Warm Springs Fish Technology Center

March/April 2013 Activity Report

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Dr. Chester Figiel Jr., Supervisory Fish Biologist

Dr. Gregory Moyer, Regional Geneticist

Jaclyn Zelko, Fish Biologist

Ashantyé S. Williams, Geneticist

Dr. Edgardo Diaz-Ferguson, Postdoctoral Researcher

Christie Jackson, SCA Intern

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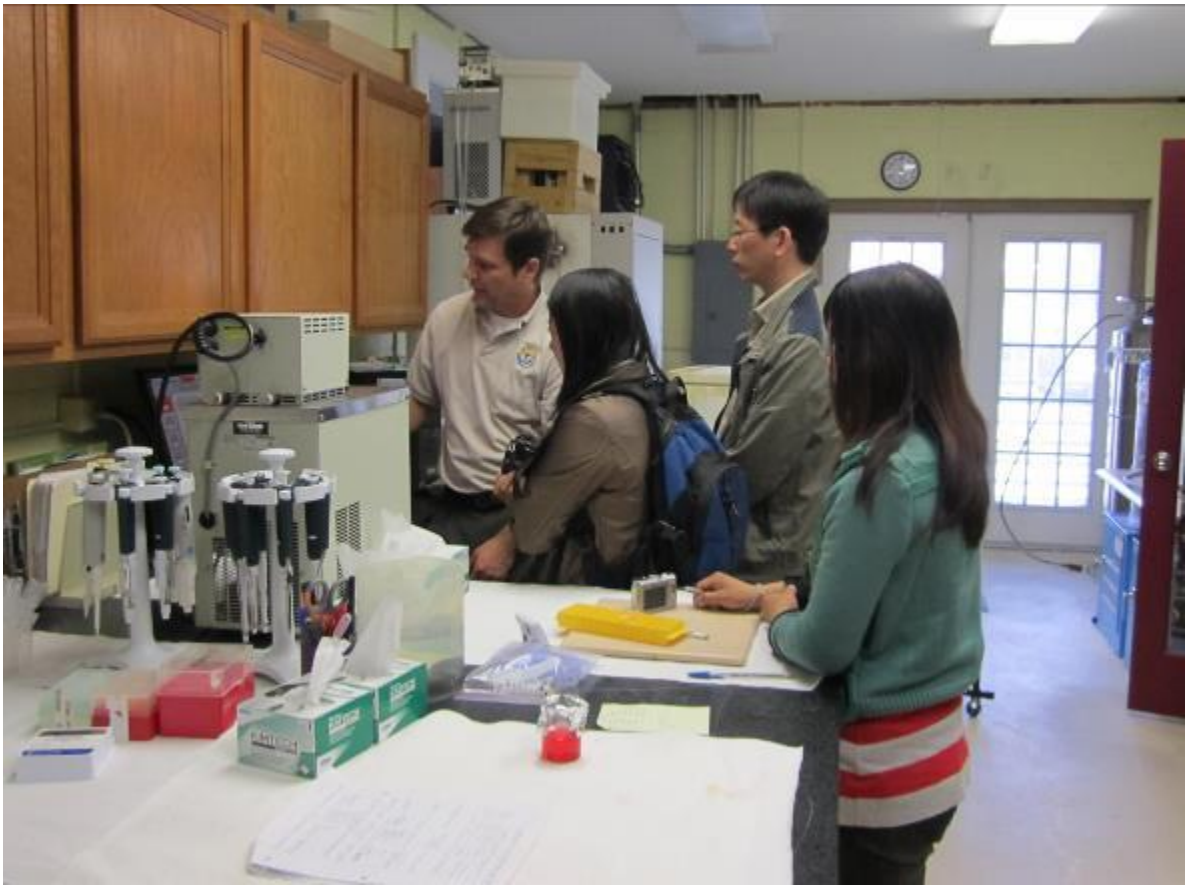

Bill is demonstrating the software used during cryopreservation trials for visiting Chinese biologists Wang Xiaomei, Feng Guangpeng, and Wang Ke. Credit: USFWS

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http://www.fws.gov/warmsprings/fishtechno/

Warm Springs Fish Technology Center

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.

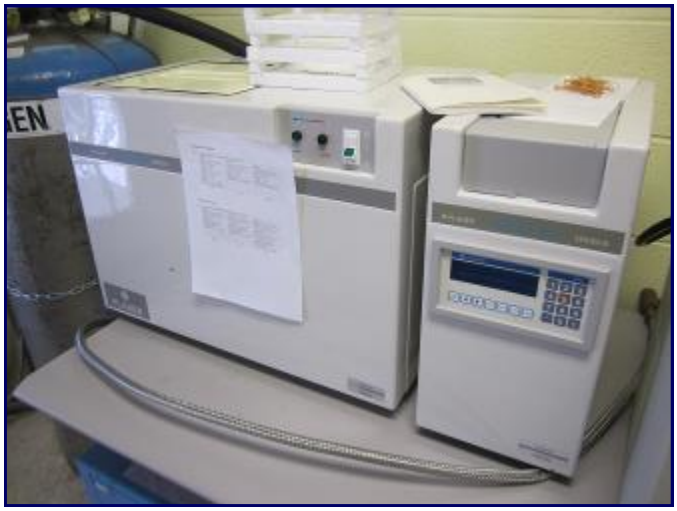
Goals:

- 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.

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.



Planer KRYO 10 programmable cryopreservation freezer used for the freshwater mussel project. Credit: USFWS

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 to become a registered user.

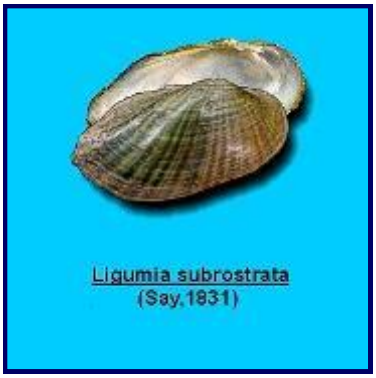
A long way to travel, but it is worth it!!

William Wayman traveled to New London, Wisconsin to collect sperm from lake sturgeon in the Wolf River on April 28th. Over a 2-day period, males were collected, and sperm were then shipped back to Warm Springs, and cryopreserved by Jaci Zelko. Sperm from a total of 15 males were cryopreserved this year. The cryopreserved sperm will be held in the repository for use in future breeding programs within the Tennessee River system. William also assisted the National Fish Hatchery with spawning efforts.

(Left) Wisconsin DNR employees measure the length on a male lake sturgeon. (Right) Spawning lake sturgeon are observed on the side of the bank in the Wolf River, WI. Credits: USFWS

Freshwater Mussel Research is Progressing

Gravid *Ligumia subrostrata* (pondmussel) mussels were transferred from Dr. Jim Stoekel's lab at Auburn University to the Fish Technology Center on April 2nd. Cryopreservation experiments were conducted on April 2nd and April 9th investigating the effects of different freezing rates on the glochidia. On April 4th and 12th, cryopreserved glochidia were thawed and placed in in-vitro culture to determine if any would transform. Unfortunately, no cryopreserved glochidia were capable of transforming. However, fresh glochidia placed in in-vitro culture as controls for glochidia survival performed very well. Glochidia transformed at rates between 60-90% depending on female after 15-17 days of culture. This work was conducted while the Chinese Delegation was visiting, so they observed the techniques we use when working with freshwater mussels and cryopreservation.



(Left) Freshwater mussel *Ligumia subrostrata*. Credit: Ohio State University (Right) Jaci demonstrates the glochidia extraction process to the Chinese Delegation. Credit: USFWS

Leadership in Science and Technology

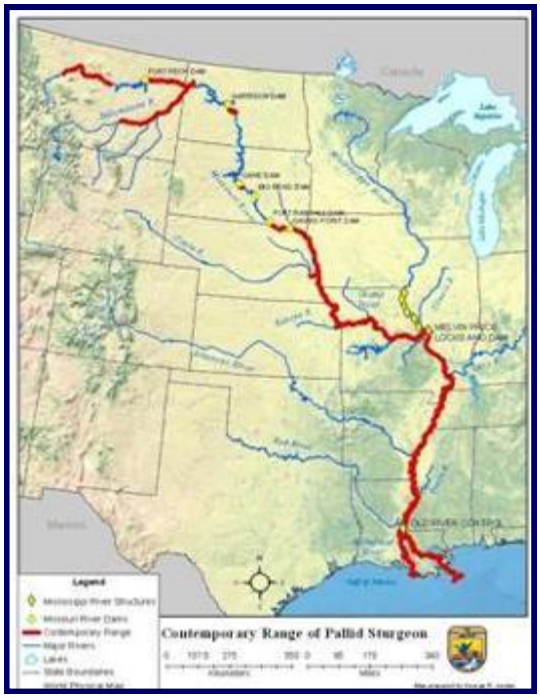
eDNA Detection Project is Moving Forward!

During the months of March and April 2013, we optimized and finished the development of primers and a probe for eDNA detection of the red lion fish (*Pterois volitans*). We used a gene segment of the mtDNA control region as a template for the development of the new genetic markers. The lion fish has not been reported yet within the limits of the Savannah National Wildlife Refuge. However, due to its presence in border states to the Refuge (currently reported in coastal ecosystems of Florida and North Carolina) it is considered a species of concern and one of the target species of the Savannah eDNA project.

We also established the lower level of detection for this species using serial dilutions of known quantities of DNA extracted from lion fish tissues and running a standard quantification protocol in the qPCR machine. In addition, we conducted the first controlled experiments to test the effect of inhibitors on qPCR amplification and eDNA detection. Primers and probes were tested in water samples with lyophilized tissue of the target species and with common organic inhibitors for freshwater systems (simulated by using pond fertilizer and fish food both rich in common organic inhibitors). We also tested the effectiveness of removing organic inhibitors using two different DNA extraction kits (Rapid water kit vs Power water kit). Power water kit showed to be effective in eliminating potential inhibitors of downstream procedures such as PCR, qPCR and sequencing. We also proved the effectiveness of the power water kit at removing inhibitors from water samples collected from crayfish burrows. This result is a step forward for the molecular identification of the imperiled crayfish *Cambarus harti*.

Middle Basin Pallid Sturgeon Cryopreservation

In an effort to preserve the genetic diversity of the endangered pallid sturgeon, sperm were shipped from Blind Pony State Fish Hatchery in Missouri to the FTC for cryopreservation on April 25th. Sperm from 7 males were cryopreserved and placed in the pallid sturgeon sperm repository. This is the fourth year that sperm have been cryopreserved from middle basin fish, and brings the number of middle basin males that have been cryopreserved up to 31. The work was partially funded by the U.S. Army Corps of Engineers.



Contemporary range of pallid sturgeon. Map prepared by George Jordan/USFWS

Aquatic Species Conservation & Management

Amphibian Survey Conducted

Christie Jackson traveled to the Mountain Longleaf NWR in Alabama to help Greg Scull (a U.S. Fish and Wildlife law enforcement agent) conduct a survey of amphibians on the Refuge. They captured and released a number of amphibians including Southern leopard frogs, American toads, slimy salamanders, and the previously elusive red salamander. Three new call recorders that makes recordings of frog calls were put into place during this trip.

Robust Redhorse Spawning on the Pee Dee River, NC

Greg Moyer and Jaci Zelko traveled to North Carolina in April to assist North Carolina Wildlife Resource Commission biologists with robust redhorse spawning efforts on the Pee Dee River. This year is the first year that spawning these fish has been attempted. Six boats were involved in collection efforts manned by several partner agencies including Duke Energy, North Carolina State University, North Carolina Museum of Natural Sciences, South Carolina Department of Natural Resources, and South Carolina Aquarium. Sampling efforts were concentrated in two areas from Highway 74 boat ramp downstream to Diggs Track and the Jones Creek shoal area. Robust redhorse have been captured in these areas during population monitoring surveys in previous years. During the two weeks that Greg and Jaci participated, only 3 females were collected and at that time they were not ready to spawn.

Biologists that participated in the first week of sampling for robust redhorse on the Pee Dee River, NC pause for a photo after a long day of sampling. Credit: NCWRC

Partnerships & Accountability

Chinese Delegation

Warm Springs Regional Fisheries Center staff welcomed three biologists from China as part of an International Cross-Training and Technology transfer program hosted by Washington International Affair (FWS) and co-sponsored by the Southeastern Region. Chinese biologists, accompanied by Steven Kohl from the Washington office, arrived on March 25 for three weeks of fisheries science and training exchange.

Bill and Jaci discuss their freshwater mussel project with visiting Chinese biologists Wang Xiaomei, Feng Guangpeng, and Wang Ke. Credit: USFWS

Women Inspiring Innovation through Imagination

Women Working in STEM - Geneticist Ashantyé Williams

As part of the National Women's History Month Celebration and its theme "Women Inspiring Innovation through Imagination: Celebrating Women in Science, Technology, Engineering and Mathematics (STEM)," the Southeast Region showcased some of the accomplishments of the women who are working in the STEM fields. FTC employee Ashantyé Williams was part of this showcase.

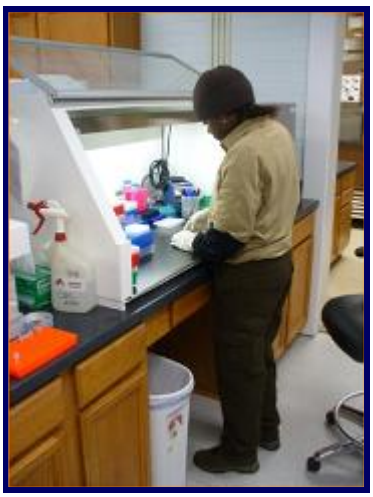
Ashantyé's Biography:
"I started my endeavors in conservation at Fort Valley State University, where I earned a Bachelor of Science degree in Biology. During the summers, I would complete internships in genetics, working with a variety of species such as cockroaches and strawberries. I continued my education and earned a Master's Degree in Plant Biotechnology from Tuskegee University and a Doctoral Degree in Molecular Genetics from Alabama A&M University. While working on my dissertation, I developed a close working relationship with employees from the National Park Service and FWS. I thought they had the coolest jobs ever, so I began applying for positions. Basically, I went from being a lab rat, to a tree hugger and then a fish lover. What a life!

I realize the mere mention of genetics can frighten some folks, so I'll simply ask them, "Have you seen CSI or The Maury Povich Show?" CSI solves crimes with the use of forensic techniques, while I use genetic marker techniques to assess the diversity of a species throughout a river system. Maury has his "Paternity Test Tuesdays" to determine the father of a child. Comparably, I determine the paternity of hatchery and wild species with the use of molecular markers. And that's how I go about explaining to others what I do for a living. I may not have an award winning show, but I'm greatly rewarded every time I put on my FWS uniform.

One of the most rewarding aspects of my job is helping others. When the oil spilled into the Gulf of Mexico, FWS employees were asked to help with cleanup efforts. The first time I was deployed to assist, I became a public relations specialist and was featured on several local news stations, riding in a SWAT boat donated by Jimmy Buffet.

Another rewarding experience was working with the genetic analysis of lake sturgeon in the Upper Tennessee River. Several years' worth of data had been collected for this project before I came on board. It was exciting to share the progress that we made in reintroducing lake sturgeon to the river system while maintaining the genetic diversity of the species. It was also gratifying to see FWS staff recognized for their hard work and efforts in the spawning and stocking of lake sturgeon."

Ashantyé with a paddlefish that was collected on the Pearl River in Louisiana. Credit: USFWS



Ashantyé preparing DNA samples. Credit: USFWS

Women Inspiring Innovation through Imagination

Women Working in STEM - Fish Biologist Jaci Zelko

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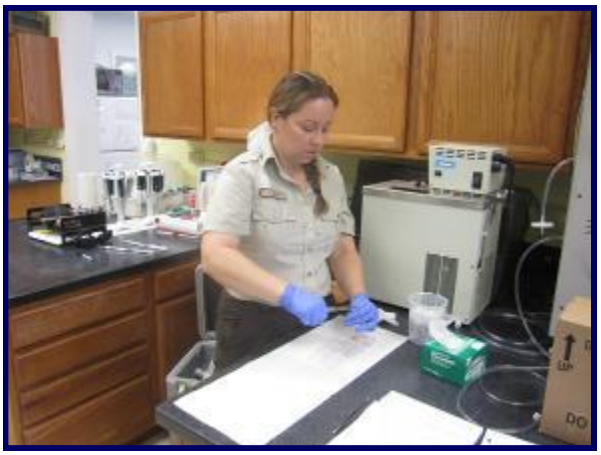
Jaci's biography:
"I realized at a very young age that I enjoyed fishing with my brothers but I just couldn't handle putting the worm on the hook. Instead, I was more interested in releasing my catch than in trying to get the "big" one. As I went through sixth grade science class, I decided right then that I was going to be a marine biologist.

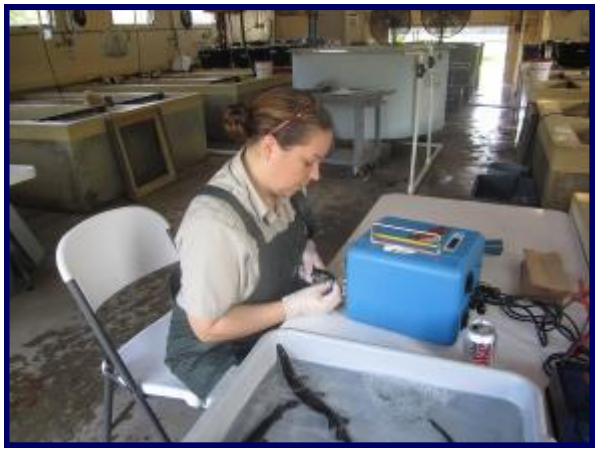
I received my Bachelor's degree in Marine Biology from Roger Williams University. My career at the FWS actually began with a Student Conservation Association (SCA) internship. The internship experience showed me how rewarding a career in conservation could be and I realized that this was the career for me!

I currently work in the Cryopreservation Lab at Warm Springs, conducting research on imperiled aquatic species. My work is focused on cryopreserving gametes from fish and freshwater mussel species. This means that I freeze sperm from endangered and threatened species. It works like a human sperm bank, but with fish! We do this to help preserve the genetic diversity of many species of fish including lake sturgeon, brook trout, robust redhorse and many others. I take a lot of pride in knowing that the work I do now will help conserve aquatic species for the future.

The most rewarding part of my job is spawning fish and freezing sperm. I have been here for 11 years now and I still get excited when fish spawning season rolls around. I also get to go to some awesome places, work with dedicated fish biologists, and handle some pretty cool fish like the alligator gar and lake sturgeon.

Even though my family gets embarrassed when I talk about my job working with fish sperm, I wouldn't have it any other way. I feel like I am making a worthwhile contribution to the science and technology of imperiled aquatic species by doing a job that very few people get to do."





(L) Jaci is preparing sperm samples in the lab. (R) Jaci using a coded wire machine to tag juvenile alligator gar. Credit: USFWS

News and Notes

FTC Employee Jaci Zelko received a plaque recognizing her 10 years of service with United States Government. The certificate was presented to her by Cindy Williams, Region 4 Fisheries Program Supervisor. Jaci has spent all 10 years of service at Warm Springs Regional Fisheries Center.

Way to go Jaci!!! Credit: USFWS

Chester Figiel completed a sixty day detail at Norfork NFH where he served as the acting project leader. He thanks the hatchery staff for their support and kindness during his tour.

Several FTC Employees participated in a First Aid/CPR Renewal Class held at the Roosevelt Warm Springs Institute for Rehabilitation in Warm Springs.

The AARP Defensive Driving Class was held at Warm Springs on March 19th. This course was well attended by Tech Center staff.

Outreach

Tennessee Aquarium WOW's and HOW's Outreach Event

Regional Geneticist Greg Moyer participated in the "Aquarium WOW's and HOW's" event held at The Tennessee Aquarium. The theme for the event was "The Science Behind Aquatic Conservation." Greg was just one scientist among researchers and conservation partners from U.S. Fish & Wildlife, Tennessee Wildlife Resources Agency, Conservation Fisheries, Tennessee Tech and UGA. Visitors to the aquarium learned about protecting habitats and restoring aquatic animal populations.

Greg Moyer talks to a visitor about genetics.
Credit: Todd Stailey, TN Aquarium

Warm Springs Regional Fisheries Center

2013 Outreach Calendar

Open House – TBD in October

Candlelight Parade – November 17