



REPORT OF THE
**ROBUST REDHORSE
CONSERVATION COMMITTEE
ANNUAL MEETING**

Hickory Knob State Park
McCormick, South Carolina
October 16 – 18, 2006



Electrofishing grids are used for the first time on the gravel bar at Avant Mine. *USFWS Photo*

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ACRONYMS & ABBREVIATIONS

CPLC	Carolina Power and Light Company		
CVIOG	Carl Vinson Institute of Government		
DPC	Duke Power Company		
FERC	Federal Energy Regulatory Commission		
GA Coop	University of Georgia Cooperative Fish & Wildlife Resource Unit		
GA DNR	Georgia Department of Natural Resources		
GPC	Georgia Power Company		
GRN	Georgia River Network		
GWF	Georgia Wildlife Federation		
NC WRC	North Carolina Wildlife Resources Commission		
NCS MNS	North Carolina State Museum of Natural Sciences		
NYU	New York University		
SC Coop	South Carolina Cooperative Fish & Wildlife Research Unit		
SC DNR	South Carolina Department of Natural Resources		
SCEG	South Carolina Electric and Gas		
SCA	South Carolina Aquarium		
UGA	University of Georgia		
USACOE	U.S. Army Corps of Engineers		
USFS	U.S. Forest Service		
USFWS	U.S. Fish and Wildlife Service		
USGS	U.S. Geological Survey (Biological Resources Division)		
FTC	Fish Technology Center		
NFH	National Fish Hatchery		
SFH	State Fish Hatchery		
WMA	Wildlife Management Area		
CCAA	Consolidated Conservation Agreement with Assurances for the Ocmulgee River		
Excom	Former Technical Advisory Group to the RRCC		
GIS	Geographic Information System		
IT TWG	Information Technology Technical Working Group		
MOU	Memorandum of Understanding		
PIT	Passive Integrated Transponder Tags		
RRCC	Robust Redhorse Conservation Committee		
TAG	Technical Advisory Group		
TWG	Technical Working Group		
AGR	Artificial genetic refuge	MWe	Megawatts of electrical output
C	Celsius	m ³ /s	Cubic meter per second
cfs	Cubic feet per second	N _e	Effective population size
cm	Centimeter	ppt	Parts per thousand
g	Gram	rkm	River kilometer
kg	Kilogram	RM	River mile
km	Kilometer	TL	Total length
m	Meter	YC	Year class
mg/l	Milligrams per liter	YOY	Young of year
mm	Millimeter		



EXECUTIVE SUMMARY

The robust redhorse recovery effort, in its 12th year, encompasses management activities and research and conservation efforts undertaken by members of the Robust Redhorse Conservation Committee (RRCC), university scientists, and other affiliates. The RRCC, established by a Memorandum of Understanding (MOU) signed in 1995, is responsible for developing and managing a recovery approach for the imperiled robust redhorse (*Moxostoma robustum*). The effort and expertise applied to the questions of recovery are brought together at the annual meeting of the RRCC.

The twelfth annual meeting of the RRCC was held October 16 – 18, 2006 at Hickory Knob State Park in McCormick, South Carolina. Approximately 30 representatives of the signatory agencies to the MOU, university research affiliates and other interests attended the meeting. The 13 signatory agencies include: Georgia Department of Natural Resources, South Carolina Department of Natural Resources, North Carolina Wildlife Resources Commission, Georgia Power Company, Progress Energy (formerly Carolina Power and Light Company), Duke Energy, South Carolina Electric and Gas Company, U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Forest Service, U.S. Army Corps of Engineers, Georgia Wildlife Federation, and South Carolina Aquarium. University research affiliates include: University of Georgia Warnell School of Forest Resources, University of Georgia Institute of Ecology, University of Georgia Cooperative Fish and Wildlife Research Unit, University of Georgia Carl Vinson Institute of Government, University of Georgia Department of Genetics, Cornell University Department of Molecular Biology and Genetics, Clemson University Cooperative Fish and Wildlife Research Unit, New York University School of Medicine Institute of Environmental Medicine, Roanoke College Department of Biology, and State University of West Georgia. In addition, representatives of other concerns with interest in recovery of the robust redhorse include: Santee Cooper Power Company, Georgia Aquarium, Georgia River Network, and the North Carolina State Museum of Natural Sciences. The success of the recovery effort, to a large extent, depends on the willingness of RRCC members and others to participate in the annual meeting and to continue to support recovery throughout the year.

This report summarizes updates on management activities, research findings, and conservation efforts and decisions made at the 2006 RRCC Annual Meeting. The RRCC Annual Meeting Reports have become important documents of research, science, management, and recovery that are often referred to and cited. The format of this year's report closely follows the format of previous reports and it provides a more accurate record of activities. The report notes discussion points, questions, main ideas, and/or notes recorded by the participants.



INTRODUCTION

Historically, the robust redhorse (*Moxostoma robustum*) inhabited Atlantic slope drainages from the Pee Dee River system in North Carolina to the Altamaha River system in Georgia. The first scientifically confirmed sighting of robust redhorse since naturalist Edward Cope described the species in 1869 occurred when the fish was re-discovered in the Oconee River in Georgia in 1991. In the Altamaha River drainage, the species is presently known to exist in a relatively short reach of the Oconee River between Sinclair Dam and Dublin, Georgia and in a short upper Coastal Plain section of the Ocmulgee River. Individuals also have been found in the Savannah River (the boundary river between Georgia and South Carolina) in the Augusta Shoals area as well as below the New Savannah River Bluff Lock and Dam. In addition, robust redhorse have been captured in the Pee Dee River below Blewett Falls Dam in North Carolina. Robust redhorse populations have also been reintroduced within their historic range into the Broad and Ocmulgee Rivers, Georgia, as well as the Broad and Wateree Rivers, South Carolina. The robust redhorse appears to inhabit specialized areas of large rivers, which are difficult to sample but regardless of the absence of sightings, small numbers are usually found when species-targeted surveys are conducted.

River impoundments, predation by introduced nonnative species, and significant deterioration of habitat due to sedimentation and water pollution are believed to have contributed to the decline of the species. The complex and diverse problems facing the robust redhorse require an interdisciplinary approach, using a broad spectrum of experience, expertise, and management authority to maintain and restore this imperiled species. In addition, it is essential that recovery efforts include a process that works closely with the private sector as well as government agencies potentially impacted by and interested in robust redhorse conservation.

The Robust Redhorse Conservation Committee (RRCC) was established by a Memorandum Of Understanding (MOU) signed in 1995 to develop and manage a recovery approach for the robust redhorse (*Moxostoma robustum*), previously a Category 2 candidate for Federal listing under the Endangered Species Act. The RRCC is actively committed to the recovery of the imperiled robust redhorse throughout its former range. It identifies priority conservation needs for the robust redhorse and its habitat and coordinates implementation of research and management programs for addressing those needs.



A D M I N I S T R A T I O N

Welcome – Ross Self

The 12th annual meeting of the RRCC was called to order by Chair Ross Self. He welcomed returnees and newcomers. The annual meeting is being funded by Duke Energy this year and monies from last year given by PBS&J and SCEG.

Memorandum of Understanding Status – Ross Self

The Memorandum Of Understanding is in its second year of the 5-year renewal. The Executive Committee is still waiting for some signature pages (NCWRC).

Annual Report Status – Jaci Zelko

Jaci Zelko gave an update on the status of Annual Meeting Reports. For 2002, she asked for a volunteer to write the report. The 2003 report has been completed and signatory representatives have been given a copy. A pdf copy is ready to be uploaded to the RRCC website (www.robustredhorse.com). A draft has been written for the 2004 report. Jaci also stated that the 2005 and the report for this year will be written next.



MANAGEMENT ACTIVITIES

North Carolina 2006 Update – Ryan Heise

The short-term goals of the Yadkin-Pee Dee Technical Working Group are to consistently collect robust redhorse in the Yadkin-Pee Dee River, locate the extent of the population, and determine habitat requirements. The TWG objectives this year were to track the five radio-tagged robust redhorse that were tagged in 2005, locate potential new spawning sites, and to electrofish all identified spawning areas in an attempt to capture additional robust redhorse. Captured robust redhorse were fitted with internal ATS radio transmitters.

Fifteen individual robust redhorse were caught in the Pee Dee River this spring between April 21 and May 9; two of these fish were recaptured. Total shock time for all boats was 64 hrs. The majority of our captures were at the Jones Creek shoal (about 16.5 rkm downstream from Blewett Falls Dam). Spawning fish were located at Big Island (near Blewett Falls Dam), the shoal and island complex downstream from Hwy 74, and Jones Creek Shoal. All Robust redhorse were PIT tagged and the first ten captured had radio tags surgically implanted. Five of the captures were male and ten were female. The average weight was 4192 g and ranged from 2500 g to 8450 g. Total length ranged from 577mm to 782 mm; the average was 631 mm. Water temperatures during capture ranged from 18.1 C to 21.8 C with an average of 19.3 C.

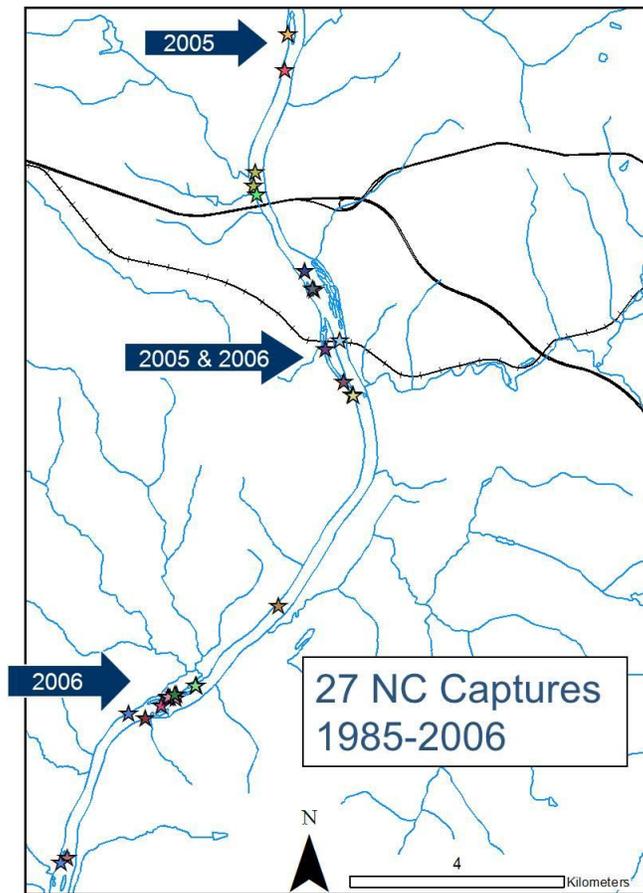
Future efforts for the Pee Dee River include continued electrofishing surveys, implanting more radio tags for telemetry work which will help identify habitat use and migratory patterns.

(L) Taking a fin clip sample for genetic analysis. (R) ATS tag ready for implantation. *NCWRC Photos*





(L) Big Island near Blewett Falls Dam. *NCWRC Photo* (R) Ryan Heise with a captured adult female.
Photo Credit www.ToddPusser.com



Yadkin-Pee Dee River robust redhorse capture locations in North Carolina.



South Carolina 2006 Update – Forrest Sessions and Scott Lamprecht

Six females were crossed with 18 males for the 2006 spawning season on the Savannah River. Two of the fish were recaps this year. The eggs from each female were divided into 3 lots and fertilized with 3 males. Eggs were incubated and had a hatch rate of 50-60%. This was a good hatch rate but there was some mortality of larvae in tanks during the first artemia feedings. Fish were treated with OTC. There was an additional mortality event in the Campbell Reservoir refugia pond of 2-year old robust and largemouth bass in springtime. This may have been related to temperature.

The stocking update for Savannah River robust redhorse progeny is as follows: 2004 stocking of 18,000 Phase I fingerlings into Broad River; 2005 stocking of 18,000 Phase I fingerlings into Broad River; 5,000 Phase I fingerlings into the Wateree River; and 2,000 Phase II fish into the Wateree River. All fish were coded-wire tagged before release. Any Phase II fish had an additional PIT tag implanted before release.



(L) Forrest Sessions strips a ripe female. The eggs are collected into one bucket before they are divided and fertilized. (R) A fingerling robust redhorse is implanted with a PIT tag prior to stocking. *SCDNR Photos*

Wateree River Collections 2006 – Dave Coughlan

The study objectives for the Wateree River is searching for rare catostomids (highfin carpsucker & Carolina and robust redhorse) and documenting the usage of the river by catostomids during the spawning season.

To accomplish this, six locations were sampled every two weeks from mid-February through early June (weekly starting in late March) by boat-mounted electrofishing (two boats and a minimum of one hour of pedal time per location). All captured catostomids were identified and enumerated.

After 79+ hours of pedal time, 1 robust was collected that had been stocked November 2005 (243mm, 218g).



Robust redhorse collected May 25, 2006 (length 243 mm, weight 217.5 g). *Duke Energy Photo*

Georgia 2006 Update – Jimmy Evans

The Oconee River was sampled for robust redhorse broodfish during the weeks of May 1, May 8, and May 15 to produce fingerlings for ongoing stocking programs in the Ogeechee, Ocmulgee, and Oconee rivers in Georgia. For the first time, electric grids were used for broodfish collection at a known spawning aggregation located near the Avant Kaolin Mine. Boat electrofishing was also conducted in the area between the Central of Georgia Railroad Trestle and Dublin where all broodfish have been collected in the past. The boat sampling was designed primarily to continue the standardized monitoring program in that area but any suitable broodfish collected were also to be used for fingerling production.

Flows were reduced to 600 cfs at Sinclair Dam at the beginning of each week to provide suitable conditions for deployment of five electric grids over a gravel deposit near the Avant Mine, and to provide lower flows for efficient boat electrofishing in other areas. Flows were reduced at Sinclair Dam on Sunday, April 30 for sampling during the week of May 1, and on Monday for sampling during the weeks of May 8 and May 15. Inflows into the Sinclair Project dictated that low flows be maintained for no more than five consecutive days in each week.

Robust redhorse were not observed near the gravel spawning bar prior to flow reduction, and did not appear at the site until low flows had been maintained for 2 - 3 days. A total of 9 – 10 robust redhorse, including 1 – 2 females, were observed at the spawning bar each week during the weeks of May 1 and May 8, but fish did not appear during the week of May 15. Spawning was observed at water temperatures of between 21 and 24°C. Broodfish collection efforts were terminated on Friday, May 19 although observations will continue at the Avant site at prevailing run-of-the-river flows for an additional two weeks to determine if spawning continues intermittently for a longer period.

All spawning activity during the week of May 1 occurred over a small gravel deposit located under a snag at depths of 2 - 3 ft. where grids could not be deployed. Seven males and one female were collected at this and an adjacent location on May 4 using an electrofishing boat. By contrast, all spawning activity during the week of May 8 occurred at two locations on the gravel bar at depths of 0.5 – 2.0 ft. where the grids could effectively be deployed. On May 12 a spawning triad that included the only available



female was easily collected using the electric grids. In summary, a total of eight broodfish were collected by boat electrofishing and three with the electric grids (nine males and two females) at the Avant site during the two-week period.

Boat sampling was conducted on May 9, 10, and 11 between the railroad trestle and Dublin and one male robust redhorse was collected. Sampling conditions were excellent, but electrofishing catch rates in this area were very low and further broodfish collection efforts were confined to the Avant site.

A total of about 13,000 eggs were collected, fertilized, and transferred to the McDuffie and Warm Springs hatcheries. Hatching success appears to be about 90 – 95 percent at both facilities and the fry will be stocked into ponds at the Walton and Richmond Hill hatcheries. Although relatively few fertilized eggs were produced this year, much was learned regarding spawning behavior and habitat use at the Avant Mine site. Electric grid sampling at this site was demonstrated to be an effective technique for broodfish collection.

Oconee River 2006 Spawning Update – Jaci Zelko

Artificial propagation of robust redhorse from the Oconee River population in 2006 involved broodfish collection efforts during the weeks of May 1, May 8 and May 15. The broodfish collection protocol for 2006 represents a major departure from methods used in previous years. These changes were implemented in an effort to significantly reduce the increasing amount of effort needed to collect sufficient numbers of broodfish required to meet the fingerling production goals of the RRCC. Reduced flows from Sinclair Dam at the beginning of each week of broodfish collection resulted in Oconee River flow conditions similar to those in most previous years. Prior to 2006 all broodfish have been collected using boat electrofishing in the area between the Central of Georgia Railroad Trestle and the city of Dublin. However relatively few broodfish were collected in this area during 2005 or 2006. Sampling in 2006 which employed a combination of boat electrofishing and pre-positioned electric grids in the area of the Avant Mine site resulted in the collection of a total of 12 broodfish (9 broodfish were collected by boat electrofishing and 3 with the electric grids during the period). Electric grid sampling was demonstrated to be an effective broodfish collection technique at this site.



(L) Using a grid to shock fish. (R) Robust were also collected using an electrofishing boat. *USFWS Photos*



One ripe female was crossed with 2 males for a total of 2 matings. Milt from 6 males was cryopreserved and added to the repository. A total of 13,705 eggs were collected, fertilized and transferred to McDuffie SFH and Warm Springs NFH for incubation in 2006, as compared to 34,996 in 2005 and 97,048 in 2004. This decline in egg production is coincident with a decline in available broodfish for spawning from the Oconee River. Overall survival to fry stage from fertilized embryos produced in 2006 was the highest ever reported (approximately 90%) compared to 28% in 2005, and 30% in 2004. Survival of fry stocked in ponds and reared to fingerling stage in 2006 was among the lowest ever reported (less than one percent of total eggs produced). Hatchery personnel at Walton SFH attributed poor survival to water quality problems observed in fingerling ponds; while hatchery personnel at Richmond Hill SFH attributed poor survival to predation by otters and cormorants. Survival to fingerling stage for all years of artificial propagation (1995-2006) has been relatively low but highly variable, ranging from zero to 34%. The reasons for this high degree of variability remain unknown.

Summary of hatchery production of robust redhorse year class 2006 at Warm Springs NFH and McDuffie SFH including location of ponds receiving all fry produced from Oconee River broodfish.

Hatchery	Embryos received	Yolk-sac fry (% survival from embryos to swim-up stage)	Swim-up fry (% survival from embryo to pond stocking)	Pond Stocking for grow-out to Phase I fingerling stage
Warm Springs NFH	6853	6600 (96%)	6600 (96%)	6600 (Walton 6)
McDuffie SFH	6852	6600 (96%)	6487 (95%)	2870 (Richmond Hill C13) 3617 (Richmond Hill C14)
TOTAL	13705	13200 (96%)	13087 (95%)	13087



THE OCONEE SESSION

The following is discussion of current conditions and future needs.

The assessment of the population status could be described as a gradual natural mortality of an older population with not enough natural recruitment to replace the die-offs at a sufficient rate. However, there is no consensus among the group with the previous statement. The population modeling consistency is a great concern for Georgia Power Company and others agencies for many reasons. No model has been published since 1998. The Excom has been charged at looking at QA/QC of population modeling for

Oconee River. Cecil Jennings will look at the actual model specifications and data consistency. There is a consensus among participants that the population assessment is a much greater concern now than ever before.

Another major point of discussion focused on the gene pool integrity and how this can be achieved by stocking crosses into other river systems. There is a trade-off between stocking increased numbers verses increasing genetic diversity. One way to increase consensus and effective population size is to stock 100 fish from the Ogeechee River back into the Oconee River on top of the fingerlings that will be stocked from the 2006 crosses. After much discussion it was agreed on by all attending participants that there would be a translocation of 100-200 fish from YC 2000-2005.

The importance of telemetry work was also discussed. It was agreed that several fish will be tagged with ATS transmitters and then tracked. However, participants were unsure of funding, staff or a time frame. However, the participants prioritized a list of fish that will be tagged (up to 30 total).

1. several Oconee stocked fish with equal number of Ogeechee transplanted fish,
2. Oconee wild males,
3. Oconee wild females previously spawned,
4. And Oconee wild females never spawned.

2006 STOCKING RECOMMENDATIONS

Georgia

Georgia DNR personnel will transfer up to 200 fish from the Ogeechee River into the Oconee River. Walton SFH will be harvesting fingerlings on Nov 1st with an estimate number of few to none that will be harvested. Richmond Hill will harvest in Nov also with an estimated low return. The total fingerlings will probably number less than 2000. All fish will be coded-wire tagged and divided between the Oconee and Ocmulgee Rivers for stocking.

There was a discussion concerning genetic diversity if too many fish from one year-class are moved into the Oconee population and what effect this may have on swamping of genetics. All the fish last year were essentially from one cross, so there is concern that we



have already swamped the population with that year-class. The Committee did not wait for Anthony's recommendation last year before proceeding with stocking and he hasn't been in contact with us since. A new geneticist, Greg Moyer, at Warm Springs FTC will be starting soon and it would be a good idea to get his opinion on this issue. The Excom will draft a letter to send to Greg Moyer asking for his assistance in the matter of stocking recommendations for the Oconee River.

South Carolina

Phase I fingerlings will be stocked into Broad River, SC and some will be held back for Phase II pond production. Phase II fish will be stocked into the Wateree River (1/2 of the total number stocked will be PIT-tagged).

2007 BROODSTOCK COLLECTION PLANNING

Georgia

Georgia DNR will attempt grid-shocking at the Avant site next year but will also do annual brood surveys on the rest of the river.

South Carolina

South Carolina will collect broodfish the same as last year but will try to do more than one day of collections. They will also collect sperm for the repository.



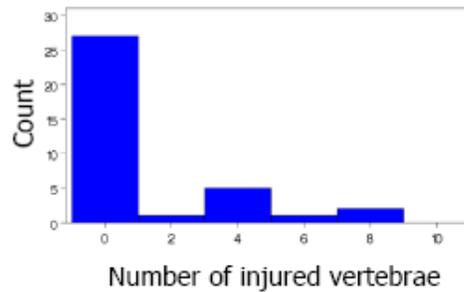
RESEARCH UPDATES

Electrofishing and Robust Redhorse – Tom Kwak, Forrest Sessions, F.M. Holliman, and W.G. Cope

This research project approach was to do a tank efficiency study looking at acute electrofishing mortality and injury, the chronic effects on survival and growth up to 6 months, and the effect on fish embryos.

The researchers asked if the intensity of the electroshock influences growth. They tested this by exposing fingerlings to a 60-Hz PDC for either 3 or 6 seconds. They would place the response in one of five categories (none-control, escape, taxis, pseudo-forced swimming, and immobilization). They also determined if there were any vertebral injuries.

Number of injured vertebrae	Count	Percent (%)
0	11	58
1	1	5
3	3	16
4	2	11
5	1	5
7	1	5



Courtesy of North Carolina State University

Next, the researchers tested effects on electrofishing on embryos. Normally-developing eggs were exposed to varying electrical treatments then returned to the hatching system. The outcomes were based on hatch rates and sub-lethal effects observed on the developing embryo and newly-hatched fry.

Gravel Augmentation – Jimmy Evans

Several slides were presented to show the habitat as it is before any type of augmentation activity takes place at the Avant gravel bar.



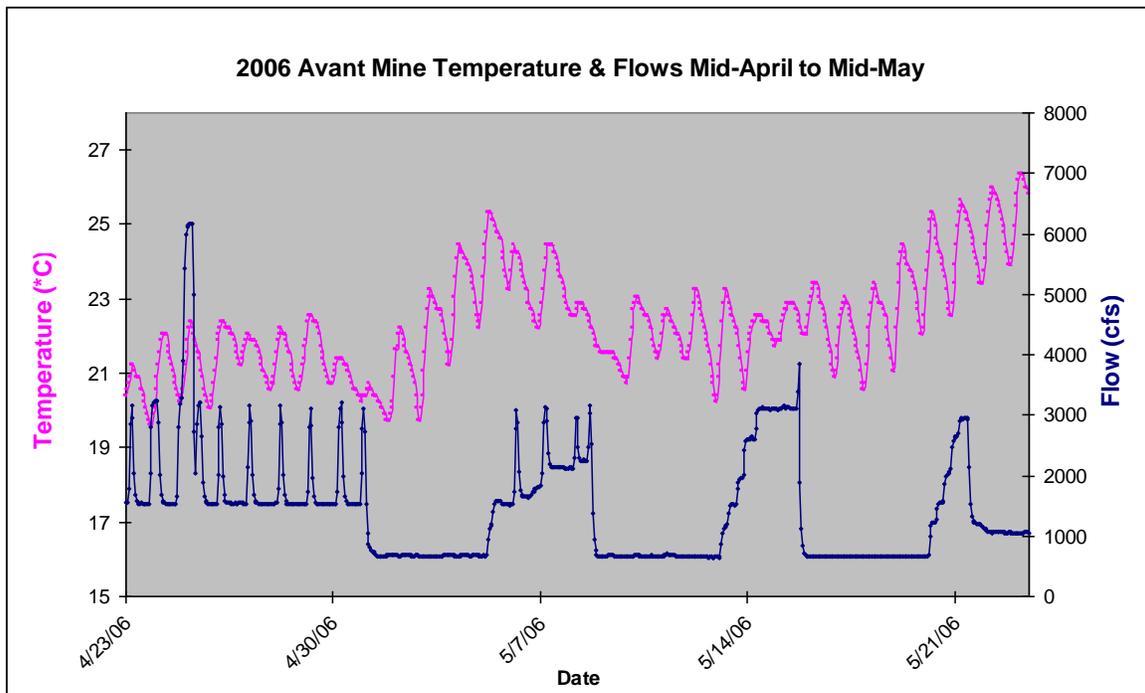
Existing gravel bar. *GADNR Photo*



(L) 4 potential sites for gravel augmentation have been identified. (R) Downstream view of the Avant Mine gravel bar location. *GADNR photos*

Georgia Power Update on Avant Flows – Mike Abney

Georgia Power Company provided several slides showing the temperature and flows at Avant Mine during the spring spawning season.



Georgia Coop Unit update – Cecil Jennings and Rebecca Cull

Preliminary data for the robust redhorse reproductive success in the Altamaha system in 2006 was determined by a larval survey on Oconee River. The river was sampled from May 8 to July 31 using light traps, pushnets, and seines. In 2006, the number of samples collected was 373, bringing the total collected during the duration of this study to 46,255.



At this time only 13,249 have been identified and only 543 have been determined to be suckers. Of those suckers collected, 174 have been identified to the redhorse level (robust and notch-lip). However, a DNA analysis is needed to determine species.

Re-evaluation of Habitat Use and Movement Patterns of Robust Redhorse Released in Ocmulgee River, GA – Tim Grabowski and Cecil Jennings

The objectives of this study were to assess success of reintroduction efforts in Ocmulgee River, monitor dispersal rates, habitat use, and movement patterns, and evaluate the potential of “sentinel fish” to locate additional spawning aggregations in the Altamaha River Basin and elsewhere.

The study used 37 robust redhorse from refugial populations in late March and early April 2006. 13 were fish captured from the Broad River, GA. These fish ranged from 513-573 mm TL and appeared to be either sexually mature or getting very close to it. The remaining 24 fish were caught from the Ogeechee River and ranged 316-502 mm TL. Fish were transported back to holding facilities at UGA.

ATS frequency coded radio transmitters were implanted into 30 individuals (10 Broad River; 20 Ogeechee River) on 11 April 2006. These transmitters have a guaranteed battery life of approximately 1 year. Radio transmitters were surgically implanted into the abdominal cavity and used the shielded needle method to create a small secondary opening for the antennae. The incision site was closed using 2-3 interrupted sutures. Fish were held for an additional 8 days to monitor their condition and recovery. During this time, we lost 3 Ogeechee fish. We re-implanted transmitters from these fish into the spare Ogeechee fish.



(L) Adult robust redhorse used for the study (R) Suturing the incision made in the abdomen.
UGA-Georgia Coop and T. Grabowski Photos

All radio-tagged fish were released at the boat ramp immediately downstream of Lloyd Shoals Dam on the morning of 19 April 2006. Broad River and Ogeechee River fish were kept separate up to the point of release. Fish initially were relocated several times a week and are currently relocated once a week. Tracking is conducted primarily by boat; however, a canoe is used some stretches 1-2 times a month. Upon relocation, GPS waypoint and temperature, DO, depth, current velocity, and turbidity measurements are



taken. A qualitative habitat assessment by categorizing available cover and substrate is also conducted.

Preliminary conclusions include:

- Approximately half of the stocked adult robust redhorse have remained within the reach bounded by Lloyd Shoals Dam and Juliette Dam,
- Fish appear to differ in their habitat use and movement patterns upstream and downstream of Juliette Dam,
- And robust redhorse behavior appears different in the Ocmulgee River than that exhibited by individuals in the Savannah River.

Future research will determine the detectability of robust redhorse by attempting to recapture radio-tagged individuals and assess the potential of using radio-tagged robust redhorse as sentinel fish to locate wild individuals through electrofishing or additional spawning aggregations in the Ocmulgee.

Stable Isotope Analysis of Savannah River Catostomid Eggs – Tim Grabowski and Aaron Fisk

A small sample of unfertilized eggs (approx. 50-75 ml) were taken from ripe and running catostomids. Samples taken in spring 2004 and 2005 from Brassy jumprock ($n=1$), Notchlip redhorse ($n=4$), Spotted sucker ($n=3$), and Robust redhorse ($n_{2004}=12$; $n_{2005}=14$). Lipids were extracted and the remaining samples were dried, ground, and analyzed using mass spectrometer at the Analytical Chemistry Laboratory at the University of Georgia's Institute of Ecology.

Preliminary conclusions include that there does not appear to be any difference in egg lipid content among species or between years, Savannah River catostomids appear to acquire the energy to provision eggs at the same trophic level, and there may be some evidence to suggest robust redhorse feed in different locations while provisioning eggs but there are several issues with this.

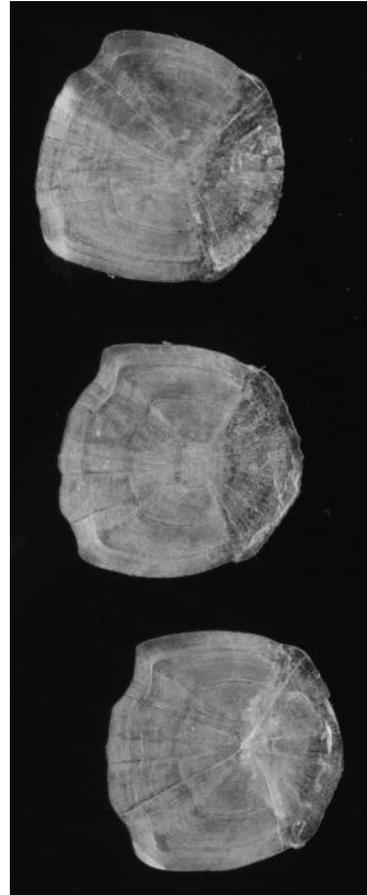
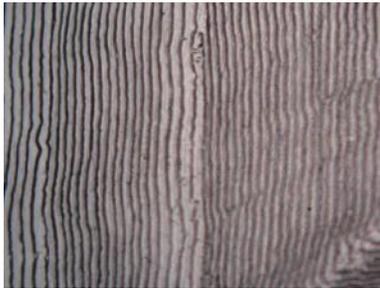
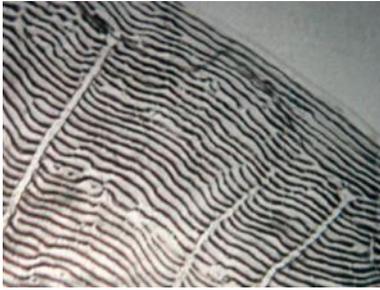
Age, Growth, and Mortality Rate Estimates of Savannah River Catostomids – Tim Grabowski, Nicholas L. Ratterman, and J. Jeffery Isely

Catostomids were collected from the lower Savannah River in spring 2002, 2004, and 2005. Each individual was measured and weighed, sex was determined, and three scales were removed from all captured individuals prior to release. Scale impressions were made on acetate slides using a roller press and read magnified 24X using a microfiche reader. Sexual dimorphism in growth was evaluated using PROC NL MIXED in SAS. Von Bertalanffy growth curves were fitted for each species (and sex where appropriate). Instantaneous and annual mortality was estimated from catch curve data (Ricker 1975).

This study showed that robust redhorse ages estimated from scales are a conservative estimate. It also showed that they are sexually dimorphic in growth, presumably due to females reaching sexual maturity later in life. Also, Savannah River robust redhorse



spawning aggregations appear to be composed of a wide range of age groups. The mortality rates of robust redhorse are statistically similar to those of other Savannah River catostomids.



Robust Redhorse scales. *UGA-Georgia Coop and T. Grabowski Photos*



TECHNICAL WORKING GROUP REPORTS

Yadkin-Pee Dee Technical Work Group Activities – Ryan Heise

Future plans for this group include tracking radio-tagged fish and continuation of electrofishing surveys. The TWG has asked the Committee members for direction of TWG efforts in this system and other ideas:

- Tracking fish after Blewett Falls dam changes flow regimes to see if it changes movement patterns or behavior of fish in the system,
- Population estimate before dam changes flow regimes,
- Exposure and possible mortality rates of eggs to dry conditions,
- Tag several more fish to track movement patterns before/after dam changes the flows,
- and determine the impact of non-native species.

Information Technology Technical Working Group – Jaci Zelko

The website has not been updated since the last meeting but will be changed to include several new reports including the 2003 Annual Meeting Summary and the Habitat Management Plan. Any additional reports or photos are appreciated and can be directly forwarded to Cecil Jennings for uploading to the website.

A draft version of the database was shown to the members. Several people offered their help in the design or inputting of data (Carrie Straight, Tim, Scott). The database should be completed by next year. Housing of the database was discussed and one possible location could be UGA. Data managers for each river system would be designated and they would be responsible for adding all new data into the database.

Habitat Technical Working Group – Alice Lawrence

The Management Plan has been updated and a pdf version will be uploaded to the website.

Habitat restoration of two private landowners' banks is underway. They are trying to prevent cattle access near gravel areas in the river. Also, Soil & Conservation will work with the landowners to fence the cattle out, but it would take a lot of money to fix the entire buffer zone.

\$85,000 has been provided to Georgia DNR from SARP for 3 restoration projects. The gravel is available from the mine, and they will provide it for no cost. The hauling distance is only about ½ mile and will use existent contractors from the mine. For this project, the gravel will be deposited where the fish are spawning.



The habitat is deteriorating at the Avant gravel bar. A total of 4 potential sites have been identified by a hydrologist with road access. It was determined the bend immediately above the existing bar is the best. A riffle construction of a mid-channel bar would cost \$40,000 but GADNR only has \$15,000 for this project. That amount will cover the costs of equipment and labor of depositing the gravel near the channel making a 50-75 yard 1' deep and 8-10' wide deposit. Hopefully this will allow the natural process to redistribute the gravel and will come to rest on the kaolin in front of the existing gravel bar.

Oconee River Technical Working Group – Alice Lawrence

The Management Plan First Draft has been completed and comments from TWG members is being reviewed and added. The plan should be finished by next year but several issues of fundamental core ideas of population estimates and the non-publication of vital information is holding up the process. Georgia Power Company feels that they are funding research that isn't included in the plan or isn't being reported. The Excom was charged with assisting the TWG to help get a final version of the Plan completed.



B U S I N E S S

Research Topics and Resource Needs

1. Re-assessment of population models and estimates for Oconee River.
2. Impact of egg survival in redds during dry events.
3. Implementation of telemetry work on the Oconee River.
4. Ethanol preserved fish age swim-up to 3 months for Tim/Rebecca.
5. Micro-satellite marker development to help document re-introductions and evaluate genetic diversity of hatchery raised fish proposed by Joe Nairn.
6. Population monitoring of stable self-sustaining spawning populations in the Broad and Ogeechee Rivers by GADNR.
7. MOU development for ownership and housing of robust germplasm for all 3 river systems between the states and the FWS.
8. Electrofishing lethal effects study needs field observations.

Outreach/Education Opportunities

1. Bass Pro Shop is opening in Macon, a poster of robust efforts will be on display.
2. NC State Fair highlighted aquatic species this year and included robust.
3. Jaci and Alice attended a Water Festival in Athens for 4th graders.
4. Georgia Aquarium seemed interested in joining the Committee but additional meetings will be required.
5. Fact sheet has been updated.

Installation of New RRCC Chair

Dave Coughlan, Duke Energy was installed as the new chair. Out-going chair, Ross Self, was commended for his dedication and time spent in preparing the annual meetings.

Executive Committee Action Items

1. Follow-up on missing signature pages for MOU renewal.
2. Find volunteers to help finish the 02, 04, 05, 06 Annual Meeting reports and get pertinent information to those who are currently working on several of the reports.
3. Excom has been charged at looking at QA/QC of population modeling for Oconee River. Cecil will look at the actual model specifications and data consistency.
4. Excom was charged with assisting the Oconee TWG to help get a final version of the Oconee River Management Plan completed.
5. Assisting partners with implementation of telemetry work for Oconee River.
6. MOU development for ownership and housing of robust germplasm for all 3 river systems between the states and the FWS. Examples of a standard MOU will be provided to the Excom by WSFTC.
7. Request the possible services of the new Geneticist at Warm Springs Fish Technology Center.