

**Meeting Summary**  
**Robust Redhorse Conservation Committee**  
**Georgia Wildlife Resources Division**  
**Social Circle, Georgia**  
**October 4-5, 1995**

**October 4, 1995**  
**(Presentation Session)**

The meeting began at approximately 1:00 pm. Jimmy Evans made a few introductory comments and introduced Michelle Katz, the meeting facilitator. Michelle introduced the speakers and presentations were made as follows.

**A. Review of species status: Abundance, distribution, systematics, natural history. Bud Freeman.**

- Identified historic range of species (Georgia, S. Carolina, and N. Carolina), rivers where records exist (PeeDee, Yadkin, Savannah, and Oconee).
- Reviewed meristic characteristics, compared with river redhorse, Moxostoma carinatum.
- Reviewed known habitat requirements, population structure, age and growth characteristics, food habits.
- Outlined past and present efforts to document occurrence in other river systems.
- Identified potential causes for historic decline, threats to Oconee River population.

**B. Review of recovery effort to date. Jimmy Evans**

A time line was presented showing major events since discovery of species in August 1991.

- **August 1991** - Unknown species first collected from Oconee River below Sinclair Dam.
- **September 1991** - Start of 1st stage consultation for FERC relicensing of Sinclair Dam.
- **February 1992** - Bob Jenkins, Bud Freeman begin biological assessment, manuscript for publication of species description.
- **April 1992** - 1st attempt to spawn robust redhorse by transporting broodfish to Warm Springs Regional Fisheries Center - effort was unsuccessful.
- **September 1992** - Species identified. It was discovered that species was described by naturalist Edward Cope from Yadkin R., NC in 1869. Copes's scientific name was transferred; has been known as robust redhorse, Moxostoma robustum since September 1992. Other than Oconee R. population, species represented by two other complete specimens (from Savannah and PeeDee R.), collected in 1980's.
- **January - September 1993** - Habitat availability for adult spawning and non-spawning life stages in Oconee R. evaluated in instream flow study, a requirement of the FERC

relicensing process.

- **May 1993** - 2nd effort to spawn fish at Warm Springs results in production of 7,631 fry.
- **September 1993** - 1st interagency meeting to discuss recovery through listing under the Federal Endangered Species Act. Prepared status summary (senescent population, no recruitment, limited geographical distribution, no immigration, predation threats, possible environmental threats).
- **December 1993** - 2nd interagency meeting to continue recovery process under a federal listing approach.
- **May 1994** - 3rd effort to spawn fish. Broodfish held in tanks on river, eggs fertilized and transported to Warm Springs Hatchery. High mortality in hatchery and rearing ponds resulted in very low production for the year.
- **June 1994** - Georgia DNR begins prelisting recovery process under an MOU between agencies, power companies, and conservation groups in Georgia, S. Carolina, and N. Carolina.
- **August 1994** - 3rd interagency meeting; discussed and outlined recovery process under an MOU.
- **September 1994** - 4th interagency meeting; produced first draft of MOU to establish the Robust Redhorse Conservation Committee (RRCC).
- **March 1995** - MOU sent out for signatures.
- **March 1995** - Upper Broad R. stocked with 445 - 8-9" fingerlings from the 1993 year class (an additional 102 fingerlings from 1993 year class stocked in same area in August 1995).
- **April - May 1995** - 4th effort to spawn fish. Hormones used; fish held in tanks and fertilized eggs transported to three hatcheries. 72,000 fry produced from 814,000 fertilized eggs; fry stocked into 8 ponds at 2 state and 2 federal hatcheries.
- **May 1995** - Field studies funded by Georgia Power Company begin on Oconee River; designed to document spawning/recruitment success and describe spawning behavior.
- **May 1995** - All signatures obtained for MOU (currently - Ga. DNR, S. C. DNR, N. C. Wildl. Res. Comm., USFWS, NBS, Ga. Wildl. Fed., Ga. Power Co., Duke Power, Carolina Power and Light).
- **July 1995** - Agreement drafted by GPC to establish the Robust Redhorse Flow Advisory Team for the Oconee River; this is the first working group under the umbrella of the RRCC; agreement addresses requirements of the FERC relicensing process.
- **August 1995** - Final FERC negotiations between GPC and agencies on future flow regime below Sinclair Dam. Satisfactory agreement is reached.
- **October 1995** - 1st meeting of signatories to the MOU creating the Robust Redhorse Conservation Committee (present meeting).

**C. Primary role and major responsibilities of the Robust Redhorse Conservation Committee - Chuck Coomer.** Reiterated that the Committee's primary role was to implement recovery plans for the species under a Memorandum of Understanding (MOU). He also emphasized that the U. S. Fish and Wildlife Service supports the process of recovery under the

MOU and is a signatory to the Agreement. The MOU is being used as a recovery vehicle to prevent, if possible, the need for federal listing and to reduce excessive administrative delays, thereby speeding the process of recovery.

**D. FERC relicensing of Sinclair Dam, Role of new working group - "Robust Redhorse Flow Advisory Team for the Oconee River". Mike Wilder, Scott Hendricks.**

Mike Wilder presented a summary of the FERC relicensing of Sinclair Dam.

- First stage consultation October 1991
- Oconee River and Lake Sinclair studies Early 1992
  - Water quality
  - Reservoir fisheries
  - Oconee River fisheries
  - Wetlands
  - Geomorphology
  - IFIM
  - Robust redhorse spawning locations
  - Boat passage
  - Cultural resources
  - Land management and aesthetics
- The Energy Policy Act of 1992 allowed an applicant for a FERC license to prepare a draft EA (DEA). Important steps in the preparation of the Sinclair DEA were as follows.
  - Scoping meeting December, 1993
  - Preliminary DEA March 8, 1993
  - DEA and license application August 30, 1995
  - FERC issued for comment September 19, 1995
  - Comments due November 19, 1995
- DEA Preferred Alternative
  - March - April 1500 cfs minimum flow, modified peaking
  - May Run-of-river (ROR), or robust redhorse broodfish collection
  - June - November 700 cfs minimum flow, normal peaking
  - June 1 - 10 ROR, or if required by electric system demands, 700 cfs minimum flow, normal peaking
  - December - February 500 cfs minimum flow, normal peaking
  - Year round 7 day operation
- Other issues
  - Anadromous species
  - Fluctuating flows
  - Oxbow connections
  - River mussels

- Water supply
- Downstream flooding
- Lake levels
  - Recreation
  - Wallace Dam pump back

Scott Hendricks pointed out that the Flow Advisory Team for the Oconee River (Advisory Team) is under the overall umbrella of the Robust Redhorse Conservation Committee, and that other working groups will probably be formed under the RRCC in the future. Current signatories to the Agreement establishing the Advisory Team are: Georgia Power Company, U.S. Fish and Wildlife Service, Georgia DNR, National Biological Service, and the Georgia Wildlife Federation.

**Flow Advisory Team Actions**, as stipulated in the Advisory Team Agreement are:

- Review flow release data from Sinclair Dam annually.
- Review studies and data on the robust redhorse developed by the RRCC.
- May petition FERC for changes to flow releases from Sinclair Dam to improve habitat for the robust redhorse. Flow requirements for other species, especially anadromous species, will be considered when requesting any flow changes.

As stipulated in the Agreement, **Advisory Team communication with FERC** is governed by the following rules:

- Only motions passed with no dissenting votes may be communicated to FERC.
- There are no limitations on the rights of individual Advisory Team members to communicate with FERC on their own or their agency/company's behalf.
- Any Advisory Team member communicating with FERC on his or her agency/company's behalf agrees to provide this correspondence to other Team members.

**Advisory Team administration and duration** is as follows:

- A chairman will be elected by Team members for a term of three years.
- Under the Advisory Team Agreement, membership is limited to six agencies/companies/conservation groups. Changes in team membership may be approved by the Team and any member is free to withdraw from this agreement by providing other Team members with a 30-day written notice.
- Meetings of the Team are coordinated through the chairman of the RRCC, and may be held when requested by individual Team members. At least one meeting will be held annually.
- The Agreement will remain in effect for the duration of the license for Sinclair Dam. It will be terminated if the species is declared either extinct or recovered.

**E. Experiments on the use of hormones to induce ovulation in broodfish. Jay Shelton.**

Jay presented the following outline of the hormone experiments.

- Hormone Treatment Regimes

Hormones	Treatment Regimes
Ovaprim	1 dose of 20 ug/kg
Carp Pituitary Extract (CPE)	3 doses of 15 mg/kg (12 hr intervals)
Human Chorionic Gonadotropin (HCG)	1000 IU/kg daily for 4 days
CPE + HCG	15 mg/kg CPE+1000 IU/kg HCG 24 hrs later
Luteinizing- Releasing Hormone (LH-RHa)	20 ug/kg
Control (saline solution)	placebo

- Hormone Induced Matings
  - Total of 24 matings
  - 17 females were mated with 17 males
  - 5 males were used more than once
- Egg/fry production
  - Total eggs produced = 813,821
  - Fry hatched = 71,769

**F. Assessment of reproductive and recruitment success in the Oconee River, Ga. Cecil Jennings.** Cecil outlined rationale, design, and preliminary results of the study as follows:

**Rationale:**

- Sole surviving population found in Oconee River.
- Age structure highly skewed towards older individuals.
- Available evidence suggests negligible recruitment over the past 10 years.

**Possible causes for apparent recruitment failure:**

- Biological bottleneck (senescent population)
- Environmental bottleneck (limited spawning and rearing habitat).

**Goal:** Evaluate the reproductive and recruitment success of robust redhorse in the Oconee River.

**Specific objectives:**

- Determine if robust redhorse still produce viable eggs and are still spawning.
- Determine the distribution and abundance of larval robust redhorse in the Oconee River.

### Methods:

- Larval fish were sampled with four different gears.
- Environmental conditions (dissolved oxygen, water temperature, water depth, current velocity, and turbidity) were measured at each sampling station.
- Drift and trap samples were taken back to the laboratory and processed.

### Results:

- A total of 597 samples had been taken as of October 4, 1995, with 222 (38%) of these samples processed.
- The 22 samples processed contained 5,142 larval and juvenile fishes. Most were caught with light traps.
- A total of 77 suckers have been identified among the 5,142 fish sampled. Most of the suckers were caught with light traps.
- A total of five of the 77 suckers may be robust redhorse. A taxonomic description of larval robust redhorse will probably be required before these fish can be identified conclusively.

### G. Description of spawning behavior. Bud Freeman.

Bud prepared a 6-minute video documenting behavior of a spawning aggregation located approximately 25 RM below Sinclair Dam. Major conclusions are as follows:

- Spawning behavior is similar to that observed in several other catostomid species, particularly the river redhorse (*M. carinatum*).
- Spawning occurred over a shallow gravel bar (1-2 feet deep) immediately below a pool which served as a staging area. Spawning was in triads, with 2 males pressing eggs from female while fertilization occurred.
- These observations and discussions with local fishermen seemed to indicate that fish were actively spawning over the gravel bar from about mid-May through the first week in June.
- Fertilized eggs were collected with a plankton net immediately below the spawning aggregation and a high percentage hatched successfully in the lab. This provides clear evidence that some suitable spawning habitat is available and that successful fertilization is occurring.

### H. Physiological tolerances of juvenile robust redhorse. Steve Walsh.

Steve presented the following results from studies conducted on juvenile robust redhorse from the 1993 year class. Studies were conducted at the NBS lab at Gainesville, FL.

- Temperature tolerance
  - Lower 5° - 14°C(15°, 30° acclimation)
  - Upper 35° - 37°C(20°, 30° acclimation)
- Salinity tolerance

- Acute <50% mortality at 0 - 9 ppt
- Chronic <50% mortality at 12 - 15 ppt
- Oxygen tolerance <0.6 mg O<sub>2</sub>L<sup>-1</sup> at 20° - 30° C
- pH tolerance 4.3 - 9.5

These results are within ranges typically observed with other catostomid species.

**I. Function of state and federal hatcheries in the recovery effort. Greg Looney.**

Greg presented recent information which indicates a possible closure date of October 1, 1996 for the federal fish hatcheries at Bo Ginn, Georgia and McKinney Lake, North Carolina. This leaves only the federal hatchery at Orangeburg, South Carolina as a possible participant in the robust redhorse recovery effort. The Orangeburg hatchery has made a commitment to provide 2.5 acres of pond space to rear fry from the 1996 year class. This seems to indicate a greater role for Georgia's state hatchery system in the recovery effort.

The following table provides a summary of 1995 robust redhorse fry production and distribution. Numbers indicate totals of all fry shipped to each facility. The source of fry is indicated as either the Warm Springs Regional Fisheries Center or the University of Georgia (UGA)

	Warm Springs	UGA	Total
Bo Ginn (Fed.)	15,281	1,712	16,993
McKinney (Fed.)	10,198	1,431	11,629
McDuffie (State)	20,900	3,060	23,960
Walton (State)	14,523	2,361	16,884
Univ. Of Georgia	1,206	-	1,206
Warm Springs (Fed.)	1,097	-	1,097
<b>Total</b>	<b>63,205</b>	<b>8,564</b>	<b>71,769</b>

### Stocking Densities

#### Low Density Ponds

#### High Density Ponds

Bo Ginn	4,811/ac	45,416/ac
McKinney Lake	4,903/ac	9,632/ac
McDuffie	22,374/ac	26,888/ac
Walton	16,217/ac	21,302/ac

The meeting was adjourned at approximately 5:00 pm following a short wrap-up by Jimmy Evans. A proposal to conduct a genetics study of the Oconee River robust redhorse population was distributed and meeting participants were asked to read the proposal, as well as several other handouts, before the next days meeting. The proposal (Stock Structure and Genetic Diversity in the Robust Redhorse from the Oconee River Based on Analyses of mitochondrial and Nuclear DNA) was prepared by Dr. Isaac Wirgin of the Institute of Environmental Medicine, New York University Medical Center, Tuxedo, New York. One goal of the following days meeting was to determine if there was group consensus on the need for a genetics study, and specifically to discuss the objectives and cost estimates contained in Mr. Wirgin's proposal.

### October 5, 1995 (Presentation Session)

Michelle Katz reviewed the agenda and summarized meeting goals for the day.

- Clarify roles and level of commitment to the recovery effort by individual agencies/companies.
- Review and reach consensus on prioritized list of research needs for the next five years.
- Identify funding sources for research.
- Accept motions for committee discussion and consideration.
- Identify and discuss specific work items to complete before the next meeting and establish a date for the next meeting.
- Discussion of unfinished business.

A discussion of the agenda items began.



#### **A. Roles, Commitment of Agencies and Power Companies.**

Each agency and power company present was asked to provide appropriate areas and levels of commitment to the recovery effort.

##### **Georgia DNR (Fisheries Section) - Jimmy Evans**

- Collect broodfish annually for as long as needed.
- Assist with transportation of fertilized eggs, fry and fingerlings.
- Conduct surveys of Oconee River as needed to assess population status.
- Conduct surveys to assess status of stocked populations.
- Provide administrative services.
- Assist with public relations.
- Provide pond space on state hatcheries to rear fry, fingerlings, and adults.
- Assist Broad River Watershed Association with educational outreach program.

##### **Georgia Non-Game Program - Jim Ozier**

- Some funding
- Assist in production of video for use in public relations programs.

Suggestions were made regarding other things Georgia DNR (Fisheries and Non-game) should do:

- Need a public relations package put together for team members to use. This should include a statement of the need and purpose for conservation of the species. Need press releases, slides of fish, etc.
- Emphasize increased enforcement on the Oconee River to discourage taking of fish near known spawning aggregations.

##### **Carolina Power and Light - John Crutchfield**

- Will assist with river surveys in spring of 1996 (Yadkin, PeeDee, and Little rivers).
- Research funding (especially graduate student research). Would possibly consider funding specific proposals by June 1996; no funds available in FY 1996. Proposals should address very specific, high priority research needs.
- May provide flow releases for sampling.
- Company communications department can assist with public relations.

##### **National Biological Service - Steve Walsh**

- Can provide graduate student involvement in research.
- Conduct research - physiological, behavioral, and ecological.
- Provide technical expertise in other areas (i.e., sort samples, assist with ID's).
- Assist in river surveys (provide personnel).
- Assist with public relations; editorial and scientific assistance.
- Pond space may be available for stocking fry or fingerlings at Gainesville, FL., but further investigation required before final commitment can be made.

**U. S. Fish and Wildlife Service (Fisheries) - Greg Looney, Rick Nehrling**

- Provide assistance with hormone studies.
- Provide personnel and equipment to assist with annual production of fry.
- Can help transport eggs, fry, and fingerlings.
- Some pond space available to rear fry and fingerlings at hatchery in Orangeburg, SC. Ponds could become available in the future at Warm Springs, if they can be adequately quarantined.
- Emphasized that 3 coldwater and 4 warmwater hatcheries are scheduled to close in the southeast. Further closures in the future may eliminate federal hatchery services in the southeast. FWS will provide as much assistance to the recovery effort as possible, but pond space will be at a premium in the future. The robust redhorse is competing for pond space with striped bass, sturgeon, and paddlefish. It was emphasized that the FWS will provide funds to assist in the transfer of federal hatcheries to the states.
- Can provide personnel, equipment, expertise to assist with studies relating to robust redhorse propagation (i.e., optimal temperature and flow requirements for egg incubation, cryopreservation techniques).

**U. S. Fish and Wildlife Service (Ecological Services) - John Fridell**

- Provide administrative services in regulatory area.
- Use data to make biological recommendations to agencies, FERC, private sector, etc.
- Compile and disseminate data.
- Emphasize watershed protection in licenses, permits, etc.
- Educate upper management within FWS on approach and progress of recovery effort.
- Educational outreach to public.
- Assist with field work in the spring on Oconee River.

**Georgia Power Company - Mike Wilder, Scott Hendricks**

- Provide flow data on Oconee River to correlate with ongoing studies, evaluate effectiveness of new flow regime.
- Provide flows needed for larval fish studies and broodfish collection.
- Has made prior commitment to fund studies in 1996 and 1997 (i.e., hormone trials, larval fish studies, spawning behavior, river surveys). Will consider funding other studies to address high priority needs.
- Will provide electrical power to the spawning facility at Beaver Dam Wildlife Management Area.
- Assist with transporting fertilized eggs in the spring (will require 2 weeks notice).
- Can provide personnel to assist with other field work.
- Can assist with public relations; should be cooperative effort with other Committee members.

**Yadkin Incorporated\Alcoa (private utility) - Julia Larson**

- Would sign the MOU or participate as a cooperator.
- Would coordinate with CP&L to provide flows for sampling, studies, etc.

- Could provide boats and drivers.
- Could discuss with management the need to fund a survey on Yadkin River; survey would be tied to future FERC relicensing process.

#### **North Carolina Wildlife Resources Commission - John Alderman**

- Would like to become more educated on problems of recovery by participating in field work with Georgia DNR on the Oconee River and with hydropower interests in Yadkin/PeeDee system.
- Non-game biologist would consider conducting a survey of mussels in Oconee River; would also like to learn more about habitat preferences of robust redhorse.
- Non-game biologist would attend meetings, etc., then educate Commission on progress and problems of the recovery effort. There is a need for a marketing package to present to the Commission and interest groups.
- Can educate local governments (i.e., county commissions).
- Can assist with obtaining collectors permits for sampling in North Carolina.
- Will discuss the need for hatchery space with Division of Inland Fisheries.

#### **South Carolina Department of Natural Resources - Chris Sample**

- Will incorporate search for robust redhorse with normally scheduled fisheries surveys conducted on South Carolina rivers. May sample specific stream sections where there is higher probability that robust redhorse may exist.
- Will work with Bob Jenkins on the identification of catostomids collected during river/stream sampling.
- Will educate environmental groups and other state agencies on recovery plans when opportunities arise.
- Considers no further public relations work necessary unless species is discovered in South Carolina waters.
- There is no pond space available for rearing robust redhorse on state hatcheries.

#### **Duke Power - Larry Olmsted**

- Will survey the Yadkin R. with Bud Freeman and Bob Jenkins in October 1995.
- Will schedule training in redhorse taxonomy for company personnel responsible for fisheries work.
- Will work with S. C. DNR in assessing fish composition on Catawba River.
- Will incorporate redhorse issues into ecosystem management approach in Catawba River watershed.
- Funds may be available to fund studies relating to recovery effort. Need proposals with good, clearly defined objectives.
- May provide suitable flows for sampling river sections downstream of Duke Power projects.
- Will provide assistance with public relations.



These research needs were discussed and added where appropriate. The list was then re-prioritized through group discussion and consensus building. The Committee's final prioritized list of research needs is given below. It should be emphasized that only the major research headings, listed in bold below, were discussed and prioritized at the present meeting. Subheadings were derived from a more detailed discussion of research needs conducted at the August 5, 1994 meeting. Many of these subheadings have since evolved through informal discussions between Georgia Power Company and researchers conducting studies on the Oconee River.

- 1. Culture techniques. (GPC, WRD, FWS)**
  - a. Use of hormones to induce ovulation in broodfish.(GPC)
  - b. Flow, temperature, water quality requirements for egg incubation.(GPC)
  - c. Evaluations of fry and fingerling diets.(GPC, WRD, FWS)
  - d. Growth and survival at various stocking rates in ponds.(WRD, FWS)
- 2. Early life history habitat requirements. (GPC)**
  - a. Conduct lab and field studies to determine habitat suitability criteria for depth, velocity, substrate, and cover variables (larvae, yoy, and smaller juveniles).
  - b. Determine temperature requirements as well as upper and lower temperature tolerance limits.
- 3. Monitor the Oconee River population. (GPC, WRD, Jenkins and Freeman).**
  - a. Larval fish studies to determine reproductive success, larval and yoy distribution. (GPC)
  - b. Catch rate comparisons, population estimation, age and growth studies, predation threats.(WRD, Jenkins and Freeman)
  - c. Behavioral studies (spawning, daily and seasonal movement patterns). (GPC)
  - d. Adult spawning and non-spawning habitat requirements.(GPC)
- 4. Basin-wide assessment and characterization of Oconee River drainage (GPC) as well as other drainage basins possessing potential stocking sites. (Duke, CP&L)**
  - a. GIS-based mapping of land use patterns, water quality and flow disturbances, sources of sedimentation, etc.
  - b. Conduct mussel surveys, continued monitoring of mussel populations.
- 5. Monitoring of stocked populations (WRD, Duke, CP&L)**
  - a. Telemetry studies of movement patterns.
  - b. Sampling to determine abundance, distribution, reproductive success.
  - c. Evaluation of sampling methods.
  - d. Evaluation of tagging methods.
  - e. Evaluation of predation threats.
- 6. Predator control (GPC, Duke, CP&L)**
- 7. Population genetics (Duke, CP&L)**
- 8. Distributional history (GPC, Duke, CP&L, Jenkins and Freeman)**
  - a. Additional surveys to determine if other populations or isolated individuals exist in Georgia, South Carolina, or North Carolina (GPC, Duke, CP&L).
  - b. Investigations into historical occurrence and distribution (Jenkins and Freeman).

9. Physiology (Duke, CP&L)

10. Evolutionary biology (Duke, CP&L)

### C. Identify Funding Sources

Following the discussion of research needs, current as well as potential signatories to the MOU were asked to identify specific research categories considered appropriate for funding or other support. The results of this discussion are indicated in the above outline (Items 1-10), with the funding or support source indicated in parenthesis beside individual categories. GPC = Georgia Power Company; CP&L = Carolina Power and Light; Duke = Duke Power Company; WRD = Wildlife Resources Division; FWS = U. S. Fish and Wildlife Service; Bob Jenkins (Professor of Biology, Roanoke College, Salem, VA); Bud Freeman (Ichthyologist, Institute of Ecology, Univ. Of Georgia).

Other possible funding and support sources were identified as follows:

- **Alcoa Foundation** - Funds provided for educational programs.
- **Yadkin - PeeDee Lakes Project** (Non-Profit Organization) - Not a funding source, but provides assistance in locating sources of funding.
- **South Carolina Electric and Gas** - Has hydropower projects within the historical range of the species.
- **Santee Cooper Power Co.** - Has hydropower projects within the historical range of the species.
- **Soil Conservation Service.**
- **Southern Rivers Council** - Provides funding for basin-wide pollution and sedimentation control projects.
- **U. S. Forest Service**
- **Turner Foundation**

### D. Issues list.

During the course of the meeting, unresolved issues were placed on an issues list. At this point in the meeting all participants were asked if they would like to add any additional issues to the list. The final issues list consisted of pond space concerns, stocking strategies, and the need for a genetics study of the Oconee River robust redhorse population. Each issue was allowed a brief discussion.

### Pond Space

- Chris Sample indicated that no pond space was available on state hatcheries operated by the South Carolina DNR.
- Pond space is available at the Bo Ginn federal hatchery in Georgia through September 1996.

- A limited amount of pond space will be available at the Orangeburg federal hatchery in South Carolina. There will be competing demands at this hatchery from other species, especially after the closures at Bo Ginn and McKinney Lake.
- John Alderman indicated that he would determine if pond space is available through the Division of Inland Fisheries in North Carolina.
- The state of Georgia can provide a minimum of 2 acres of rearing pond space on state hatcheries.
- The suggestion was made that Santee Cooper Power Co. may have some ponds which could be contributed to the recovery effort.

### **Stocking Strategies**

- Group consensus was that it is advisable at present to stock reduced numbers of larger fish (8-10 inches) rather than larger numbers of smaller fish (fry or larger yoy).
- The group addressed the question of whether it is advisable to stock only the Broad River in Georgia. It was suggested that a more thorough evaluation of stocking sites in Georgia is needed, with the goal of locating at least one or two other sites. It is apparent, however, that the Broad River is the most desirable site and that few stocking sites exist in Georgia with the requisite characteristics (large river, suitable habitat, limited development, no hydropower operations, absence of flathead catfish). Given this scenario it is preferable at present to concentrate stockings in the Broad River. Eventually, however, other sites in Georgia should be stocked as well.
- It was suggested that there is a need to prioritize stocking sites in North and South Carolina as well as in Georgia.
- Larry Olmstead indicated that Duke Power Company would consider a survey of potential stocking sites in their service area. He also expressed a concern about future liabilities if a population becomes established at one of these sites, especially as it relates to the FERC relicensing process.

### **Genetics Study of the Oconee River Population.**

A short discussion was held regarding the need for a genetics study of the Oconee River robust redhorse population. A proposal to conduct this genetics study, prepared by Isaac Wirgin of the New York University Medical Center, had been distributed at the end of the previous days session. Many of the meeting participants indicated they had reviewed the proposal prior to the meeting and the discussion centered on the justification for a genetics study. The following points were made at various points throughout the meeting as possible justifications.

- A genetics study would result in the development of a rapid PCR based approach for the positive identification of early life stages of robust redhorse. These early life stages cannot presently be identified with certainty and reliable identification is necessary in order to meet the objectives of the ongoing larval fish study.

- A genetics study would determine if the Oconee River supports a single genetically homogeneous stock, or multiple stocks separated primarily by fidelity to specific spawning locations. This information would be used to determine if broodfish used in hatchery propagation can be collected from a single spawning aggregation, or if there is a need to collect them from multiple locations. To minimize disturbance during the spawning period, broodfish should be collected from several aggregations only if a genetics study demonstrates the existence of significant genetic divergence between them.
- Hatchery matings for establishing refugial populations in other rivers can be planned to maximize genetic diversity in resulting progeny. This would enable planners to more accurately estimate both the number of hatchery crossings per year and the number of years required to capture the genetic diversity present in the parental population. These factors, in turn, are primary determinants of the length and scope of the recovery effort.
- A record of the genetic characteristics of the species would be preserved in the event that all wild populations are eventually extirpated.
- Recovery efforts for other species have been criticized for initiating extensive stocking programs without sufficient knowledge of the genetic characteristics of the species involved. A genetics study of the robust redhorse conducted at this point would help blunt future criticism that reintroductions were initiated without full knowledge of possible implications.
- If specimens are eventually collected from other rivers, information would be available to allow a genetic comparison of the two populations. This would in turn determine if the two populations should be managed separately or as a single homogeneous species.
- Techniques have recently been developed to allow tissue samples for genetics studies to be collected from fin-clips. A statistically valid sample size can therefore be obtained without sacrificing valuable fish.

**E. Identify and discuss specific work items to be completed before the next meeting; establish date for next meeting.**

Section A above (roles, etc.) formed the basis for identifying specific work items to be completed before the next meeting. Rather than discuss specific work agendas at the present meeting, participants listed under A above were given Gantt Charts (see enclosed example) and were asked to incorporate general commitments made under section A into a work schedule. The Gantt Charts were to be completed in consultation with key personnel within the individual organizations and returned to Jimmy Evans prior to November 6.



The next meeting of the Robust Redhorse Conservation Committee was tentatively scheduled for October 9 and 10, 1996.

#### **F. Unfinished business**

There was a short discussion on the need to publicize the recovery effort and provide "marketing" materials to members of the Committee. It was agreed that the Georgia DNR should take the lead role in developing these materials, including the production of a film to document various aspects of the recovery effort. It was suggested that the Georgia Wildlife Federation could take a significant role in the publicity effort through their publication and would be the appropriate organization for making contacts with other conservation groups.

#### **G. Adjourn**

The meeting was adjourned at approximately 4:00 pm.