

**PROJECT TITLE:** Reducing sedimentation and connectivity impacts from road infrastructure on water quality and habitat for species of Greatest Conservation Need in the Kings River Watershed, Arkansas

**PROJECT SUMMARY:** This 2-year project will prioritize, plan and implement unpaved road BMPs on heavily used unpaved roads along the Kings River. Two unpaved road BMP workshops will be provided to provide training to road managers in the watershed. A potential barrier to aquatic habitat connectivity will be assessed to determine the feasibility of retrofit to reduce barrier characteristics.

**PROJECT LEAD:**

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**PROJECT PARTNERS:**

**Carroll County**

Sam Barr, County Judge. 870-423-2967, [countyjudge@carrollcoar.com](mailto:countyjudge@carrollcoar.com)

**Madison County**

Lanny McConnell, Road Supervisor, 479-738-6822

**AGFC Madison County WMA**

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**AGFC Fisheries**

Point of Contact: Steve Filipek, [sfilipek@agfc.state.ar.us](mailto:sfilipek@agfc.state.ar.us)

**BUDGET SUMMARY:**

Match Scenario	SWG Request	Match Required	Total Amount
50% Match Required	\$45,000	\$45,000	\$90,000
35% Match Required	\$58,500	\$31,500	\$90,000

**BUDGET DETAIL:**

	50% Match Scenario			35% Match Scenario		
	SWG	Match	Total	SWG	Match	Total
<b>Personnel / Fringe</b>	\$ 10,000	\$ 5,000	\$ 15,000	\$ 10,991	\$ 4,009	\$ 15,000
<b>Travel</b>	\$ 1,636	\$ 1,636	\$ 3,272	\$ 1,636	\$ 1,636	\$ 3,272
<b>Supplies</b>	\$ 18,000	\$ 20,000	\$ 38,000	\$ 28,000	\$ 20,000	\$ 48,000
<b>Contracts</b>	\$ 7,000	\$ 10,000	\$ 17,000	\$ 7,000		\$ 7,000
<b>Subtotal</b>	\$ 36,636	\$ 36,636	\$ 73,272	\$ 47,627	\$ 25,645	\$ 73,272
<b>Indirects (22.83%)</b>	\$ 8,364	\$ 8,364	\$ 16,728	\$ 10,873	\$ 5,855	\$ 16,728
<b>Total</b>	\$ 45,000	\$ 45,000	\$ 90,000	\$ 58,500	\$ 31,500	\$ 90,000

Match sources include TNC, county match of personnel time and equipment use, and donation or discount supplies and contracts (rental equipment).

## **PROJECT NEED:**

The Kings River is a priority watershed for conservation due to its rich aquatic biodiversity and exceptional water quality. The Kings River has recently been shown to have some of the best water quality in the upper White River basin (Ozarks Water Watch, 2011). The river has been designated by the state of Arkansas as an Extraordinary Resource Waterbody (ERW) and an Ozark Zone Quality Stream for smallmouth bass. The Kings River flows into Table Rock Lake, a significant interstate drinking water source.

The Kings River watershed is known to harbor 84 fish, mussel, and aquatic crayfish species (AGFC/TNC/MORAP Arkansas Aquatic GAP 2011, 2012). Of these species, 15 are identified as Species of Greatest Conservation Need (SGCN) in the Arkansas Wildlife Action Plan (AWAP, 2006). Twenty-four non-AWAP fish species found in the Kings watershed also serve as hosts to the 12 AWAP mussel species in the watershed. The AWAP recognizes sedimentation and habitat destruction as a primary threat to all 15 AWAP species, and recognizes road infrastructure as a leading cause of this threat for 11 of these 15 species.

Several studies and plans for the Kings River watershed also recognize unpaved roads as a primary source of sediment into the Kings and its tributaries, leading to degraded water quality and aquatic habitat. They also recognize streambank erosion as a primary sediment source. These studies include: Upper White River Non-Point Source Management Plan (ANRC, 2011), Kings River Watershed Management Plan (KR Watershed Partnership, 2006), Kings River Watershed Assessment (FTN, 2005), Geospatial Inventory of Sediment from Unpaved Roads (WCRC, 2005), Kings River Conservation Action Plan (TNC, 2004).

Several funders and partners are working in the watershed to address sediment sources from unstable streambanks. These include AGFC, ANHC, TNC, ANRC 319 Program, Kings River Watershed Partnership, and others. Minimal effort had been made to date to reduce sediment impacts from unpaved roads to water quality and habitat in the watershed. Only a few potential barriers to aquatic passage exist on the main stem of the Kings River. Minimal efforts have been made to address this potential habitat impact as well.

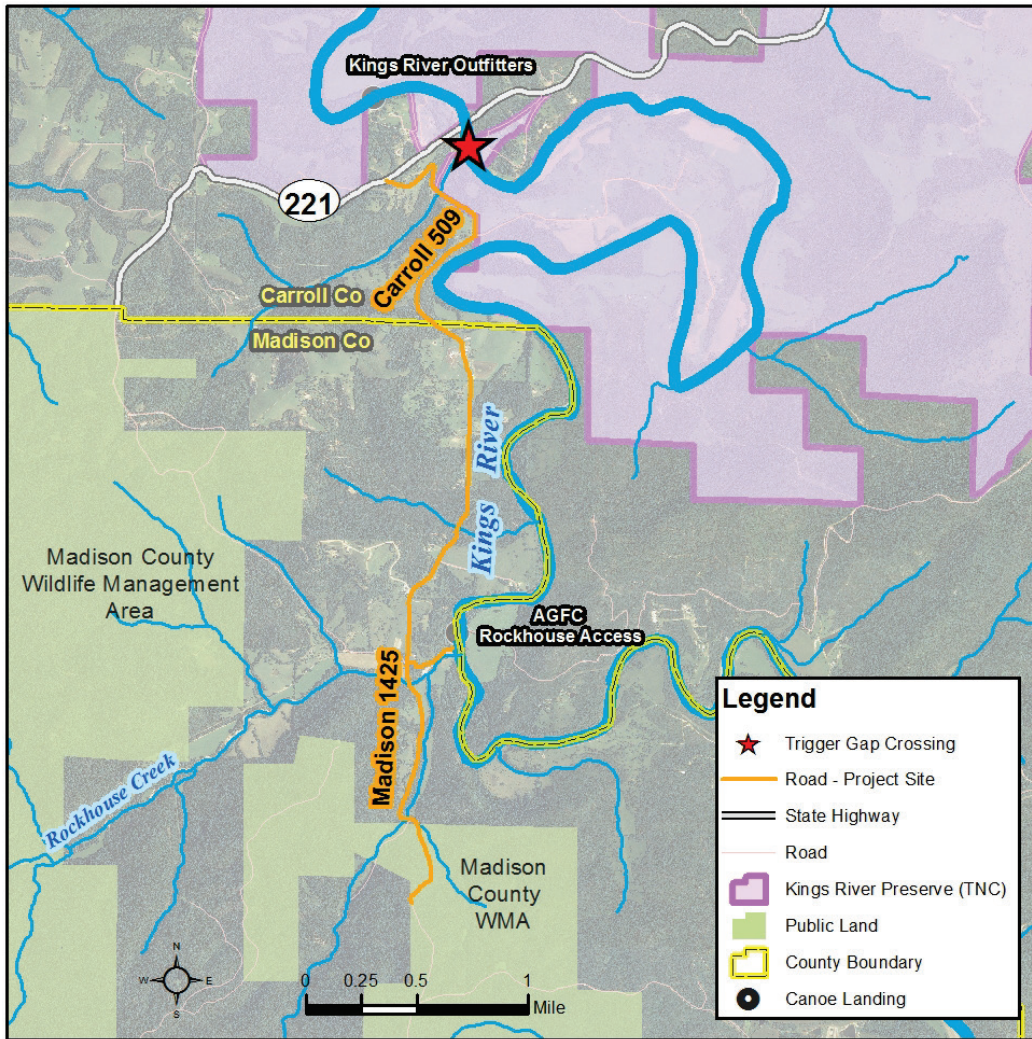
The proposed project would address sedimentation impacts from unpaved roads in the watershed, and assess an old road stream crossing (known as ‘Trigger Gap’) for its barrier and mitigation potential.

The proposed project would address several specific **AWAP 2014 funding priorities**, including:

- Improve aquatic habitat through conservation practices and sustainable design within the Ozark Interior Highlands
- Status of habitat connectivity, and identification and mitigation of barriers/impediments to connectivity
- Projects benefiting *Quadrula cylindrical* (rabbitsfoot)

## **LOCATION:**

The site for the project will be focused near the TNC Kings River Preserve, the AGFC Madison County WMA, and the AGFC Rockhouse Kings River access. The Map in Figure 1 below shows the primary location. Unpaved road sediment reduction work will be done on Madison and Carroll County roads from the WMA to AR Highway 221. The potential aquatic passage barrier is just upstream of the Highway 221 bridge on the Kings River in Carroll County.



**Figure 1:** Proposed project site. Rockhouse Road (Carroll County Rd. 509 / Madison County Rd. 1425) is heavily driven by river goers traveling through the WMA or on Highway 221 to recreate on the Kings River. The road crosses several tributary streams and creeks, which quickly confluence with the Kings River.

**OBJECTIVES and APPROACH:**

- Objective 1:** Identify and *prioritize unpaved road segments* for sediment reduction practices on 4.5 miles of Madison County and Carroll County roads, including on the WMA and the spur road to Rockhouse river access. (Year 1)

**Approach:** Use TNC unpaved road geospatial inventory methods to map describe the road, ditch, road bank and stream crossing characteristics in a GPS / GIS. Utilize field and GIS landscape characteristics to estimate erosion and sediment delivery in the Water Erosion Prediction Project (WEPP) sediment model. Rank road segments based on modeled sediment delivery.
- Objective 2:** Work with Madison and Carroll County roads department staff, AGFC WMA managers, local landowners and business to select at least one demonstration project site in each county. Work with stakeholders to *design and implement best management practices* (BMPs) that will reduce road erosion, sediment delivery to the Kings River, and will reduce road maintenance requirements. (Year 1)

- **Approach:** Present road priorities to project partners during site visits. Work with road managers to select appropriate BMPs for the landscape and traffic constraints. Implement feasible BMPs based on project budget. BMP practices may include drainage improvements, erosion control for concentrated flows, and road surfacing improvements.
- **Objective 3:** Work with Madison and Carroll counties to hold *two unpaved roads BMP workshops*, including one in Huntsville and one in Berryville. Public road managers, as well as private contractors and landowners will be invited to attend. (Year 2)  
**Approach:** TNC will provide one-day unpaved roads BMP training. The unique training covers practices from Pennsylvania Center for Dirt and Gravel Road Studies, US Forest Service, and other BMP sources. The course will include ½ day in the classroom and ½ day at the demonstration project sites.
- **Objective 4:** Survey and assessment to *determine if the ‘Trigger Gap’ road crossing acts as a barrier* to aquatic SGCN and game species. If it is determined to act as a migration barrier, study the *feasibility of retrofitting* the structure to improve passage. (Year 2)  
**Approach:** TNC survey the structure and will work with AGFC fisheries staff and other agency biologists to determine if the structure acts as a barrier to migration using US Forest Service Fish Xing or other appropriate methods. If determined to be a barrier, the assessment team will develop designs to improve aquatic passage and assess the feasibility of implementing the design without causing other impacts to the river. If it is determined that the structure cannot be modified without increasing channel instability, the design will be considered non-feasible.

#### **EXPECTED RESULTS AND BENEFITS:**

- A determination of the feasibility or non-feasibility of retrofitting the Trigger Gap stream crossing will dictate whether future efforts are made to implement the retrofit, or leave the structure in place.
- Implemented unpaved road BMP demonstration projects are expected to reduce sediment delivered to the Kings River in the order of tens of tons per year. Roads will also be greatly improved for drivers and reduce maintenance needs for road managers.
- Unpaved road BMP demonstration projects will be completed along one of the most heavily used rural road sections in region. The road connects the WMA to Highway 221, and is used especially by canoeists and fishermen traveling to/from the outfitters at Trigger Gap and the Rockhouse access. This will give extensive public visibility to the issue of unpaved road maintenance and water quality.
- The BMP workshop will provide training to at least 40 road managers responsible for management of approximately 90% of unpaved roads in the Kings River watershed. In past efforts to combine BMP demonstration sites with BMP workshops, TNC and partners have seen a broader adoption of practices beyond demonstration sites by road managers following the workshops.
- Broad adoption of BMPs at a watershed scale will require additional funding to road managers, in addition to the BMP training that would be provided. TNC, AGFC, the Arkansas Association of Counties, and a dozen additional partners formed the Arkansas Unpaved Roads Program (AURP) in 2013 to build support for training and funding unpaved road managers to implement sediment reduction BMPs in priority watershed such as the Kings River. The AURP is currently working to implement five to ten pilot demonstration projects throughout Arkansas to build private, public and political support for greater funding. This project could serve as a pilot project for the AURP, further leveraging future funding for broad-scale adoption of BMPs throughout the Kings and other priority river watersheds.
- Once the project is completed, funding would be sought to complete other priority road segments.

**BUDGET:** See proposal **Page 1** for budget details.

**Ethan Inlander** has been applying geospatial technologies and physical sciences to conservation issues for over 19 years. He received his undergraduate and master's degrees from the Department of Geography at University of California Santa Barbara. Before joining The Nature Conservancy as the Ozark Rivers Program Director, Ethan applied geographical information systems technology to address multiple scale conservation problems in riparian and coastal habitats of California. Since joining The Nature Conservancy, Ethan has applied these same techniques to identify and reduce impacts and habitat degradation to freshwater stream ecosystems, conduct local, watershed, and regional threat assessments of subterranean environments, and prioritize and implement karst and riverine conservation actions at multiple scales.

Over the past ten years at TNC, Ethan has led efforts by the TNC unpaved roads team to map and prioritize over 2000 miles of unpaved roads in for priority Ozark river watersheds. The team has worked with landowners and public partners to implement unpaved road BMPs on fifteen separate projects in nine counties. The team has also organized road 15 unpaved road maintenance BMP workshops over the past five year that have been attended by hundreds of road maintenance professionals from cities, counties, state and federal agencies, timber and energy industries. Ethan serves as lead instructor in these workshops, and has travelled to Oklahoma, Texas, Pennsylvania, and California to give similar workshops. He authored the unpaved roads best management practices chapter of the Illinois River Watershed Plan.