Management Workshop

Greg Moyer traveled to Wakulla Springs on August 22-25, 2011 to discuss the need to update the 5 Year Plan for striped bass management. During the meeting, several workshops were held to discuss the future goals of managing striped bass. It was decided to actively collect data and think of innovative ways to answer the questions on the proper management of striped bass. CGL has been the sole genetics resource for aiding managers in the continual stocking of striped bass into the surrounding southern states. Greg played a critical role in emphasizing the importance of having a genetic component in any management plan implemented.

## Partnerships and Accountability

### Shortnose Sturgeon Protected Species Permit Meeting

William Wayman and Vincent Mudrak (RFC) traveled to Orangeburg National Fish Hatchery to discuss National Marine Fisheries Service's Protected Species Permits with Willie Booker (Orangeburg NFH), Allan Brown (Warm Water Hatchery Program Supervisor), and Cindy Williams (Fisheries Management Assistance Program Supervisor). The discussions centered on Orangeburg's application for a Protected Species permit for shortnose sturgeon. The new permit would transfer oversight of shortnose sturgeon at Orangeburg from Warm Springs to the new Orangeburg permit. This would simplify end-of-year reporting procedures.



Shortnose sturgeon.  
Credit: USFWS Photo.

## Connecting the Hatchery with the Conservation Genetics Lab

Sheena Holley, a student from Columbus State University, first began working and volunteering for the hatchery for almost a year. CGL is always available to mentor young and upcoming scientists as they explore the world of conservation genetics.

This summer Sheena and Dr. Kevin Burgess (her advisor) approached CGL with interest in adding a genetic component to Sheena's research on black bass species and their possible hybridization. As a result, she spent most of her time learning molecular techniques from Dr. Greg Moyer and Ashantye' Williams. Sheena learned everything from DNA extraction to data analysis of the genotypes. Her research interest is to evaluate the ability of genetic markers developed from Florida bass to generate successful amplification in shoal bass, spotted bass and their hybrids. She plans to take the tools she learned in the lab and apply them to her graduate studies. The data she collected also aided in providing a baseline for a possible spotted bass study that CGL will coordinate.



Sheena Holley (left) and Ashantye' Williams (right) working in the genetics lab.  
Credit: USFWS Photo.

Chester completed the annual report as required in the shortnose sturgeon permit to the NOAA Fisheries permits and authorizations for Federally protected species under the Endangered Species Act.

## Workforce Management

William Wayman attended the Applied Supervision class at NCTC from August 15-19<sup>th</sup>. The class centered on effectively performing roles and responsibilities as Supervisors. Main areas of focus included: employee performance and conduct, communication skills, and creating a work environment conducive to high productivity.

Chester participated in the Scientific Writing for Publication course at NCTC on Aug 29 – Sept 2, 2011. He taught and mentored fellow biologists on how to improve their scientific writing so that it becomes clear, concise and interesting to the reader.



## Welcome Sarah!

We are pleased to welcome a new volunteer to the Fish Technology Center - Sarah Edgar!!! She is a senior at Manchester High School. She is actively involved with the Dance Team, Academic Team, and Golf Team.



*“Working as a volunteer at the Warm Springs National Fish Hatchery has been a brilliant experience. Over the last few months I have learned and done an assortment of things that have made me grow to love the hatchery. I have helped work with mussels, turtles, salamanders, crawfish, and a variety of fish. The real life experience I have gained here has magnified my understanding of sciences and, allowed me to grow as a person. I am so pleased to be a volunteer at The Warm Springs Fish Technology Center.” –Sarah Edgar*

## Nicole, We Will Miss You!

Nicole M. Rankin has accepted a new position within the Service, and her last working day at Warm Springs was August 11. She is working in the Refuge Inventory and Monitoring Program as the new coastal ecologist and is located at Cape Romain NWR in Awendaw, South Carolina. She is working with South Atlantic Landscape Conservation Cooperative (LCC) refuges’ staff to help identify monitoring needs, design consistent surveys for multiple refuges, implement monitoring protocols, and provide timely data analysis. She is also helping to coordinate a project that will monitor the effects of sea level rise across coastal refuges within the SALCC. While at Warm Springs, she worked as a biologist and managed the National Fish Strain Registry database and website where she collected, compiled, standardized, and analyzed fish strain information. She also planned and participated in field investigations, collecting and inventorying fish and freshwater mussels, and conducted age and growth studies on threatened and endangered freshwater mussel populations, including fat threeridge, oval pigtoe, and purple bankclimber mussels. Before working with the Service, Nicole worked for one year as a Knauss Marine Policy Fellow at NOAA's Office of Ocean Exploration and Research coordinating international and domestic multidisciplinary expeditions that explored and investigated extreme ocean ecosystems including hydrothermal vents and hydrocarbon seeps. Nicole earned her Master of Science in Biology (May 2007) from the University of West Florida with a thesis titled “The role of World War II era shipwrecks, ranging in depth from 84 to 1,964 m, as artificial reefs by fishes in the northern Gulf of Mexico.”



(from left to right) Nicole is sectioning a freshwater mussel, working with a young student during a Junior Ranger Camp session, and posing with the Auburn Tiger mascot during an outreach event. Credit: USFWS Photos.