

**MAPPING AND PRIORITIZING SEDIMENT SOURCES AND FISH PASSAGE
BARRIERS FROM UNPAVED ROADS FOR THE BENEFIT OF ARKANSAS
FATMUCKET AND 13 OTHER SPECIES OF GREATEST CONSERVATION NEED IN
THE SOUTH FORK OUACHITA RIVER WATERSHED**



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Project Summary:

The proposed project will assess the impacts of sedimentation from unpaved roads and stream crossings to streambed habitat for the endangered Arkansas fatmucket and 13 other Species of Greatest Conservation Need (SGCN) in the South Fork Ouachita River Watershed.

Total Project Cost: \$39,220

Total Amount Requested: \$25,091

Total Matching Funds: \$14,129

Need: Mussel communities in the South Fork Ouachita River Watershed are rapidly declining. Unpaved roads are a major contributor to sedimentation in the streambed. Identifying and prioritizing sediment sources were identified as a conservation priority in the Arkansas State Wildlife Action Plan as well as the 2016 State Wildlife Grants Request for Proposals. Completing this project will provide tangible data when prioritizing future unpaved road worksites in need of best management practices in the watershed.

The Arkansas fatmucket is endemic to the Ouachita Mountains Ecoregion of Arkansas. The known range of Arkansas fatmucket is restricted to the Ouachita River basin; two known locations are in the South Fork Ouachita River. Aside from the federally listed Arkansas fatmucket, the Upper Ouachita Headwaters contain 13 other SGCN (See Table 1).

Table 1: Species of Greatest Conservation Need for the Upper Ouachita Headwaters

Species of Greatest Conservation Need (SGCN) for the Upper Ouachita Headwaters		
	Scientific Name	Common Name
Fish	<i>Etheostoma pallidorsum</i>	paleback darter
	<i>Noropsis perpallidus</i>	peppered shiner
	<i>Noturus lachneri</i>	Ouachita madtom
	<i>Noturus taylori</i>	Caddo madtom
	<i>Percina sp nov</i>	Ouachita darter
	<i>Percina uranidea</i>	Stargazing darter
Insects	<i>Agapetus medicus</i>	Arkansas agapetus caddisfly
Mussels	<i>Alasmidonta marginata</i>	elktoe
	<i>Cyprogenia aberti</i>	western fanshell
	<i>Lampsilis powellii</i>	Arkansas fatmucket
	<i>Ptychobranhus occidentalis</i>	Ouachita kidneyshell
	<i>Ligumia recta</i>	Black sandshell
	<i>Pleurobema rubrum</i>	Pyramid pigtoe
	<i>Toxolasma lividus</i>	purple lilliput

Purpose and Objectives: Since 2004, TNC and partners have mapped and inventoried over 800 miles of unpaved roads in priority Ozark and Ouachita Watersheds of Arkansas using differential GPS. As a result of these assessments, TNC has implemented nine unpaved road improvement projects throughout these watersheds benefiting multiple species of concern as well as reducing maintenance costs for county road departments by providing long term sustainable solutions to problematic, high maintenance areas.

This project will provide a road inventory in the South Fork Ouachita River Watershed for the listed species, Arkansas fatmucket and 13 other SGCN. An unpaved road inventory and assessment will be completed with the following purpose: mapping the location and accessibility of roads; documenting the sediment-runoff characteristics and drainage conditions of the roads and their ditches; and documenting road features of concern such as stream crossings and barriers to aquatic passage. The inventory will occur on approximately 232 miles of public accessible unpaved roads within the South Fork Ouachita River watershed (see Figure 1).

The proposed project objectives will be:

1. Analyze approximately 232 miles of public accessible unpaved roads and develop a roads inventory of road segments with high rates of sedimentation within the South Fork Ouachita River watershed.
2. A road maintenance prioritization GIS model will be developed to identify the road segments and features that have the greatest impacts to species habitat.
3. Determine erosion rates within high priority road segments for various types of high priority road templates/soil types/slope gradients using WEPP (Water Erosion Prediction Project).
4. Inventory fish passage characteristics and develop GIS analysis of fish passage barriers for all stream crossings.

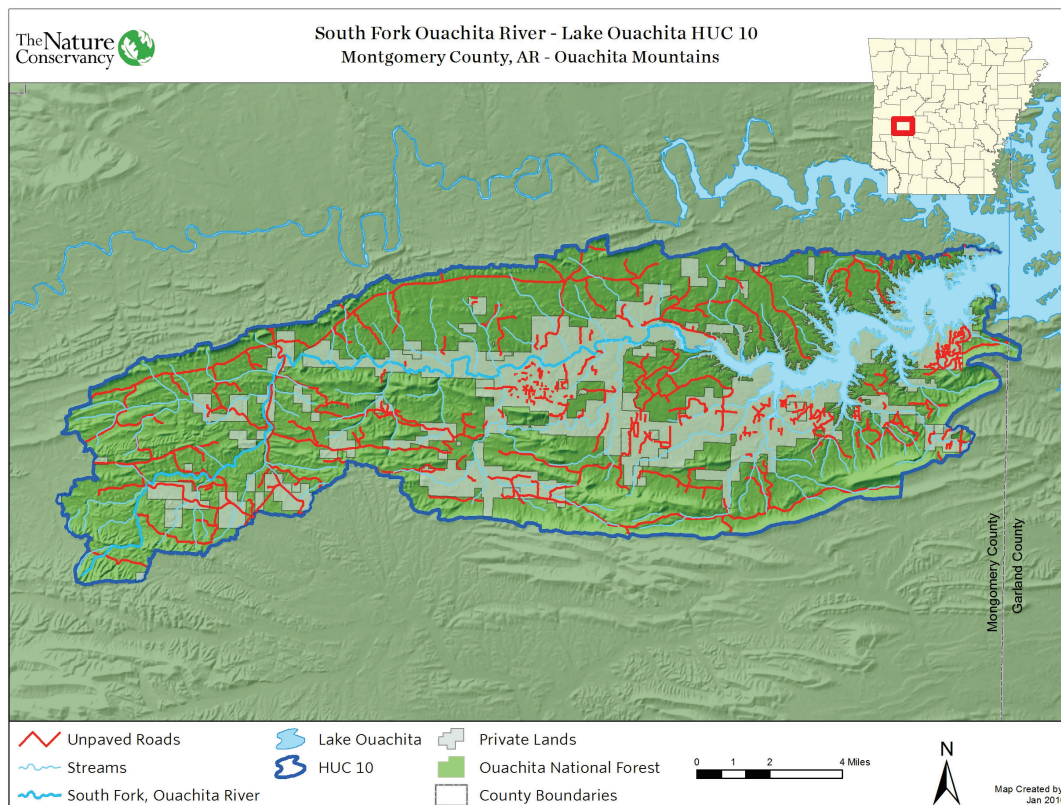


Figure 1: Map showing public accessible unpaved roads proposed to be inventoried in the South Fork Ouachita River Watershed.

Location: The project is located in the Ouachita Mountain Ecoregion (36b), South Fork Ouachita River Watershed, Montgomery County, near Mt. Ida, Arkansas.

Approach:

Analyze approximately 232 miles of public accessible unpaved roads and develop a roads inventory of road segments with high rates of sedimentation within the South Fork Ouachita River Watershed.

Provide a GPS inventory of high priority, public accessible unpaved roads selected from the tier 1 GIS analysis (outside city limits) in the South Fork Ouachita River Watershed. The road inventory will include road and ditch characteristics, culverts, wing ditches, stream crossings, and other erosion prevention structures associated with the roads selected from the tier 1 analysis. Upon completion of the road inventory, GPS data will be processed into GIS, which will be used to conduct a road assessment.

A road maintenance prioritization GIS model will be developed to identify the road segments and features that have the greatest impacts to species habitat.

Using a two-tier approach, a road maintenance prioritization GIS model will be developed. The two major tiers include: 1) inventory assessment and 2) landscape assessment. The inventory assessment will include road, ditch and bank components, based on GPS-inventoried attributes. Road segments will be further assessed by assigning various landscape scores based on topographic, soils and biological information. The landscape assessment will include sediment production and delivery components derived from GIS data sources.

Determine erosion rates for various types of road templates/soil types/slope gradients.

Erosion rates for various types of road templates/soil types/slope gradients throughout the study area will be determined using field measurements and the WEPP erosion model on a small sample of the highest priority inventoried roads.

Inventory fish passage characteristics and develop GIS analysis of fish passage barriers for all stream crossings.

Because TNC describes fish passage characteristics for all stream crossings it inventories during road inventories, a detailed fish passage inventory will also be an outcome of this project. A GIS analysis of fish passage barriers will be developed. This analysis will identify and prioritize which barriers would expand available habitat for the species.

Expected Results and Benefits:

A road inventory score will be assigned to each road segment based on field collected attributes describing characteristic of road surface, roadside ditches and cut banks. A landscape assessment score will be assigned to each road segment based on topographic, soils, and biological information. Both the road inventory score and landscape assessment score will be added together to produce a total surface vulnerability score for each road segment.

Following road inventory and assessment, road segments will be prioritized as maintenance work sites using a two-tiered approach. The first tier uses road segment surface vulnerability scores to group road segments into priority classes. The second tier of prioritization will focus on only

Classes 1 to 3, which represent the top 25% of most vulnerable roads. Within that set of roads, work sites will be prioritized based on the road inventory score. This two-tiered approach will be implemented for the study area as a whole. Various GIS indices will be generated that express a relative scale of likely sediment production on the road segment, sediment delivery from the segment to nearby streams, and direct impact of sediment delivery to habitat for Arkansas Fatmucket and thirteen other SGCN.

TNC intends to apply for future funding for the second phase of the project, which will include rehabilitation of at least one high priority road segments and conducting one or more BMP workshops focused on sedimentation to the South Fork Ouachita River.

Budget:

<i>Category</i>	<i>Funds Required</i>	<i>TNC Match</i>	<i>Total</i>
<i>Salaries and Benefits</i>	<i>\$18,200</i>	<i>\$7,850</i>	<i>\$26,050</i>
<i>Travel</i>	<i>\$1,100</i>	<i>\$3,750</i>	<i>\$4,850</i>
<i>Supplies</i>	<i>\$1,200</i>	<i>\$0</i>	<i>\$1,200</i>
<i>Other</i>	<i>\$100</i>		<i>\$100</i>
<i>Subtotal</i>	<i>\$20,600</i>	<i>\$11,600</i>	<i>\$32,200</i>
<i>Indirect Cost 21.8%</i>	<i>4,491</i>	<i>\$ 2,529</i>	<i>7,020</i>
<i>Total</i>	<i>25,091</i>	<i>\$ 14,129</i>	<i>\$ 39,220</i>

TNC’s indirect cost rate in its FY16 NICRA is 21.8%. TNC’s indirect rate is negotiated annually, and TNC will charge indirect at the federally approved rate each year.

Qualifications:

Clay Knighten, Fire Management Crew Leader, will be responsible for data collection, GIS analysis and completion of the project. Knighten is a graduate of Arkansas Tech University with a B.S. in Park and Recreation Administration with an emphasis in Natural Resources. After graduating he worked with the U.S. Forest Service on the Ouachita National Forest where he gained three years of experience assisting in a wide range of conservation projects. These projects included mapping of trails and unpaved roads using Geographic Information Systems (GIS), recreational trail and unpaved road construction and maintenance utilizing best management practices. Knighten began work with The Nature Conservancy in May 2014. Prior to becoming Fire Management Crew Leader, he worked with the Rivers Restoration Team, assisting in stream surveys and sediment data collection on unpaved roads in the Ouachita Headwaters Watershed.

Melissa Jenks, Ouachita Rivers Project Specialist, will be responsible for assisting in data collection and providing technical expertise. Jenks is a graduate of Arkansas Tech University with a B.A. in Geology and Environmental Science and has worked with The Nature Conservancy since 2008. Jenks has completed professional training in “Applied Fluvial Geomorphology”, “River Assessment and Monitoring”, and “Natural Channel Design”, specific to stream restoration led by instructor Dave Rosgen, Ph.D., conducted numerous geomorphic surveys, and assisted in implementation of a stream restoration projects on the Middle Fork Saline and Archey Fork Little Red River. She also has seven years combined experience in the Geographic Information Systems (GIS) field with the U.S. Forest Service and The Nature Conservancy.

Mitchell Allen, Stream Restoration Specialist, will be responsible for assisting in data collection. Mitchell is a graduate of the University of Central Arkansas with a B.S. in Environmental Science/Biology. While working on his undergraduate degree, he was able to gain 3 years of experience with non-native plant removal and restoration ecology with the UCA Department of Biology and the National Park Service. Since graduating he has worked with the U.S. Fish and Wildlife Service on the Upper Colorado River Endangered Fish Program, helping restore habitat for four endangered species, as well as removing non-native fish species. He began work for The Nature Conservancy in August of 2012 where he has assisted with surveying, planning, and construction of multiple river restoration projects.

Joy DeClerk, River Conservation Program Director, will be responsible for assisting in data collection and providing technical expertise. DeClerk is a graduate of Hendrix College with a B.A. in Environmental Studies, and Economics and Business and has worked for The Nature Conservancy since April 2005. In her current position she has focused conservation work on assessing sedimentation from various land uses and applying natural channel design restoration techniques to reduce sedimentation and restore habitat. DeClerk has completed trainings in “Applied Fluvial Geomorphology” and “Natural Channel Design” led by Wildland Hydrology Inc. The most recent successful project completed was a large-scale river restoration project on the Archey Fork Upper Little Red River in Clinton, AR, designed and constructed by DeClerk. Other projects completed include: Assessment and improvement project on unpaved roads in the Middle Fork Saline Watershed, in Garland County; and Development of a trail assessment and monitoring methodology for Best Management Practices on ATV trails in the Wolf Pen Gap Area, Ouachita Headwaters Watershed near Mena, Arkansas.