Warm Springs Fish Technology Center

January/February 2011 Activity Report

William Wayman, Center Director.

Chester Figiel Jr., Supervisory Fish Biologist.

Gregory Moyer, Regional Geneticist.

Jaclyn Zelko, Fish Biologist.

Nicole M. Rankin, Fish Biologist.

Ashantye' S. Williams, Geneticist.

Mike Hassett, SCA Intern.

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Rainbow Trout Reared at Erwin National Fish Hatchery. Credit: USFWS Photo.

5308 Spring Street, Warm Springs, GA 31830, Phone: 706-655-3382
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.

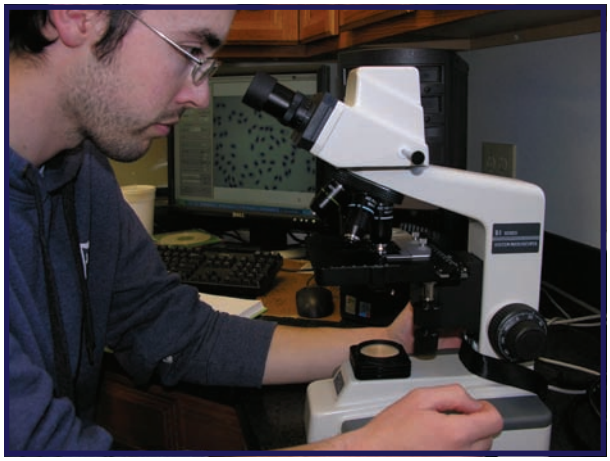
Goals:

- Provide management support of interjurisdictional coastal and riverine fishes such as robust redhorse, shortnose sturgeon, Gulf sturgeon, 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 and mussels.
- 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. In the near future, the FTC will expand cryopreservation research to include other aquatic species (e.g., freshwater mussels, amphibians) for conservation efforts.



Using a microscope and image analysis software, Mike Hassett checks the ploidy of grass carp samples. 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 or nicole_rankin@fws.gov to become a registered user.

Partnerships and Accountability

Using Molecular Tags with Lake Sturgeon

Lake sturgeon. Credit: USFWS Photo.

Ashantye' Williams attended the Annual Tennessee River Lake Sturgeon Reintroduction Working Group Meeting held in Chattanooga, TN on January 13, 2011. The annual meeting is comprised of various state, federal, and university scientists that are united under one goal – successful restoration of lake sturgeon to the Tennessee River. The importance of genetics is emphasized in the restoration plan of the upper Tennessee River lake sturgeon. One of the main goals is to create and maintain genetic diversity in stocked populations. The working group discussed the possibilities of using molecular tags and how they may be useful as an alternative, or in conjunction with, standard external or internal tags and offer the advantage of permanency (do not fall off or diminish over time). Cost is the major drawback to using molecular tags because of the large number of markers necessary to allocate progeny to parents. Ashantye' reminded the group about the importance of sampling procedures when collecting tissue samples for determining the genetic characteristics of the adult broodfish. Molecular tags can also be used to accurately perform mark/recapture studies for estimation of survival and census size of lake sturgeon in the Tennessee River.

Leadership in Science and Technology

Southern Division AFS Meeting

Amblema neislerii. Credit: USFWS Photo.

Greg Moyer, William Wayman, and Nicole Rankin attended the 19th Annual Meeting of the Southern Division of the American Fisheries Society in Tampa, Florida on January 14 –16, 2011. Nicole organized and moderated the symposium, *Tools and Techniques Used to Conserve and Manage Freshwater Mussels*. Sixteen presenters from eleven federal, state, and academic agencies presented information about genetic techniques, life history research, mark-recapture studies, population modeling, stress, contaminants, and toxicity testing, and species and habitat restoration. Greg gave an oral presentation entitled "Tools for assessing genetic diversity within and among populations of threatened freshwater mussels." He reported on the development of microsatellite loci for *Pleurobema pyriforme*, *Amblema neislerii*, and *Elliptoideus sloatianus* and the utility of these markers to assess genetic diversity. William gave an oral presentation entitled "In-vitro transformation of purple bankclimber (*Elliptoideus sloatianus*) glochidia." He discussed the preliminary in-vitro methodology and transformation rates for this experiment.

Vulnerability Analysis for Climate Change Effects

Chester Figiel, Jr. revised the report entitled: "Risk and Vulnerability Analysis Matrix and Risk Management Guidance for Climate Change Effects on Hatchery Systems" for the U.S. Fish and Wildlife Service's Fisheries and Habitat Conservation Program. He and Hayley Dikeman (Ecological Services – Oklahoma) developed a quantitative climate change risk-assessment matrix that provides resource managers the ability to prioritize actions needed to address climate change impacts.

Leadership in Science and Technology

Cryopreservation at Erwin NFH

William Wayman, Jaci Zelko, and Mike Hassett traveled to Erwin National Fish Hatchery (NFH), TN to cryopreserve sperm from 2-year old Fish Lake strain rainbow trout broodstock. The project is an effort to try to reduce the man-power and feed costs associated with raising male broodstock for an additional 3rd year. Erwin NFH uses 3-year old males in crosses to create their future broodstock. Sperm were collected from 240 males and cryopreserved over a 2-day period during February 15 – 18, 2011. The frozen sperm will be stored until next year when it will be used in fertilization trials to help determine the feasibility of the project.

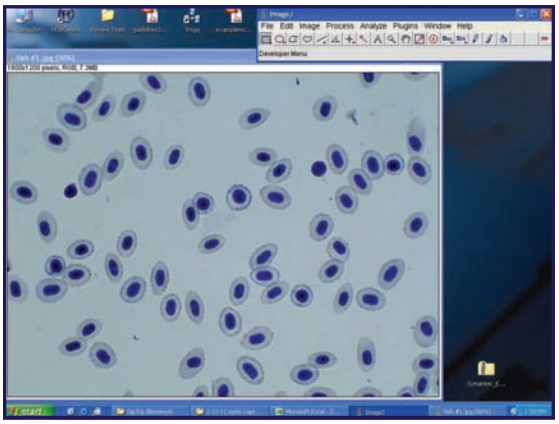
Collecting sperm from a 2-year old rainbow trout. Credit: USFWS Photo.

Checking sperm motility. Credit: USFWS Photo.

Freezing sperm collected from males. Credit: USFWS Photo.

Field Kit Development to Detect Grass Carp Ploidy

William Wayman, Mike Hassett, and Brian Hickson (Warm Springs Fish Health Center) conducted experiments on February 22, 2011 to determine if an inexpensive, portable microscope and image analysis system could be used to accurately determine ploidy in grass carp. Wildlife law enforcement officers need a method of determining the ploidy of grass carp shipments entering their state. There is no way to determine ploidy of grass carp from visual observation, so blood samples must be drawn. The blood samples are usually shipped to university or hospital labs to determine the ploidy using extremely expensive equipment, which can take two days to get results. The officers need a quick and accurate method that will give them a sound reason to hold a shipment of fish for further analysis. The microscope and image analysis software was able to accurately determine the ploidy of 39 fish in a blind study, and the entire process from collecting blood to results takes only 30 minutes per sample. Although further experimentation on the process needs to be conducted, it appears to offer a practical solution to the wildlife officer's need for a rapid field assessment of grass carp ploidy.



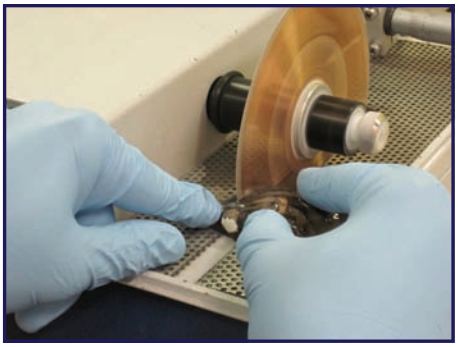
Using image analysis software to analyze blood cells. Credit: USFWS Photo.

William Wayman and Chester Figiel, Jr. completed a chapter "Simple Extenders for Refrigerated Storage and Cryopreservation of Channel Catfish Sperm" for the book *Cryopreservation in Aquatic Species, 2nd Edition* edited by Terrence Tiersch and Christopher Green.

Aquatic Species Management and Conservation

2011 Eastern Gulf Slope Mollusk and Crayfish Meeting

Nicole Rankin and Bill Bouthillier (Warm Springs National Fish Hatchery) attended the Eastern Gulf Slope Mollusk and Crayfish Meeting in Eufaula, Alabama on January 20, 2011. This informal meeting was a gathering of over 50 researchers, students, volunteers, and agency personnel from North Carolina, Alabama, Florida, Tennessee, Kentucky, and Georgia. The meeting served as a review of mollusk, snail, and crayfish conservation and research activities for the Gulf of Mexico drainages. Nicole gave a brief overview of the freshwater mussel age and growth work being conducted at the FTC. Bill gave a presentation highlighting the fish passage work and partnerships of the Paint Rock River Watershed in northern Alabama.



Sectioning an *Amblema neislerii* valve. Credit: USFWS Photo.

GA Chapter of the American Fisheries Society Meeting

American Fisheries Society Logo.

Nicole Rankin attended the Annual Georgia Chapter of the American Fisheries Society Meeting in Perry, GA on February 2 and 3, 2011. Over 100 people attended the conference at the Georgia National Fairgrounds and Agricenter. The first meeting day was packed with student and professional technical presentations. As a change this year, non-technical presentations were scheduled to help increase the diversity of presenters. During the business meeting, Nicole was chosen as a member of the Executive Committee and is the lead for designing and updating the GA Chapter website.

National Fish Strain Registry Updates

Chester Figiel, Jr. and Nicole Rankin completed an operational analysis for the National Fish Strain Registry (NFSR) on January 13, 2011 to assess how well this investment is meeting the U.S. Fish and Wildlife Service's mission and program objectives, customer needs, and business and performance goals. The Office of Management and Budget requires that all steady state investments be reviewed to ensure their continued effectiveness in supporting mission requirements to minimize the cost of ownership.

Nicole Rankin, Lizz Pena, and Chester Figiel, Jr. worked together to add a new group functionality to the NFSR. This functionality allows users to be more flexible when creating records for their hatchery or facility. Now, more than one user at a hatchery can create and edit records for that hatchery. The NFSR group functionality was launched on February 15, 2011.

Nicole Rankin participated via phone in the National Broodstock Meeting held at Neosho National Fish Neosho, MO on February 23 and 24, 2011. This annual meeting is conducted to discuss broodstock egg requests, fish health and nutrition matters, and database concerns for each region. Nicole provided an update of the NFSR including information about number of records, number of state and federal users, a new group functionality, and the pending move to the Environmental Conservation Online System.

Aquatic Species Management and Conservation

2011 Annual *Morone* Meeting

Greg Moyer and Ashantye' Williams attended the Annual *Morone* Meeting held February 8 – 9, 2011 in Crawfordville, FL. The meeting was comprised of various state, federal, and university scientists that met to discuss striped bass research, stocking, and issues in the Apalachicola, Flint, Chattahoochee (ACF) River Basin. Greg Moyer presented three short talks regarding conservation genetics of striped bass inhabiting the ACF River Basin. He also presented the evaluation of striped bass stocking success in West Point Lake, GA. Using molecular tags, this study evaluated the efficiency of molecular markers and oxytetracycline (OTC) tagging. Greg and his coauthors estimated levels of genetic diversity, estimated age using otoliths (fish ear bones), and checked for presence of an OTC mark. Ashantye' Williams described results of Gulf coast striped bass broodstock screening and assessment of the genetic status of broodstock lakes. Results indicated that while there is ample genetic diversity in the broodstock lakes, the genetic diversity differs significantly among lakes. Ashantye' also suggested that microsatellite markers are necessary for accurate allocation of closely related progeny (brothers and sisters) to their respective parents. These data highlight the importance of genetic data in conservation and the utility of molecular tags to accurately perform mark/recapture studies for estimation of survival and census size of striped bass in the ACF River Basin.

Cody Meshes, Youth Ambassador, holding a striped bass. Credit: USFWS Photo.

Striped bass held at the Warm Springs FTC. Credit: USFWS Photo.

Public Use

Job Shadow

Cody filling the cryo dewars. Credit: USFWS Photo.

Cody Meshes, Youth Ambassador, had the opportunity to work an entire day at the Warm Springs Regional Fisheries Center. As part of his school's job shadowing program, Cody assisted with many facets of the FTC program on February 9, 2011. He helped clean and siphon striped bass tanks and sumps. He assisted with feeding and performed water quality analysis on water collected from striped bass tanks. Jaci Zelko taught Cody how to fill the cryopreservation dewars with liquid nitrogen. In the afternoon, Chester Figiel, Jr. and Mike Hassett used Cody's knowledge and creativity of woodworking to assist with building crayfish outreach displays. After a full day's work, Cody learned the importance of being flexible and gained a better understanding of working at a Fish Technology Center with the U.S. Fish and Wildlife Service. To read more about Cody and the other students in the Youth Ambassador Program, please visit: http://www.fws.gov/southeast/youthambassadors/.

Public Use

Manchester High School Career Day

Chester Figiel, Jr., Nicole Rankin, and Mike Hassett attended the Manchester High School Career Day, Manchester, GA on Feb 11, 2011. They set up a career display with information highlighting the majors needed, SCEP and STEP programs, and job requirements for different positions in the U.S. Fish and Wildlife Service. They brought a tank with several lake sturgeon as a mechanism to gain student interest and then would talk to them about their future plans. Students grades 9 – 12 were brought through the gymnasium to learn about potential careers and college opportunities. Several students expressed an interest in science and more specifically, wildlife and fisheries science. Since the event, one student has contacted the FTC about a volunteer opportunity.

Chester and Nicole are ready for the students. Credit: USFWS Photo.

2011 Great Backyard Bird Count

Red-Bellied Woodpecker. Credit: USFWS Photo.

It was great weather for viewing a variety of birds during the 2011 Great Backyard Bird Count held at Warm Springs on February 19 and 20, 2011. Jaci Zelko, Cody Meshes (Youth Ambassador), and Frida Powers-Coates (Friends' Group) set up a booth to help participants with identification and data collection during the event. Some of the birds observed on station were purple martins, turkey vultures, red-bellied woodpeckers, Northern mockingbirds, American crows, tree sparrows, European starlings, and several others. This was a great event to get the public involved with bird counts. The bird counts are compiled by the Cornell Lab of Ornithology and will help scientists document the complex distributions and movements of many bird species.

Workforce Management

Welcome Back Jaci!

Jaci Zelko transferred to the Fish Technology Center in February 2011. She previously worked at the FTC from 2003 to 2007 before transferring to the Warm Springs National Fish Hatchery. She is excited to be performing research, specifically cryopreservation, again. Jaci brings her extensive background and knowledge of intensive fish culture for many species including sturgeon, alligator gar, striped bass, and freshwater mussels. Jaci's new role is the lab manager for the Cryopreservation Laboratory, and her main duties will be fish culture, freshwater mussel cryopreservation, and lab coordination.

Jaci filling a cryo dewar. Credit: USFWS Photo.

Chester Figiel, Jr. participated in the two-day U.S. Forest Service webcast, "Understanding and Adapting to Climate Change in Aquatic Ecosystems at Landscape and River Basin Scales: A Decision Support Workshop for Integrating Research & Management" on February 28 and March 1, 2011.