# Summary of fisheries assistance project on the Ouachita National Forest, Arkansas, June 2004


**U. S. Forest Service**
**Southern Research Station**
**Center for Aquatic Technology Transfer**
**1650 Ramble Rd.**
**Blacksburg, VA 24060**

**C. Andrew Dolloff, Project Leader**

**Prepared by:**
**Daniel R. Nuckols and Craig N. Roghair**

**September 2004**

## Background

In 2004, resource managers from the Ouachita National Forest contacted the U.S. Forest Service, Southern Research Station, Center for Aquatic Technology Transfer (CATT) to request assistance with the conduct of annual stream monitoring surveys. The CATT provided a three-person crew to assist with surveys on long-term monitoring sites on the Mena, Oden, Fourche, Poteau, Caddo, and Womble Districts. Data from annual inventorying is used to determine the influence of management activities on stream quality.

## Methods

The surveys were performed from June 1-10, 2004 using methods previously established by the Ouachita National Forest (Hlass 1999). We sampled a total of 24 sites in 20 streams on the six Districts.

### Site descriptions

All sites contained at least two pool and two riffle units while reach length varied depending on width of stream. At each site we recorded a description of the starting and ending points and painted a light blue ring around trees at the upstream and downstream end of reaches that were established as long term monitoring (LTM) sites. All four sites on the Caddo District were not painted due to high public use, but beginning and ending locations were later established by Dan Miller using a global positioning system. Sites on private land were not painted (Table 1). We revisited some of the same sites that had been sampled the previous year, repainting trees when necessary. Locations on the Oden, Mena, Fourche and Poteau districts were recorded using GPS and noted on data sheets. GPS equipment was not provided on the Womble District and points were not taken.

### Macroinvertebrates

We sampled macroinvertebrates using a rectangular frame kicknet at a total of 14 sites. At each site we collected three combined kick samples in riffle areas within the long term monitoring sites for a total of five minutes. We field-picked and sorted the samples and recorded organisms to Order using a Issac Walton League Save our Streams (SOS) datasheet (Firehock 1994). The samples were not preserved.

### Physical habitat

Physical habitat was inventoried using modified methods of the Basin Area Stream Survey (BASS) at 14 sites (Clingenpeel 1992). Each monitoring reach was divided into habitat unit types with measurements of channel length, width, depth, substrate composition, bank angle, bank stability, and instream and riparian cover characteristics recorded for each habitat unit.

**Water chemistry**

We collected water for chemical analysis at 14 sites. Water temperature, conductivity, alkalinity and pH were measured and recorded. Some or all of these variables were collected with a Hach kit or an electronic measuring device depending on District and availability of equipment. Some Districts did not have equipment needed to take all measurements.

**Fish**

We collected fish at each site by making a single pass through each monitoring reach with a Smith Root battery powered DC backpack electrofishing unit. On the Mena, Oden, Fourche and Poteau Districts the unit was set to J9, and we used between 700-900V depending on fish response. The Womble and Caddo Districts provided older models and they were set to a frequency of 60Hz and set between 700-900V. All shockers had two circular probes, one which was outfitted with a net. The shocking crew on the Mena, Oden, Fourche and Poteau Districts consisted of one shocker, three netters, and one bucket person at all sites except the final two where we only had two netters. On the Caddo and Womble Districts we primarily had one shocker and two netters. We did not blocknet the upstream or downstream ends of the monitoring reaches. We identified fish to species and counted the total number of all fish before releasing them back into the monitoring reach. At several sites on the Mena and Oden Districts, fish were collected and preserved for later identification. Preserved specimens were given to Rhonda Huston for identification.

## Summary

We collected monitoring data at a total of 24 sites over ten days on six Ranger Districts on the Ouachita National Forest (Table 2). At sites where samples were previously collected, these data can be compared to past data to examine for changes in stream habitat, biota, or water chemistry over time. Data collected at new sites will serve as baseline for comparison with future inventories performed in a similar manner.

## Recommendations

1. The Save our Streams protocol used to collect and identify macroinvertebrates is a good first step in describing the macroinvertebrate community and may be useful in detecting major changes over time. However, the SOS approach used here has been shown to consistently overrate ecological condition (Engel 2000). Other approaches may be more sensitive and provide additional insights not apparent in the SOS analysis (Hiner 2002). Even if funds are not immediately available for more complete analysis, samples should be labeled and archived in a controlled environment. The samples are small and can easily be stored for long periods of time with minimal maintenance. Money may become available for additional analyses such as part of a larger research project, support for biological evaluations or environmental impact statement documents, etc.

2. In its original form the BASS habitat inventory was designed to provide estimates with a high degree of precision in entire small basins. The scaled-down version of BASS used here still provides precise estimates, but only over small areas. While this approach can provide good information for monitoring projects focused in small areas (e.g. culvert installation), for more general Forest-wide monitoring we recommend surveys performed at the original basin-wide scale.

3. Some Ranger Districts lacked GPS units and general equipment needed to perform basic chemical analysis of water samples, particularly alkalinity and conductivity. All Districts should have capability to collect such data, or should coordinate with other Districts or the Supervisors Office to share equipment.

4. We identified 33 species of fish (Table 3), the majority of which we rarely work with, during our time sampling. Some additions or omissions may be necessary after voucher specimens are positively identified. We feel it is absolutely essential that someone who can positively identify fish in the field be present to train crews in fish identification at the start of the surveys. We were able to identify the majority of fishes encountered; fishes that we failed to identify were preserved for later identification.

## Acknowledgements

We would like to thank the Ouachita National Forest for incorporating several remarks from our 2003 summary to improve the 2004 trip. The most notable improvement was increasing the length of stay from one to two weeks to make the most of the long trip. All accommodations were great, and everyone was easy to work with and helpful.

The Oden and Mena Districts provided housing, and field equipment as well as two very helpful field technicians (Rhonda Huston and Gina Perry) that had worked on previous stream surveys on those districts. The Caddo District provided all field equipment except devices used to measure conductivity and alkalinity, and Dan Miller was helpful in showing the CATT crew access points at all sites on the Caddo. Clay Vanhorn on the Womble District was very accommodating, allowing us to start a day ahead of schedule. Clay and Adam Strothers led us to the most difficult sites to locate, and Adam assisted at a site. The Womble District provided all field equipment needed.

Again, we would like to thank Rhonda Huston, Gina Perry, Dan Miller, Clay Vanhorn and Adam Strothers for all of their help. We would also like to thank Richard Standage and Shawn Cochran for all of their time spent organizing the project. Summer 2004 was another enjoyable experience and we look forward to returning at your request.

Table 1. Site locations and access points for streams sampled on Ouachita National Forest, Arkansas, summer 2004.

| District | Site | Date | Marked | Access |
|---|---|---|---|---|
| Fourche | Brush Creek | 6/1 | GPS | FS Rd. 739 |
| | Big Cove Creek | 6/1 | GPS, Paint | FS Rd. 739 |
| Mena/Oden | Bushy Creek | 6/2 | GPS | end of FS Rd. 7160 |
| | Little Brushy Creek | 6/2 | GPS | Co. Rd. 408 and FS Rd. 7130 |
| | Trib of Little Brushy Creek | 6/2 | GPS | Co. Rd. 402 just North of FS Rd. 176A |
| | Two-mile Creek | 6/3 | GPS, Paint | FS Rd. 173 and 176 above ford |
| | Rock Creek | 6/3 | GPS | ATV trail off of FS Rd. N79A |
| | Brushy Creek | 6/3 | GPS, Paint | end of FS Rd. 7162 |
| Poteau | Clear Fork | 6/4 | GPS, Paint | FS Rd. 29 North of Mena |
| | Mill Creek | 6/4 | GPS, Paint | FS Rd. 930 |
| | Irons Fork | 6/5 | GPS, Paint | FS Rd. 17 Northeast of Oden |
| | Rainy Creek | 6/5 | GPS, Paint | down small trail Northeast of bridge on Route 88 |
| Caddo | Long Creek upper | 6/6 | GPS | FS Rd. 512 |
| | Long Creek lower | 6/6 | GPS | FS Rd. 512 |
| | Braylock Creek upper | 6/7 | GPS | Athens Big Fork trailhead on FS Rd. 106 |
| | Braylock Creek lower | 6/7 | GPS | Winding Stairs trailhead on FS Rd. 106 |
| Womble | Big Hill Creek | 6/8 | Paint | at path extending across stream from FS Rd. W81 which branches off of FS Rd. 68 |
| | Owl Creek site 1 | 6/9 | Paint | at ford on Owl Creek Rd. Just West of Blakely Mtn. Dam on Ouachita River |
| | Owl Creek site 2 | 6/9 | None | upstream of culvert on Owl Creek Rd. refer to site maps (Vanhorn), on private land |
| | Trib of Bear Creek | 6/9 | None | directly across Co. Rd. 2460 from FS Rd. 98A (Bear Mtn.) |
| | Bear Creek | 6/9 | None | ford on Co. Rd. 2460 just downstream of Pete Hill's Auto Shop, private land |
| | Trib of Cearley Creek | 6/9 | None | at 1st bridge on Co. Rd. 227 just off of Co. Rd. 270, private land |
| | Fulton Branch | 6/10 | None | refer to site maps (Vanhorn) |
| | South Fork Ouachita River | 6/10 | None | Co. Rd. 22 |

Table 2. Description of data collected at each site, and number of fish species captured in streams sampled on Ouachita National Forest, Arkansas, 2004. 'X' represents data collected.

| | Methods | | | | |
|---|---|---|---|---|---|
| District/ Site | Fish | Habitat | Macroinvertebrates | Water chemistry | # of fish species |
| **Fourche** | | | | | |
| Brush Creek | X | | | | 9 |
| Big Cove Creek | X | X | X | X | 7 |
| **Mena and Oden** | | | | | |
| Brushy Creek | X | | | | 8 |
| Little Brushy Creek | X | | | | 7 |
| Trib of Little Brushy Creek | X | | | | 7 |
| Two Mile Creek | X | X | X | X | 6 |
| Rock Creek | X | | | | 6 |
| Brushy Creek | X | X | X | X | 12 |
| **Poteau** | | | | | |
| Clear Fork | X | X | X | X | 13 |
| Mill Creek | X | X | X | X | 14 |
| Irons Fork | X | X | X | X | 14 |
| Rainy Creek | X | X | X | X | 15 |
| **Caddo** | | | | | |
| Long Creek upper | X | X | X | X* | 10 |
| Long Creek lower | X | X | X | X* | 8 |
| Braylock Creek upper | X | X | X | X* | 11 |
| Braylock Creek lower | X | X | X | X* | 13 |
| **Womble** | | | | | |
| Big Hill Creek | X | X | X | X | 15 |
| Owl Creek Site 1 | X | X | X | X | 6 |
| Owl Creek Site 2 | X | | | | 6 |
| Trib of Bear Creek | X | | | | 5 |
| Bear Creek | X | | | | 15 |
| Trib of Cearley Creek | X | | | | 10 |
| Fulton Branch | X | X | X | X | 4 |
| South Fork Ouachita River | X | | | | 15 |

* alkalinity and conductivity not measured

Table 3. Fish identified from 24 sites in Ouachita National Forest, Arkansas, summer 2004.

| Common Name | *Species* |
|---|---|
| Bigeye shiner | *Notropis boops* |
| Blackspotted topminnow | *Fundulus olivaceus* |
| Bluegill | *Lepomis macrochirus* |
| Bluntnose minnow | *Pimephales notatus* |
| Brook silverside | *Labidesthes sicculus* |
| Central stoneroller | *Campostoma anomalum* |
| Chain pickerel | *Esox niger* |
| Creek chub | *Semotilus atromaculatus* |
| Creekchub sucker | *Erimyzon oblongus* |
| Freckled madtom | *Noturus nocturnus* |
| Golden redhorse | *Moxostoma erythrurum* |
| Grass pickerel | *Esox americanus* |
| Green sunfish | *Lepomis cyanellus* |
| Greenside darter | *Etheostoma blennioides* |
| Logperch | *Percina caprodes* |
| Longear sunfish | *Lepomis megalotis* |
| Northern hog sucker | *Hypentelium nigricans* |
| Northern studfish | *Fundulus catenatus* |
| Orangebelly darter | *Etheostoma radiosum* |
| Orangethroat darter | *Etheostoma spectabile* |
| Ouachita Mountain shiner* | *Notropis snelsoni* |
| Paleback darter | *Etheostoma pallididorsum* |
| Pirate perch | *Aphredoderus sayanus* |
| Redfin darter | *Etheostoma whipplei* |
| Redfin shiner | *Notropis umbratilis* |
| Redspot chub | *Nocomis asper* |
| Shadow bass | *Ambloplites ariommus* |
| Slender madtom | *Noturus exilis* |
| Smallmouth bass | *Micropterus dolomieui* |
| Spotted bass | *Micropterus punctulatus* |
| Striped shiner | *Notropis chrysocephalus* |
| Warmouth | *Lepomis gulosus* |
| Yellow bullhead | *Ictalurus natalis* |

*Identification not verified.

## Literature Cited

Clingenpeel, J.A. and B.G. Cochran. 1992. Using physical, chemical and biological indicators to assess water quality on the Ouachita National Forest utilizing basin area stream survey methods. Proceedings of the Arkansas Academy of Science 46: 33-35.

Engel, S.R. 2000. The effectiveness of using volunteers for biological monitoring of streams. Masters Thesis. Department of Entomology, Virginia Polytechnic and State University.

Firehock, K. 1994. Save our Streams volunteer trainer's handbook. Izaak Walton League, Save our Streams, Arlington, VA.

Hiner, Stephen W. 2002. Analyses of two aspects of study design for bioassessment with benthic macroinvertebrates: single versus multiple habitat sampling and taxonomic identification level. Masters Thesis. Department of Entomology, Virginia Polytechnic and State University.

Hlass, Lisa. 1999. Stream survey and monitoring report. Unpublished File Report. Mena/Oden District, AR. United States Forest Service.