

**Reducing Sedimentation through Implementation of Best Management Practices (BMP's) on a Stream Crossing in the Alum Fork Saline Watershed, Ouachita Mountains Ecoregion, Arkansas**

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*February 1, 2018*



*Cover Photo: Left, Alum Fork Saline River. Right, eroding stream crossing to be stabilized.*

**Project Summary:**

The Arkansas Natural Heritage Commission (ANHC) and The Nature Conservancy (TNC) propose to partner to implement restoration of a badly eroding stream crossing in the Alum Fork Saline (AFSR) watershed near Paron, Arkansas. This project will lead to wider implementation of BMP's and reduced sedimentation from stream crossings on unpaved roads in the AFSR watershed.

**Project Partner**

Arkansas Natural Heritage Commission  
1100 North Street  
Little Rock, AR 72201  
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**Total Project Cost:** \$56,476

**Total Amount Requested:** \$35,896

**Total Matching Funds/In-kind Services:** \$20,580

### State Wildlife Action Plan Priority to be addressed

This project is geared toward “restoring, enhancing, and/or maintaining the integrity of aquatic habitat,” within the AFSR watershed. This action was identified as a conservation priority for the Arkansas State Wildlife Plan. Completing this project will reduce sedimentation from a high priority tributary to the AFSR, benefitting fourteen species of greatest conservation need. Of the fourteen species, three are fishes and eleven are mussels (See Figure 2).

### Need

One of the primary identified threats to the AFSR, its tributaries, and associated aquatic communities is sedimentation from the following activities: removal of streamside vegetation through land clearing activities, stream bank erosion, erosion of unpaved roads and trails, and stream alteration including in-stream gravel mining and unsuitable stream crossings. Siltation, sedimentation, and a lack of recruitment are thought to be the major contributors to the status of the endangered Pink Mucket, *Lampsilis abrupta* and threatened Arkansas fatmucket, *Lampsilis powelli*. The USFWS states the species listing of both mussels was due to curtailment of its range resulting from impoundments, channel alteration, gravel dredging, sedimentation, and water quality degradation. Since 2004, TNC and partners have mapped and inventoried over 1,000 miles of unpaved roads in priority watersheds throughout Arkansas. TNC used field measurements on over 50 miles of road and the Water Erosion Prediction Project (WEPP) model to determine erosion rates for the roads mapped. TNC, in partnership with Arkansas Rural Services, has held numerous road maintenance workshops across the state with county judges and road crews to demonstrate BMP’s for sediment reduction from unpaved roads.

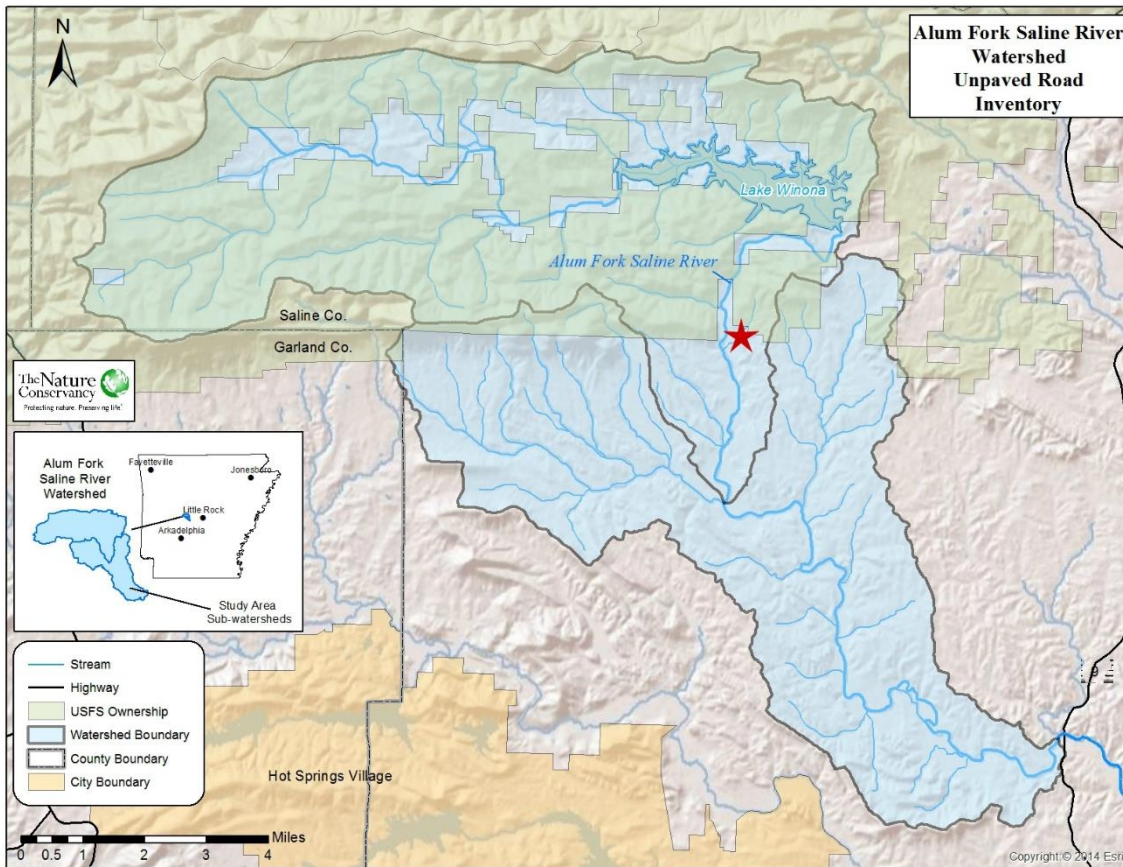
### Purpose and Objectives

1. Reduce sedimentation into AFSR by restoring a badly eroding stream crossing on a high priority tributary.
2. Partner with other private landowners and constituents in the AFSR watershed, leading to wider implementation of BMP’s and reduced sedimentation from stream crossings on unpaved roads.
3. Pre- and post-project implementation, TNC will conduct a Water Erosion Prediction Project (WEPP) modeling effort of the proposed section of road to demonstrate sediment reduction from the restoration efforts along the 500-foot road segment.

### Project Area

The AFSR (HUC 0804020303) flows in Saline and Garland County, Arkansas, traversing approximately 53 river miles (excluding Lake Winona) from the Alum Creek Experimental Forest within the Ouachita National Forest to State Highway 5 northwest of Benton in a southeasterly direction. It is joined by the Middle Fork just above its confluence with the North Fork, at which point the three forks combine to create the mainstem of the Saline River. The proposed project is located approximately 4 river miles downstream of Lake Winona on TNC’s Alum Fork Preserve, managed in partnership with ANHC.

**Figure 1.** AFSR watershed overview map, showing project location within the watershed.



### Approach

Implementation is focused in the AFSR watershed to reduce sedimentation impacts from a high priority tributary. ANHC will provide cost share in the form of in-kind matching funds through providing personnel time for construction and aquatic, biological monitoring. Fish passage and stream channel stability concerns will be addressed on a stream crossing along a 500-foot section of an unnamed road, located west of Ross Loop near Paron, Arkansas, crossing an unnamed tributary to the AFSR. The existing undersized and damaged culverts will be replaced with an open-arch, natural stream bottom crossing. Headwalls and endwalls will be constructed of native or cut stone to discourage scouring around the inlet and outlet of the crossing. Floodplain culverts will be added to provide flood relief during high flow. Installation of an open-arch crossing will require removal of the damaged culverts and will span the appropriate bankfull width of the stream channel which is consistent with fish passage friendly designs used increasingly across the country. An Active Channel Design method will be used to implement a design that is sized appropriately and embedded deep enough into the channel to allow for natural movement of bedload and formation of a stable stream bed inside the culvert. The crossing arches will be constructed of field-bolted galvanized steel plates designed by ConTech Engineering Solutions. Since materials for the crossing are pre-constructed and hauled to the site, installation is estimated to take only 1-2 days, so that disturbance to the stream channel is minimized. The steel plated arch structure is rated to last

70 years and will reside at this stream crossing for its lifetime. TNC and ANHC will host a field day event for private landowners showcasing the techniques and BMPs implemented.

**Expected Results and Benefits**

- Substantial, measured sediment reduction post-restoration determined through a WEPP analysis of the unpaved road and stream crossing.
- Decreased sedimentation to the aquatic habitat of the AFSR.
- Restored fish passage on a major tributary to the AFSR.
- Education and outreach field day on BMPs to private landowners within the watershed.

**Budget**

Category	Funds Requested	TNC Match	3rd Party Match	Total
Salaries and Benefits*	\$8,274	\$0	\$2,500	\$10,774
Operating Expenses	\$20,837	\$14,500	\$200	\$35,537
Capital Expenses	\$0	\$0	\$0	\$0
<b>Subtotal</b>	<b>\$29,111</b>	<b>\$14,500</b>	<b>\$2,700</b>	<b>\$46,311</b>
Indirect Cost (23.31% NICRA)	\$6,786	\$3,380		\$10,166
<b>TOTAL</b>	<b>\$35,896</b>	<b>\$17,880</b>	<b>\$2,700</b>	<b>\$56,476</b>

\*The Nature Conservancy has a current 23.31% Negotiated Indirect Cost Rate (NICRA) through June 30, 2018. TNC's indirect rate is negotiated annually with the Department of the Interior and TNC will charge indirect at the federally approved rate each fiscal year.

**Figure 2:** Species of greatest conservation need (SGCN) for the Alum Fork Saline River.

	Scientific Name	Common Name	Global Status	State Status
<b>Fish</b>	<i>Noturus lachneri</i>	Ouachita madtom	G2	S2
	<i>Crystallaria asprella</i>	Crystal darter	G3	S2
	<i>Percina uranidea</i>	Stargazing darter	G3	S2
<b>Mussels</b>	<i>Alasmidonta marginata</i>	elktoe	G4	S3
	<i>Cyprogenia sp. cf aberti</i>	Ouachita fanshell	G2	S2
	<i>Lampsilis ornata</i>	Southern pocketbook	G5	S2
	<i>Lampsilis powellii</i>	Arkansas fatmucket <sup>2</sup>	G1G2	S2
	<i>Toxolasma lividum</i>	purple lilliput	G2	S3
	<i>Villosa arkansasensis</i>	Ouachita creekshell	G2	S2
	<i>Obovaria jacksoniana</i>	Southern hickorynut	G1G2	S2
	<i>Lampsilis abrupta</i>	Pink Mucket <sup>1</sup>	G2	S2
	<i>Pleurobema cordatum</i>	Ohio pigtoe	G4	S2
	<i>Pleurobema rubrum</i>	Pyramid pigtoe	G2	S2
<i>Ligumia recta</i>	Black sandshell	G5	S2	

<sup>1</sup>Federally listed endangered species

<sup>2</sup>Federally listed threatened species

**Melissa Jenks**, Ouachita Rivers Project Specialist, will be responsible for overseeing the project. 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. In her current position she has completed four courses in “Applied Fluvial Geomorphology” and “Natural Channel Design” led by instructor Dave Rosgen, Ph.D., conducted numerous geomorphic surveys, and worked to implement stream restoration projects on the Middle Fork Saline and Archey Fork Little Red Rivers. She also has eight years combined experience in the Geographic Information Systems (GIS) field with the U.S. Forest Service and The Nature Conservancy.

**Joy Wasson**, River Conservation Program Director, will be responsible assisting in data collection and providing technical expertise. Wasson 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. Wasson has completed trainings in “Applied Fluvial Geomorphology” and “Natural Channel Design” led by instructor Dave Rosgen, Ph.D. 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 Wasson. 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.

**Arkansas Natural Heritage Commission** has been working to conserve Arkansas’s natural landscape since 1973. ANHC’s professional staff conducts on-the-ground field surveys to locate and evaluate occurrences of natural communities and rare, threatened, and endangered species. Research findings and results are often published in scientific journals and presented at national, regional and state forums. This information is organized, analyzed, managed, and housed in the Arkansas Heritage Program biodiversity database. These field surveys and research projects have provided a wealth of information on more than 900 rare species that can be used to evaluate the relative imperilment of native species and shared for environmental planning purposes.

**The Nature Conservancy’s Arkansas Field Office** has a great interest and knowledge in watershed restoration, and has successfully planned for and implemented a large number of watershed projects across the country, including many in Arkansas. As a result of this and other conservation work, TNC recognizes the foundational importance of planning for successful implementation, and utilizes a four-step planning process for priority conservation areas with high biodiversity. This extensive experience has proven an excellent track record for TNC in generating public involvement for watersheds across the state. Furthermore, the Arkansas Field Office of TNC has a successful track record for leveraging limited conservation dollars via collaborations with multiple partners toward measurable conservation successes.