Warm Springs Fish Technology Center

July/August 2010 Activity Report

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Ashantye' Williams was part of the first crew to ride the new Shallow Water Attention Terminal boat, which was donated by Jimmy Buffett to the Friends of Bon Secour National Wildlife Refuge. 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.

Cody Meshes talks to Chester Figiel about salamander spawning and cryopreservation at the FTC.
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

Paint Rock Fish Passage Survey

Bad stream crossing that may prevent aquatic organisms from moving upstream. Credit: Mike Hassett, USFWS.

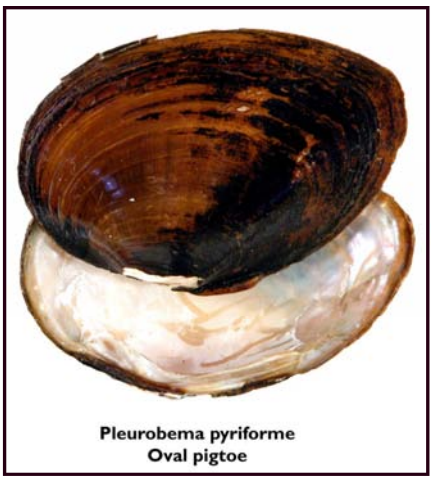
Staff from the FTC, Wheeler National Wildlife Refuge, and the Paint Rock River Working Group completed an extensive survey of stream crossings to identify and prioritize barriers to fish passage in the Paint Rock River watershed in northeast Alabama. Twenty-five crossings covering approximately 56 river miles were assessed; three crossings were determined to be barriers, and two will require additional biological surveys to evaluate if they are passable. Barriers can disrupt connectivity between stream reaches, fish host movement, gamete transport, dispersal into newly suitable habitats, and food transport. Species that may benefit from this survey include the endangered palezone shiner, threatened snail darter, and host fish species of the endangered shiny pigtoe, finerayed pigtoe, pink mucket, Alabama lampmussel, pale lilliput, rough pigtoe, and the candidate slabside pearlymussel.

Leadership in Science and Technology

Freshwater Mussel Conservation, Can't Spell "Collaboration" Without "Lab"

The FTC Conservation Genetics Lab (CGL) has continued to provide sampling guidance, genetic data generation, and interpretation of genetic data for management, conservation and policy issues. As such, the CGL has reached out a hand to Kentaro Inoue, David Berg and Emy Monroe at the Department of Zoology and the Department of Biology at Miami University (Ohio) to work on a freshwater mussel species, *Cumberlandia monodonta*. This species has experienced population declines throughout its range. The researchers isolated 29 microsatellite loci (markers) from the mussel species. The markers developed will be useful for future studies to describe the population genetic diversity of this species, which will aid in conservation efforts. As a result of this collaborative work, a manuscript was produced and accepted in the journal *Conservation Genetic Resources*.

Another ongoing collaboration is with Dr. Edgardo Díaz-Ferguson from the Department of Biology at University of Florida and involves working with *Potamilus capax*, a freshwater mussel species currently protected under the Endangered Species Act. The team isolated 12 microsatellite loci from this species. These were the first isolated microsatellite loci for this species and the primers will be used in further studies to aid in conservation efforts of this endangered species. This research was recently accepted for publication in the journal *Molecular Ecology Resources*.



Pleurobema pyriforme.
Credit: USFWS Photo.

Ashantye' Williams and Greg Moyer have also isolated eight microsatellite loci from *Pleurobema pyriforme.* This species is endemic to Georgia, Florida, and Alabama and is currently protected under the Endangered Species Act. These are the first isolated microsatellite loci for this species and will serve in ongoing conservation efforts of *P. pyriforme.*

Genetic Diversity in American Shad Populations

American Shad in a holding tank at Edenton National Fish Hatchery. Credit: USFWS Photo.

In an effort to rebuild dwindling American shad populations in upstream river reaches of the Santee-Cooper basin, state and federal agencies are using a combination of enhancement techniques including hatchery augmentation of fry, relocation of pre-spawning adults and permanent fish passage structures. One component of a successful reintroduction program entails careful selection of a donor population for use in hatchery propagation and that source and recipient populations maintain similar genetic resources and life history patterns. Greg Moyer and Ashantye' Williams used nine microsatellite markers to assess potential genetic structure within the Santee-Cooper basin and compared indices of genetic diversity between naturally reproducing adults and hatchery brood stock being used for reintroduction efforts. Finally, they explored the feasibility of using microsatellite loci as a molecular tag to assess return rates for hatchery releases. Results indicated that there was no difference in genetic diversity between naturally reproducing American shad and those used as brood in 2009. No apparent stock structure existed in the Santee-Cooper basin, and eight microsatellite markers provide enough information to successfully match returning American shad back to their respective 2009 hatchery parents. Simulations also indicated that 11 microsatellite markers provided enough information to successfully match returning American shad back to as many as 10,000 individuals used for brood stock. These results highlight the importance of using genetic information to assist in restoration and reintroduction efforts.

Processes Influencing a Natural Population of Atlantic Sturgeon

Roman Crumpton holding an Atlantic sturgeon. Credit: USFWS Photo.

Deterministic threats such as habitat loss, invasive species, or over-exploitation cause species extinctions; however, stochastic processes can accelerate extinction rates as census sizes decline. Using molecular and ecological data, Greg Moyer, John Sweka (USFWS), and Doug Peterson (University of Georgia) explored the influence of these processes on the demography of a candidate species under the U.S. Endangered Species Act – the Atlantic sturgeon, *Acipenser oxyrinchus oxyrinchus*. The group used molecular microsatellites markers to estimate the effective population size (N_e) and effective number of breeders (N_b) and mark-recapture data to estimate the number of spawners (N_a) for Atlantic sturgeon of the Altamaha River, GA. Their estimates of N_b were 7-45% less than that of N_a over four consecutive cohorts and show that skewed sex ratios could explain the relative decrease of N_b to N_a. This contemporary estimate of effective population size (N_e) was 74-335 and was at least an order of magnitude less than the historical estimate (based on coalescent theory) suggesting that this population experienced a significant reduction in N_e presumably owing to severe over-exploitation and/or habitat degradation. Together, molecular and demographic data provided for an understanding of past and present processes influencing a natural population of Atlantic sturgeon.

Leadership in Science and Technology

Fish Technology Center Director's Meeting

This year, the Fish Technology Center Directors held their annual meeting from August 8 – 13, 2010 at the Bozeman Fish Technology Center in Bozeman, Montana. William Wayman and Greg Moyer attended this meeting that focused on bringing together the Directors and staff to consider common work areas, budgetary issues for the coming year, and future research directions. A main focus of this year's meeting was the development of an informational brochure to describe and illustrate the capabilities that the Fish Technology Centers can provide to Landscape Conservation Cooperatives and Strategic Habitat Conservation.

National Fish Strain Registry Updates

Nicole Rankin and Chester Figiel, Jr. continue to work on National Fish Strain Registry operation issues including entering outstanding legacy data records. In July and August, over 250 legacy records were corrected and added to the NFSR database. They will continue to compile record information, ensure record accuracy, and perform data entry on the remaining legacy records. Chester and Nicole hope to have all legacy records added by the end of September. They will also continue to contact federal and state hatcheries to request new fish strain records to be added. To request access to the NFSR, please send an email to Chester Figiel (chester_figiel@fws.gov) and Nicole Rankin (nicole_rankin@fws.gov). The NFSR is an internet-based program that assembles information on the life history, genetics, reproduction, and behavior of wild populations and domestic broodstock strains. This management tool is available for use by federal and state governments, private producers, and tribal entities.

Aquatic Species Conservation and Management

Muckalee Creek Fish Passage Survey

Double box culvert that is fully embedded and allows aquatic animals to move freely. This is an example of a good stream crossing. Credit: Mike Hassett, USFWS.

Mike Hassett and Bill Bouthillier conducted a fish passage survey on Muckalee Creek, a tributary of the Flint River in south central Georgia. This is a joint project of the FTC, Fort Benning Ecological Services Field Office, and the Georgia Wildlife Resources Division to inventory and prioritize removal of significant barriers to movement of host fish species of the endangered shiny-rayed pocketbook, Gulf moccasinshell, and oval pigtoe mussels. Muckalee Creek contains one of the remaining fifteen known populations of shiny-rayed pocketbook, one of eight populations of the Gulf moccasinshell, and one of fourteen populations of the oval pigtoe in the Flint River Basin. Culverts that do not allow passage of fish hosts may reduce the survival of these endangered mussels through lack of host species movement. Inventory information will be used to create a prioritized GIS data layer of barriers requiring removal or retrofitting. Identification and prioritization of barriers will be the first step in restoring passage to over 56 miles of in-stream habitat.

Aquatic Species Conservation and Management

From Conservation Genetics to Wildlife Operations

On July 15, 2010, Ashantye' Williams was asked to put down her pipette and pick up a bird catching net. She was called to help with the Deepwater Horizon Response, and her duties were to serve as a wildlife operations biologist for the rescue and recovery crews, and also a public information officer (two days/week) for press releases at the rehab centers in Pensacola, Florida and Theodore, Alabama. While down in the Gulf, Ashantye' personally caught 9 live birds and 20 dead birds. She even had the pleasure of becoming part of the first crew to ride the new Shallow Water Attention Terminal (SWAT) boat. This boat was donated by Jimmy Buffett to the Friends of Bon Secour National Wildlife Refuge for wildlife rescue operations during the BP oil spill. During her three-week tour in the gulf, Ashantye' was able to rescue an oiled laughing gull, and a runner took the bird to the rehab center in Theodore. During her press release, she was able to watch the rehab center wash the gull to remove the oil. Ashantye' met a lot of amazing people during her tour of the Gulf and really represented the "face" of the USFWS.

Top Photo: Ashantye' Williams, Wildlife Operations. Credit: USFWS.
Bottom Photo: The Shallow Water Attention Terminal boat donated to the Friends of Bon Secour National Wildlife Refuge by Jimmy Buffett. Credit: Catherine J. Hibbard/ USFWS.

NFSR Responds to Call for Assistance

Nicole Rankin and Chester Figiel, Jr. joined the USFWS effort to help minimize the impact to wildlife from the Deepwater Horizon/Mississippi Canyon 252 oil spill. Nicole deployed to serve in the Mobile Sector in the Wildlife Operations Branch as an aerial biologist for 14-days during July 19 to August 1, 2010. She conducted aerial surveys from a helicopter along the Florida coastline and barrier islands from Destin to Apalachicola, FL. She, along with one crew member, would visually search for oiled and/or injured wildlife. If the crew spotted an animal in distress, they would report it to the ground and boat teams to investigate. Chester served in the Houma Sector in the Wildlife Operations Branch as a boat crew biologist for 14-days during July 28 to August 10, 2010. He conducted boat surveys along the Louisiana coastline and inland marshes and waterways. He also participated in turtle surveys headed by the National Oceanic and Atmospheric Administration which has recovered 500 turtles throughout the Gulf of Mexico since the oil response began.

Top Photo: Nicole Rankin performed aerial surveys in this contracted helicopter.
Bottom Photo: Chester Figiel captures an injured laughing gull.
Credit: USFWS Photos.

Public Use

America's Great Outdoors Listening Sessions

Mark Musaus listening to comments.
Credit: Mark Cantrell, USFWS Photo.

Kara Brown (SCA intern) and Nicole Rankin attended two listening sessions (Youth and General) held at Asheville-Buncombe Technical Community College in Asheville, North Carolina on July 15, 2010. The listening sessions were part of the America's Great Outdoors Initiative established by President Barak Obama. The goals of this initiative are to reconnect Americans (especially youth) to the outdoors, build upon conservation partnerships, and use science-based management practices to restore and protect land and water. In Asheville, the listening sessions were organized by the National Park Service and led by key figures of the Department of Interior including: Tom Strickland Assistant Secretary FWS, Will Shafroth Deputy Assistant Secretary FWS, and Jon Jarvis Director of NPS. In both sessions, participants were broken into several groups and asked to provide recommendations. Some of the recommendations were to increase public outreach/awareness, rewrite school curriculums to include environmental education and outdoor classrooms from preK-12 grade and college levels, and increase funding for outdoor groups/clubs. These recommendations will be placed in a report due to President Obama in November 2010. For more information about the America's Great Outdoors Initiative, please visit the Department of Interior AGO website at http://www.doi.gov/americasgreatoutdoors/.

Cody Meshes, WSRFC Youth Ambassador

Cody Meshes, Youth Ambassador.
Credit: USFWS Photo.

Cody Meshes joined the forces at the Warm Springs Regional Fisheries Center as a participant in the Youth Ambassador Program on August 18, 2010. Born in California, he was raised in Georgia and is currently a senior at Manchester High School in Georgia. Cody applied and was selected as the first participant to the Warm Springs Youth Ambassador Program. This program was developed by the U.S. Fish and Wildlife Service's Southeast Region as a pilot program to create opportunities for youth around the region to connect with nature, the work of the USFWS, and other youth in the program. Cody will volunteer for a minimum of 20 hours/month, learn about the Warm Springs RFC daily operations, and share conservation messages to peers using social new media, including a Youth Ambassador Blog, Facebook, Twitter, Flickr, and You Tube. Nicole Rankin will act as Cody's mentor and provide new media support throughout this program. Since the start, Cody has learned about freshwater mussels, striped bass tank-spawning, salamander cryopreservation, and fish health issues including whirling disease.

Check out the Youth Ambassador blog at http://usfwsyouthambassadors.wordpress.com/.
Follow Cody at http://twitter.com/codyforwildlife.

Public Use

Display Pool Enclosure

Chester Figiel, Jr., Cody Meshes, and Jaci Zelko checked the display pool enclosure at the Warm Springs National Fish Hatchery on August 31, 2010. The display pool enclosure houses turtles, fish, crayfish, and an alligator. In October, a small juvenile alligator will be replacing the four-foot alligator. Therefore, staff must check the fence around the enclosure to ensure that the smaller alligator cannot escape. The group checked the entire fence, closed holes in the fence using zip-ties, and removed plants that had grown through the fence.

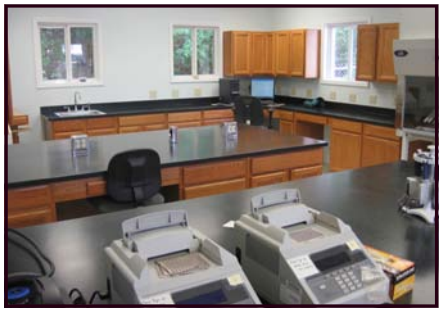
Cody and Jaci use a ziptie to close a potential hole. Credit: USFWS Photo.

Bill Bouthillier gave a tour of the FTC facilities and discussed cryopreservation and conservation genetics with Dr. Bill Daniels and his Aquaculture Production class from Auburn University on July 1, 2010.

Chester Figiel, Jr. gave a tour to Dr. George Staton and ten Columbus State University students on July 2, 2010. The group visited the facility and then, surveyed for crayfish including the Piedmont Blue Burrower.

Workforce Management

FTC Laboratory Expansion



New addition. Credit: USFWS Photo.

The FTC began construction of a small lab addition in August 2009. Today, the 540 square foot lab expansion is finally nearing completion. Finishing touches to the trim work and cabinets and moving equipment is all that remains to be completed. On August 30, 2010, staff began moving equipment and supplies into the new space. Although extremely modest, this additional space will provide much needed improvements to the combined laboratory areas, and help to alleviate some extremely over crowded office conditions.

Nicole Rankin participated as a mentoree in the Southeast Region's E^4 Mentoring Program since August 2009. This formal program ended in August 2010 and proved to be a huge success for the mentoring pairs. Although the formal program has ended, Eva Lara and Nicole plan to continue their mentoring relationship.

Bill Bouthillier attended the Annual Recirculating Aquaculture Systems short course at Cornell University during July 12 – 15, 2010. This course was intended to give complete coverage of design, operation, and management of water reuse systems for finfish.

Greg Moyer, Bill Wayman, and Chester Figiel, Jr. each completed the 8-hours of Supervisor EEO/Diversity Training meeting DOI requirements. These training courses provide a work climate that is inclusive and promotes diversity goals and initiatives.

Bill Bouthillier, Greg Moyer, Nicole Rankin, and Mike Hassett attended the American Heart Association's Heartsaver First Aid Course on August 25, 2010.