Warm Springs Fish Technology Center

November/December 2010 Activity Report

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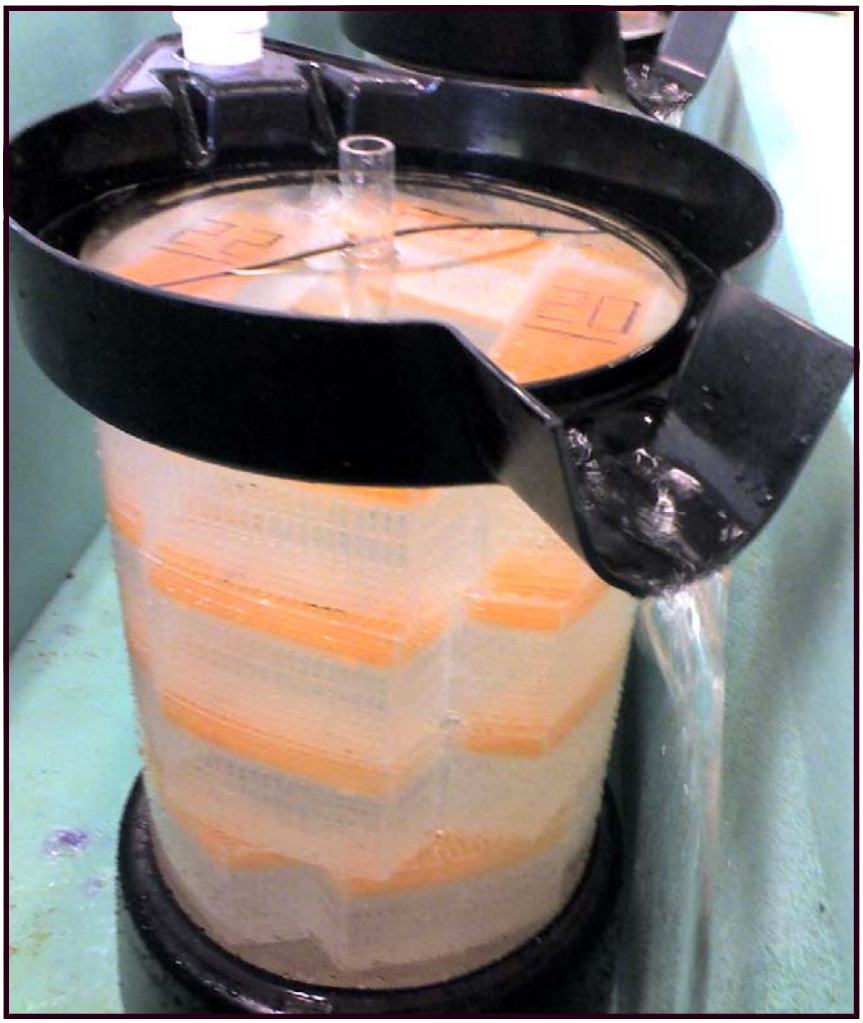

Rainbow trout eggs, fertilized by cryopreserved sperm, incubating at Erwin National Fish Hatchery. Credit: USFWS Photo.

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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.

Staff and volunteers help with the Boy Scout event. 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

Investigating the Mating System of *Villosa lienosa*

Collecting DNA samples using a tissue swab. Credit: Tyler Mosley, Auburn University.

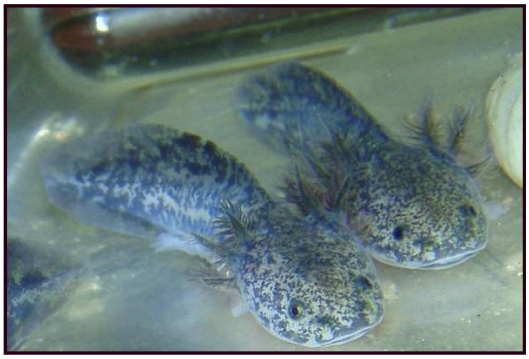
Nicole Rankin assisted Dr. Jim Stoeckel's group at Auburn University with sampling for a mussel tagging/movement study on Chewacla Creek, AL on November 10 and 12, 2010. Jim and his students have been tracking the location and movement of over 100 mussels every two weeks from April to November 2010. They have integrated a unique mapping technique using laser distance measuring devices with PIT tagging and robust design mark-recapture techniques to investigate the mating system of *Villosa lienosa* in this small stream. On this sampling occasion, Nicole assisted with collecting DNA samples from all individuals recaptured and glochidia from gravid females recaptured. The group collected length, weight, sex, images, and tissue swabs from all individuals. Jim and Nicole flushed the gills of gravid females with deionized water to release and collect glochidia. The use of genetic techniques will help determine whether females are primarily fertilized by upstream males, and by incorporating the mapping technique, they will be able to document fertilization distances between mussels.

USFWS, GADNR, and UGA Collaboration

Nicole Rankin and Jason Wisniewski (GA Department of Natural Resources) assisted Justin Dycus, graduate student in the Warnell School of Forestry and Natural Resources at the University of Georgia, with aging *Villosa vibex* (southern rainbow) samples from the Apalachicola, Chattahoochee, Flint River basin. The group worked to develop a method to mark and measure annual growth of *V. vibex* thin-sections using Image Pro Analysis software. They aged and marked twenty samples on November 15 and 16, 2010. For his thesis work, Justin is evaluating the potential influence of changes to the flow regime on mussel growth by modeling annual growth and stream flow. He hopes to refine this marking/measurement method to assess the effects of water use on growth of mussel populations in the Flint River.

Leadership in Science and Technology

Amphibian Publications



Ambystoma mexicanum salamanders currently being used in cryopreservation trials. Credit: Mike Hassett, USFWS.

Chester Figiel, Jr. completed final revisions for the book chapter entitled "Amphibian Conservation and Cryopreservation of Sperm, Cells, and Tissues" for the book *Cryopreservation in Aquatic Species* and for the manuscript entitled "Reptile and Amphibian Conservation through Gene Banking and other Reproduction Technologies" for publication in the *Russian Journal of Herpetology*.

Leadership in Science and Technology

Cryopreservation as a Tool to Reduce Cost of Raising Trout

William conducting fertilization trials.
Credit: Mike Hassett, USFWS.

On October 26, 2010, William Wayman and Mike Hassett traveled to Erwin National Fish Hatchery (NFH), TN to conduct cryopreservation experiments with rainbow trout sperm. Erwin NFH is a broodstock station, which keeps select strains of trout, and distributes fertilized eggs throughout the country for grow-out and stocking. Cryopreservation was envisioned as a tool that might help to reduce the costs associated with raising the trout broodstock for a third year. Sperm from 2-year old males would be cryopreserved, and stored until needed the next year to produce future broodstock. If possible, this would eliminate the need to keep male trout on station for an additional year and reduce feed and labor costs. On November 16, 2010, William and Mike returned to Erwin NFH to conduct fertilization trials with sperm that were cryopreserved in October. Eggs fertilized with cryopreserved sperm did have a lower (25-49%) hatch rate than eggs fertilized with fresh sperm (36-63%), but the results suggested that cryopreservation may be a suitable option for reducing costs associated with raising trout.

Amphibian Culture and Conservation

Chester Figiel, Jr. traveled to Lexington, KY on December 5 and 6, 2010 to meet with biologists at the *Ambystoma* Genetic Stock Center located at the Department of Biology, University of Kentucky. Chester gained information regarding the culture of Axolotls and discussed the reproductive biology of these animals with faculty and staff. This meeting will help to further develop protocols for cryopreservation of spermatozoa, especially for amphibian species of concern.

Aquatic Species Conservation and Management

Annual Southeastern Fishes Council Meeting

Greg Moyer and Ashantye' Williams attended the annual Southeastern Fishes Council meeting held in Athens, GA on November 11 and 12, 2010. Greg presented a paper on the past and present processes that influence a natural population of Atlantic sturgeon. He described the use of microsatellite markers to estimate the effective population size and the effective number of breeders and used mark-recapture data to estimate the number of spawners for Atlantic sturgeon in the Altamaha River. With this data, he was able to estimate that the population experienced a significant reduction in its effective population size due to severe over-exploitation and/or habitat degradation. During the meeting, Ashantye' networked with Mark Cantrell, Asheville Ecological Services Office, to discuss on-going collaborative projects. She also met with Beth Cushman and other staff from South Carolina Department of Natural Resources to discuss American shad projects. Beth presented a poster on using genetics to characterize the population dynamics of an American Shad population in the Edisto River.

Workforce Management

From Coast to Coast: Applied Conservation Genetics

Ashantye' Williams traveled to Anchorage, Alaska to attend the Applied Conservation Genetics Course during November 15 - 19, 2010. This course was designed to provide resource professionals with the tools to evaluate issues where genetic data has major implications for the evaluation, management, or restoration of populations. During this course, Ashantye' had the honor and pleasure of meeting some pioneers of conservation genetics including notable Fred Allendorf, who literally wrote the book from which the course was taught. She met with Meredith Bartron to discuss possible shadowing opportunities at the Northeast Fishery Center and with Tim King to discuss current collaborative projects and innovative technology conducted by the U.S. Geological Survey. During this course, the Warm Spring Conservation Genetics Laboratory received notoriety for various collaborative efforts on several projects mentioned. Ashantye' walked away with a better understanding of the importance of conservation genetics work to the Service. While in Alaska, Ashantye' also completed a short detail at the Anchorage Conservation Genetics Lab. She shadowed Cara Lewis, lab manager, and learned the standard day-to-day operations of their lab. The purpose for this detail was to give Ashantye' the opportunity to experience how other genetics labs function. She was also exposed to their database system that catalogues everything from tissue samples to data analysis. With this experience, she hopes to use some of their protocols and procedures to elevate the Warm Springs Conservation Genetics Lab to the next level.

CGL Logo. Credit: USFWS Photo.

The National Fish Strain Registry (NFSR) application in the USFWS's IT Investment Portfolio was reviewed and validated in the DOI Enterprise Architecture Repository. This meets our reporting requirement for the FY 2010 DOI Internal E-Gov Scorecard. The NFSR was also updated in the Investment Performance Profile; this profile includes a brief description, manager contact information, level of compliance with the FWS enterprise architecture, security and privacy certifications, customer base information, performance metrics, and other types of project compliance.

William Wayman represented the Regional Fisheries Center on the Region 4 Fisheries Budget Team. The team met on November 30 and December 1, 2010 to attempt to develop a budget for FY 2011. The process begins by sending out budget request sheets to each Fisheries office within the Region. These sheets are then collected and evaluated against a predicted Regional Fisheries budget. The team then makes recommendations to the Assistant Regional Director for Fisheries on how best to meet the predicted budget based on the requests submitted.

Chester Figiel, Jr. participated in the NCTC webinar "Climate Vulnerability Analysis for Amphibians and Reptiles" presented by Kyle Barrett on December 1, 2010.

Chester Figiel, Jr. gave a brown-bag presentation to personnel at the Warm Springs RFC on December 9, 2010. His talk was entitled "Experiments on the Cryopreservation of Sperm from the Axolotl *Ambystoma mexicanum*" and discussed two studies involving differing freezing rates and sperm viability of *A. mexicanum* spermatophores.

Public Use

Boy Scout Fall Encampment

Mike Hassett (SCA intern), Cody Meshes (Youth Ambassador), Nicole Rankin, Rosla Plant (Regional Fisheries Center), and Allison Hernandez (Fish Health Center) participated in the 2010 Chattahoochee Council Boy Scout Fall Encampment held at Camp Lumpkin on November 6, 2010. This biennial event gives scouts a chance to experience new and different things, see displays and demonstrations, and spend a weekend camping with family and friends. The Warm Springs RFC staff and volunteers set up a booth showcasing the U.S. Fish and Wildlife Service, aquatic animal and habitat conservation, fishing, recycling, and backyard composting. A touch tank with crayfish and turtles and an aquarium with lake sturgeon fingerlings were the major attraction for kids. Also on display was a Scouting Opportunities poster, which was created by Mike Hassett, and showcased the many ranks and badges scouts can earn while utilizing the Warm Springs RFC. Over 300 scouts, parents, and leaders participated in this event that celebrated 100 years of scouting. After filing through the Warm Springs booth, each scout received a reusable grocery bag, a reusable water bottle, energy and wetlands activity book, and additional handouts.

Scouts gathering around the touch tank. Credit: USFWS Photo.

Curious scout holds a turtle. Credit: USFWS Photo.

Mike Hassett developed the Scouting Opportunities Poster. Credit: USFWS Photo.

Warm Springs Candlelight Parade

Warm Springs RFC staff and Friends of the Warm Springs National Fish Hatchery (Friends') participated in the Warm Springs Candlelight Festival Township on November 20, 2010. This annual festival begins the holiday celebration in Warm Springs, GA and includes candlelit streets and shops, a township parade, a candlelight tour run, and other holiday events. Rosla Plant (RFC), Devin Chappell (Fish Health Center), Jaci Zelko (RFC), Nicole Rankin, Mike Hassett (SCA intern), Cody Meshes (Youth Ambassador), Kara Brown (SCA intern), Mike Plant (Friends'), and Frida Powers (Friends') participated and either walked, rode on a decorated electrofishing boat, or drove the government truck in the Candlelight Festival Township Parade. Over five hundred children and adults watched the parade, were given candy, and encouraged to visit the facility. Parade viewers were also excited to see the Warm Springs mascots, which were two fish costumes donned by volunteers.

Friends' and staff participated in the annual parade. Credit: USFWS Photo.