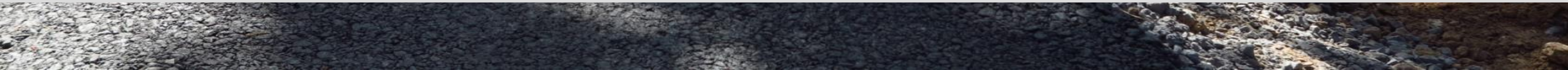
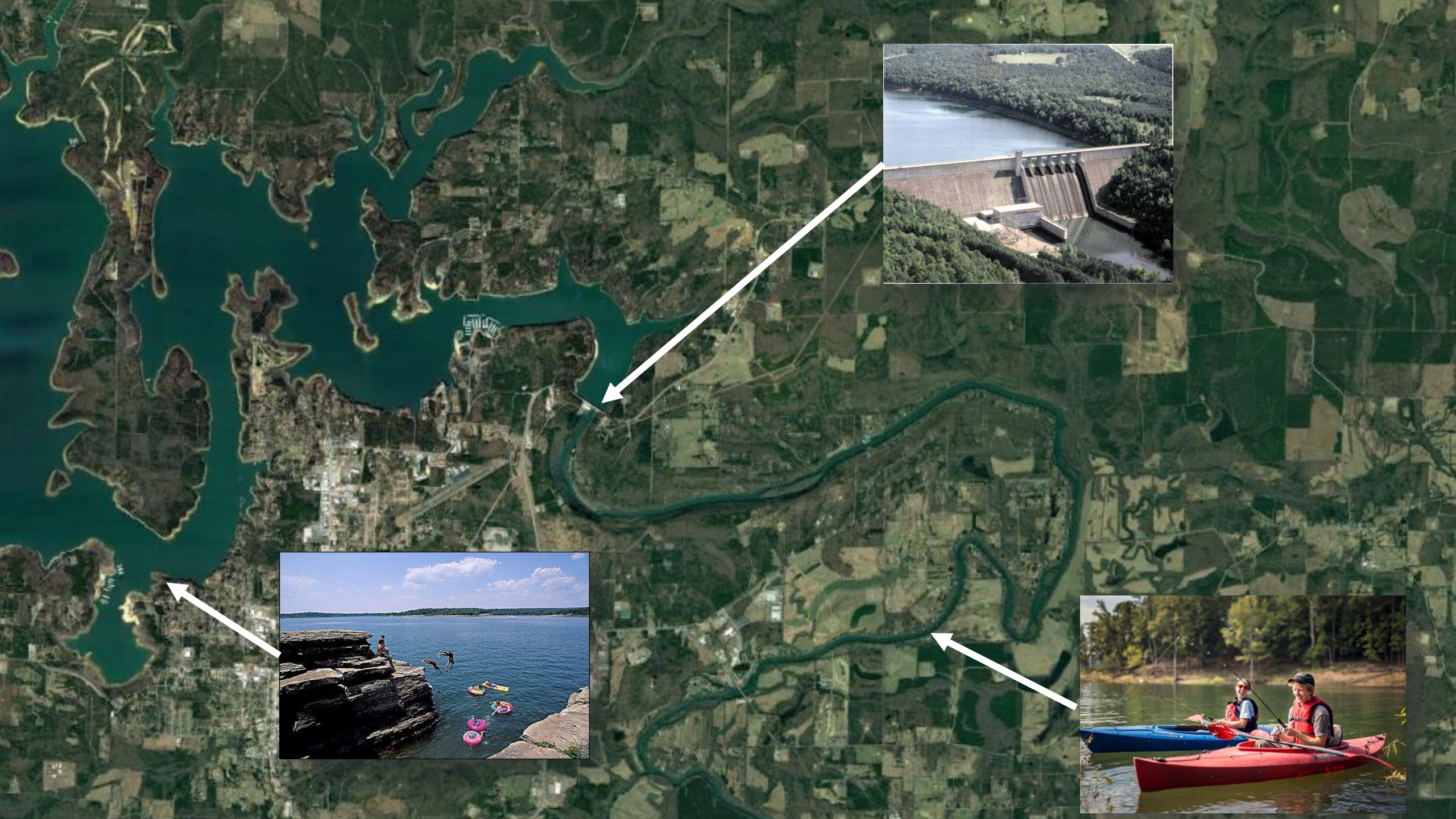
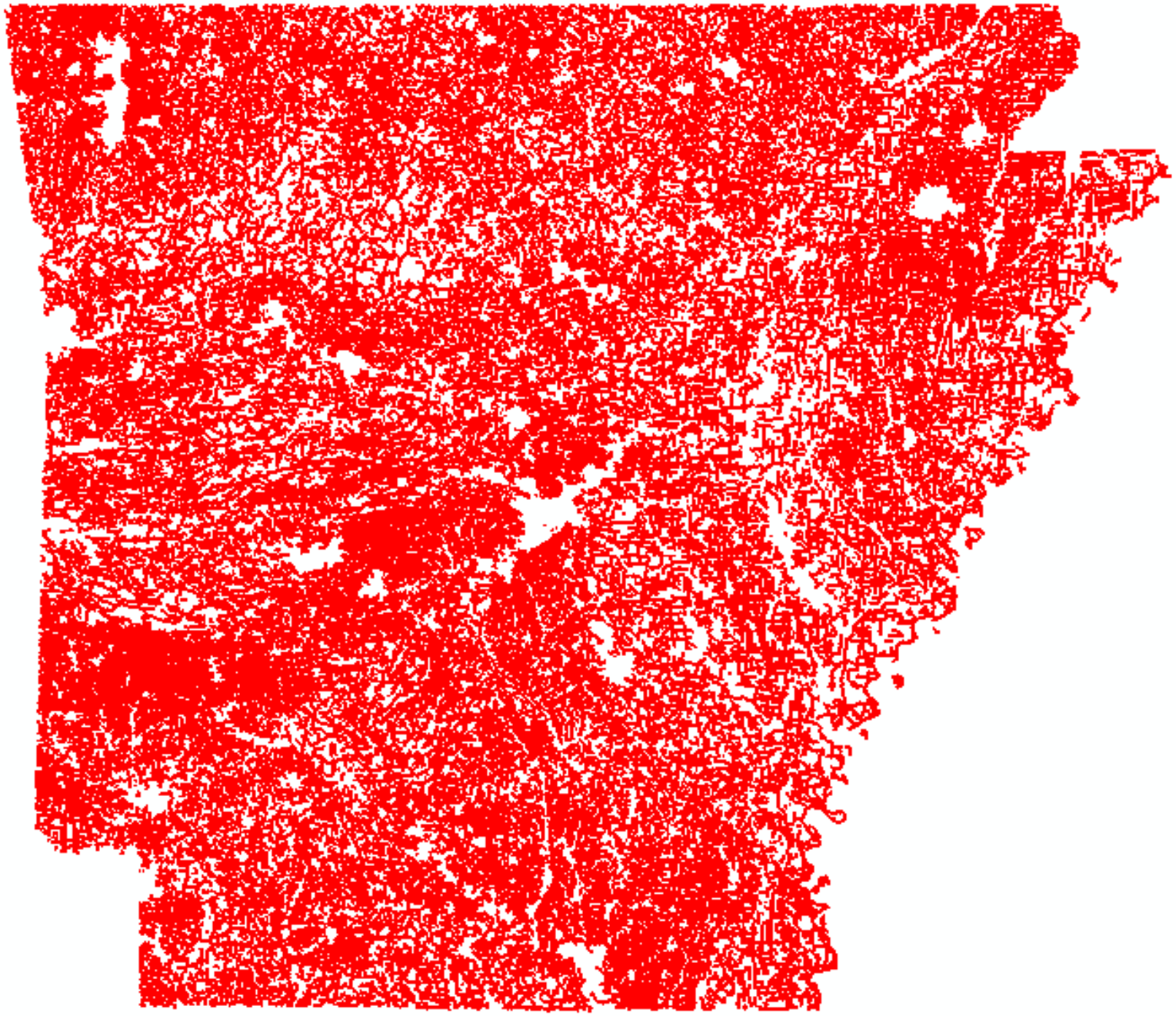
Better Unpaved Roads for People and Nature




SCHOOL BUS





No Shortage of Work

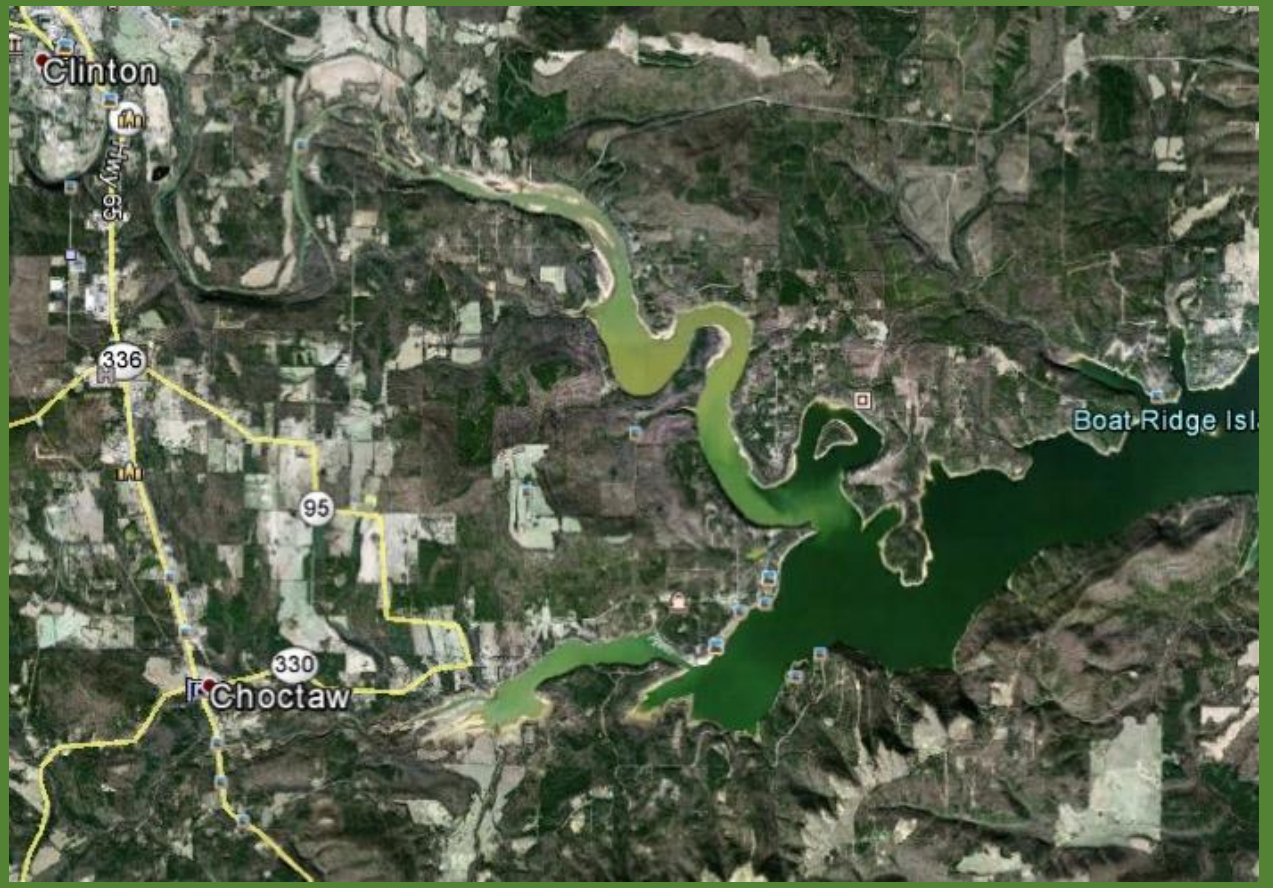
~81,590 miles of county roads in Arkansas

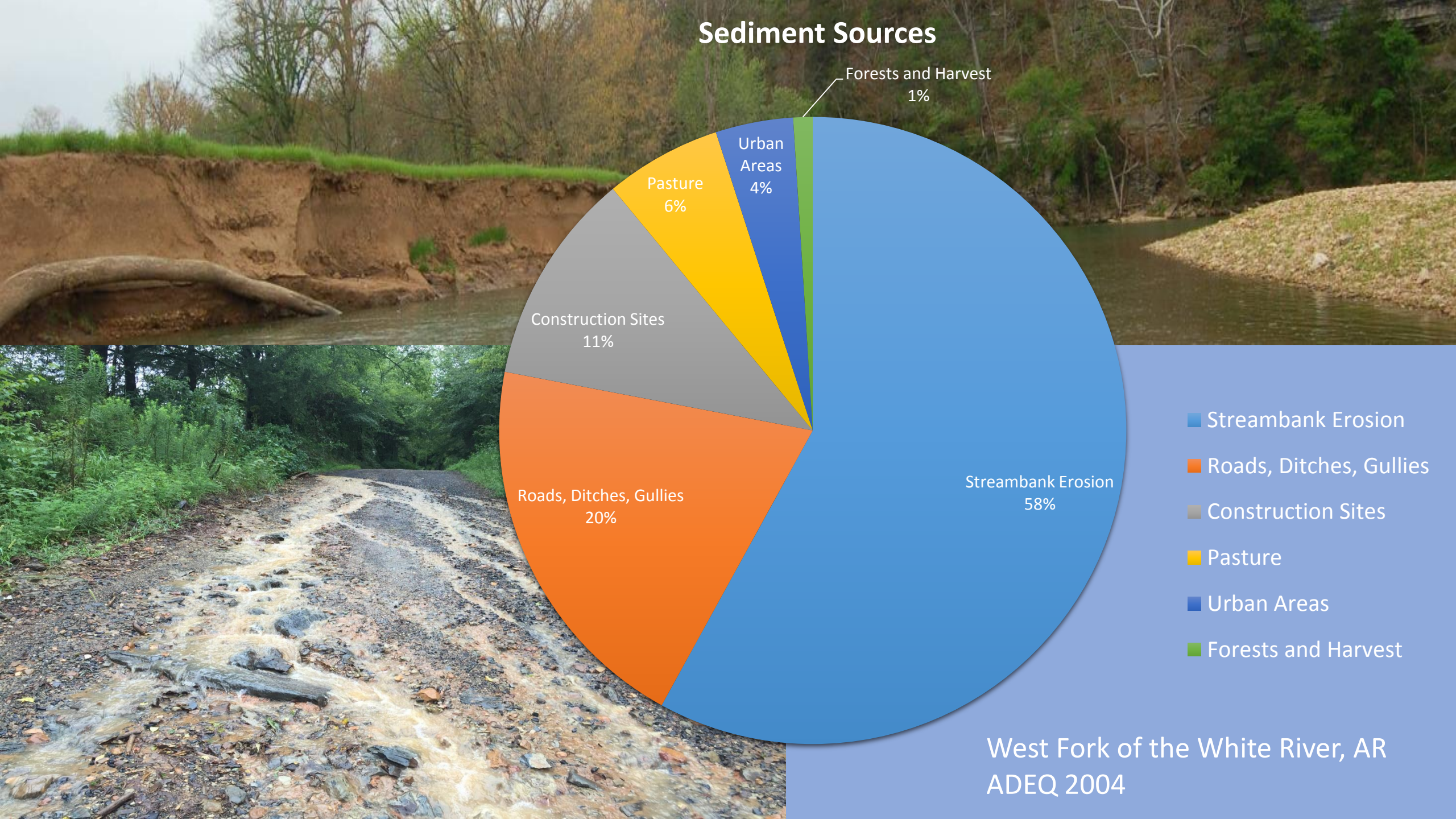
Over **85%** of county roads are unpaved.

~416 Structurally Deficient Bridges (>20’)

The Problem

IT ADDS UP TO A LOT OF SEDIMENT




Sediment Sources
Forests and Harvest 1%
Urban Areas 4%
Pasture 6%
Construction Sites 11%
Roads, Ditches, Gullies 20%
Streambank Erosion 58%
Streambank Erosion
Roads, Ditches, Gullies
Construction Sites
Pasture
Urban Areas
Forests and Harvest
West Fork of the White River, AR
ADEQ 2004

Abrasion

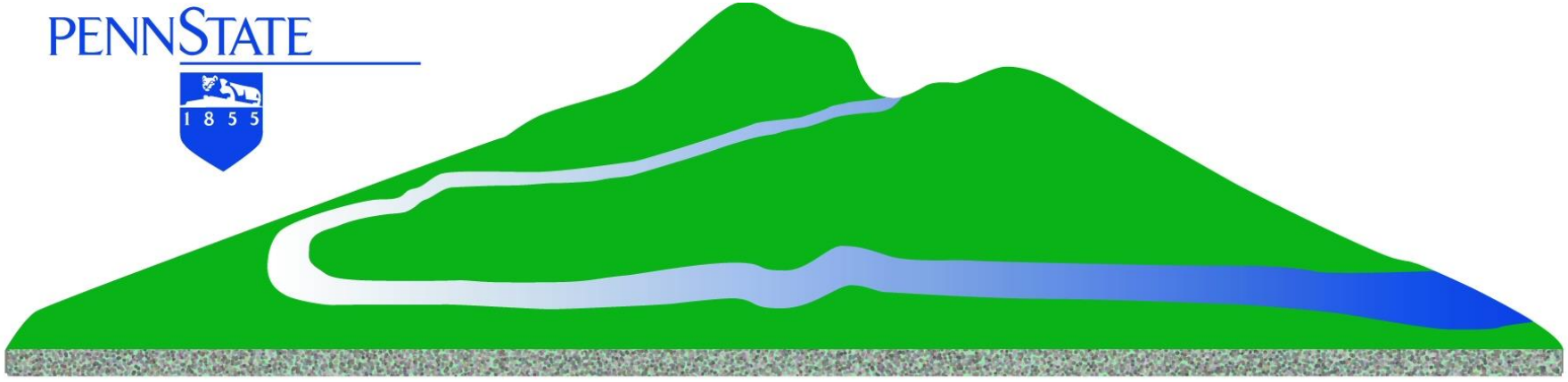
Makes breathing difficult and shreds gills!

Economic Impact of Freshwater Fishing by State in 2011

	Retail Sales	Total Multiplier or Ripple Effect	Salaries and Wages	Jobs	Federal Tax Revenues	State and Local Tax Revenues
Alaska†	$390,455,542	$580,993,450	$188,878,215	5,261	$38,988,480	$48,168,228
Alabama	$514,154,996	$776,012,671	$231,866,667	7,845	$51,356,071	$47,232,865
Arkansas	$507,855,831	$725,249,570	$222,334,267	7,549	$49,830,096	$49,462,412
Arizona	$862,298,181	$1,456,854,992	$464,810,603	12,007	$103,458,290	$86,916,175
California	$1,417,629,003	$2,704,701,141	$921,946,336	21,515	$213,770,199	$198,127,762
Colorado	$836,049,866	$1,314,006,542	$408,940,231	9,942	$98,445,119	$81,477,253

PENNSTATE

1855



Center for Dirt and Gravel Road Studies

TROUT UNLIMITED

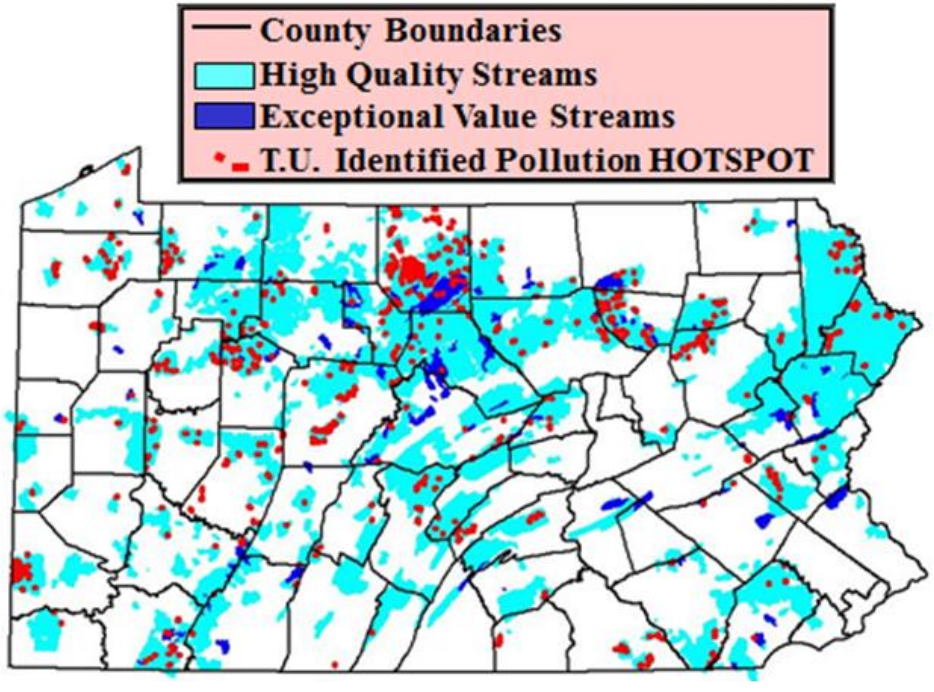
PA Task Force on Dirt and Gravel Roads

PENNSTATE

PSATS

USDA NRCS

ORIGINAL ASSESSMENT



Technical Bulletin

Natural Stone Headwalls

6/2014

Center for Dirt and Gravel Road Studies

NATURAL STONE HEADWALL OR ENDWALL – A wall built of natural stone at a pipe opening to support the road and protect it from the erosive forces of flowing water. Walls built at the inlet of a pipe are called **headwalls**. Walls built at the outlet of a pipe are called **endwalls**..

Headwall at pipe inlet.

Endwall at pipe outlet.

PURPOSES

Headwalls and endwalls are built to support the roadway at pipes and to prevent erosion around pipe installations. Properly constructed headwalls significantly improve the flow capacity of the pipe.

BENEFITS OF STONE HEADWALLS AND ENDWALLS

- low-cost, long-lasting solution to erosion problems at pipe openings
- prevent flowing water from damaging the road structure
- provide structural support for the road and prevent crushing of the pipe
- increase the flow capacity of pipes by reducing turbulence and directing flow
- visually identify pipe openings and protect them from traffic and maintenance equipment

HOW STONE HEADWALLS AND ENDWALLS WORK

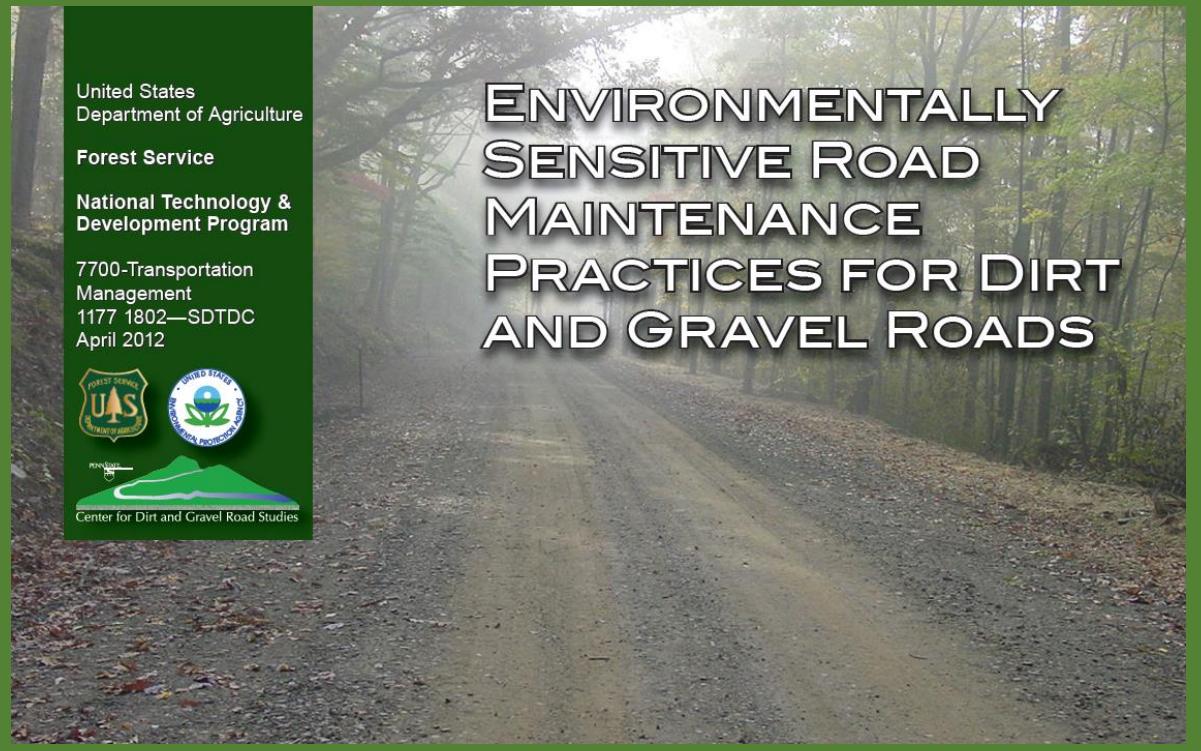
The strength of a rock wall comes from the weight of the interwoven stacked stones and friction between the rock surfaces. Wall stability comes from tightly fitting the stones together and staggering the joints.

TYPICAL REQUIREMENTS

- Materials: Rock of uniform thickness, flat on two or three sides that can be handled by one person are ideal. Native sandstone or limestone of any size and shape can be used, but construction will be easier and faster with stones that have some flat sides. In areas where native stone is unavailable, headwalls are constructed of a variety of different materials. Pre-fabricated and cast-in-place concrete, concrete blocks, and molded plastic are environmentally acceptable materials. (Alternate construction techniques will be covered in a separate technical bulletin.)
- Equipment: A pick, shovel, and sledgehammer or pry bar are the only required pieces of equipment. If large rock is available, a skilled operator can save time and labor by placing large stones with a backhoe.

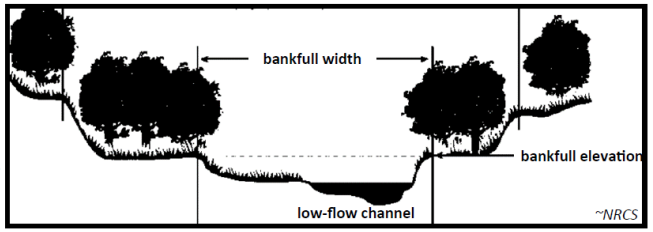
The publishers of this publication gratefully acknowledge the financial support of the PA State Conservation Commission. For additional information or assistance, contact: Center for Dirt & Gravel Roads Studies, Penn State University, 215 Transportation Research Building, University Park, PA 16802 (Toll-Free Phone: 1-866-668-6683, Fax: 814-863-6787, Email: dirtandgravel@psu.edu). Additional copies available on our website at: www.dirtandgravelroads.org.

Center for Dirt and Gravel Road Studies



Guidance in Determining Bankfull Stream Width in Pennsylvania

Bankfull Flow: This flow stage is determined by the elevation point of incipient flooding, indicated by deposits of sand or silt at the active scour mark, break in stream bank slope, perennial vegetation limit, rock discoloration, and root hair exposure. It is typically called the "channel-forming flow", with roughly a 1.5-2 year recurrence interval, and is where a stream will typically begin to access its floodplain.



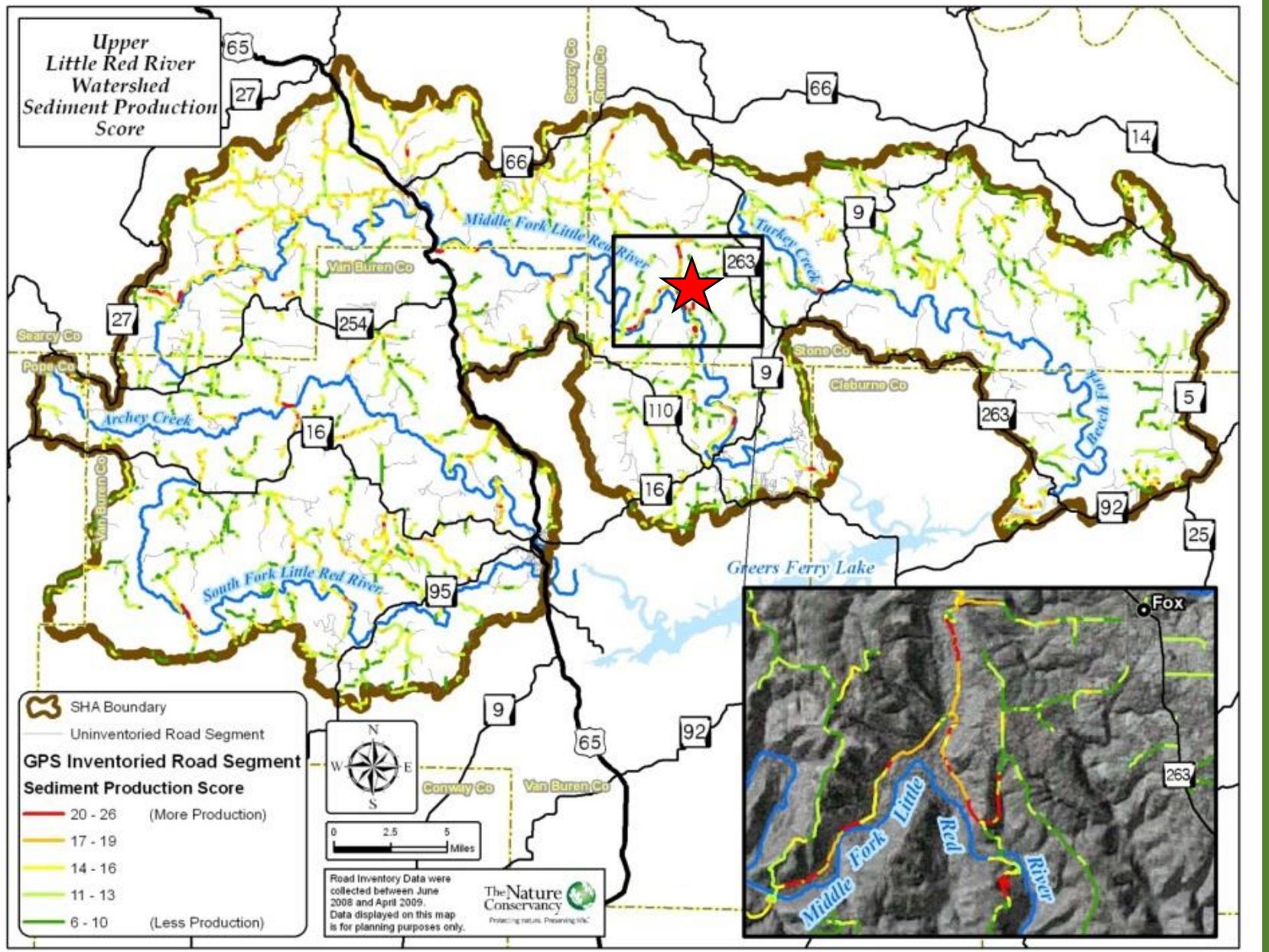
Bankfull Width – The width of the channel at the bankfull elevation.

Finding a "Reference Reach" of a Stream:

Because streams vary widely in composition, slope, and manmade impacts, it is impossible to create a set of "instructions" for determining bankfull that will work on every channel. The goal when determining bankfull flow is to find a "Reference Reach" of the stream that is the most representative of the natural channel. This sometimes means moving further upstream or down, or skipping sections of stream that are unnaturally widened or constricted. **Be flexible in choosing your bankfull measurement locations in order to find a section of stream that is the most representative of the natural channel.**

Procedure for Determining Bankfull Width Near a Road / Stream Crossing Structure:

Location: Start at a location away from the influence of any culvert or bridge, since they often impact width. To do this, roughly estimate bankfull channel width, then go at least 5 times that distance away from the structure. Looking upstream is preferred, but downstream reaches can be used if necessary *(see locations to avoid below)*.



Sources of Stress		Increased Sedimentation		Loss of Instream Habitat		Modification of water levels; changes in		Nutrification		Toxins/contaminants		Threat to System Rank
		Very High		Low		Low		Medium		Low		
Incompatible Livestock or Agricultural Practices	Contribution	Very High		Very High		Medium		Very High		High		
	Irreversibility	Low	Very High	Low	Low	Low	-	Low	Medium	Medium	Low	Very High
	Override											
	Source	High		High		Low		High		Medium		
Existing Roads and Road Maintainance	Contribution	Very High		Very High		Medium		Low		Low		
	Irreversibility	Medium	Very High	Medium	Low	Medium	Low	Low	Low	Low	-	Very High
	Override											
	Source	High		High		Medium		Low		Low		
Conversion of Riparian Forest	Contribution	Medium		High		Low						
	Irreversibility	Low	Medium	Low	Low	Low	-	-	-	-	-	Medium
	Override											
	Source	Low		Medium		Low		-		-		
Gravel Mining	Contribution	Low		Low								
	Irreversibility	Low	Medium	Low	-		-	-	-	-	-	Medium
	Override											
	Source	Low		Low		-		-		-		
Residential Construction	Contribution	Low										
	Irreversibility	Low	Medium	-	-	-	-	-	-	-	-	Medium
	Override											
	Source	Low		-		-		-		-		
Incompatible Livestock or Agricultural Practices	Contribution	High		High								
	Irreversibility	Medium	High	Medium	Low	-	-	-	-	-	-	High
	Override											
	Source	Medium		Medium		-		-		-		
Offroad Recreational Vehicle Use	Contribution	Low		High		Medium						
	Irreversibility	Low	Medium	Low	Low	Low	-	-	-	-	-	Medium
	Override											
	Source	Low		Medium		Low		-		-		
Conversion of Riparian Forest	Contribution	High		High		Medium						
	Irreversibility	Low	High	Low	Low	Low	-	-	-	-	-	High
	Override											
	Source	Medium		Medium		Low		-		-		


Before


Construction

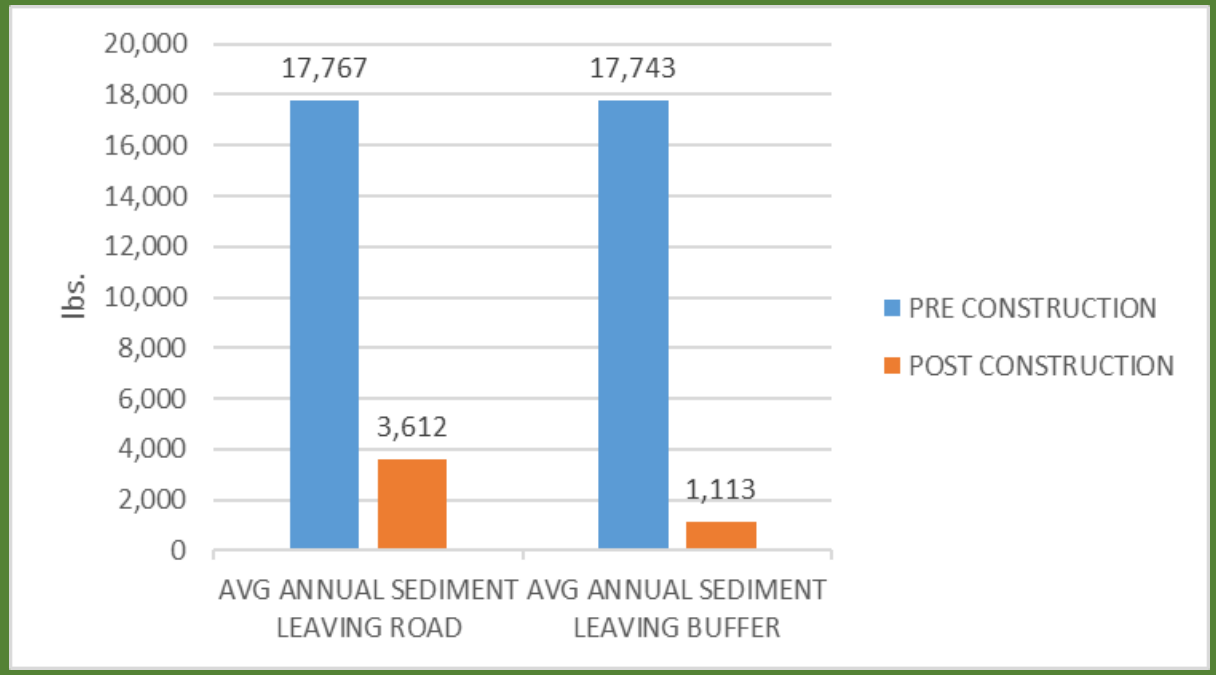

Construction


After

WEPP SUMMARY REPORT

WORKSITE ID: UPR-16-5
ROAD ID: MEADOW CREEK ROAD
DATE: 2/27/2017

	AVG ANNUAL SEDIMENT LEAVING ROAD (lbs)	AVG ANNUAL SEDIMENT LEAVING BUFFER (lbs)
PRE CONSTRUCTION	17,767	17,743
POST CONSTRUCTION	3,612	1,113
REDUCTION (VOLUME)	14,155	16,630
REDUCTION (PERCENT)	80	94



Stricken language would be deleted from and underlined language would be added to present law.

State of Arkansas *As Engrossed: H3/11/15*
90th General Assembly **A Bill**
Regular Session, 2015 SENATE BILL 613

By: Senators Irvin, *B. Sample, J. Woods*
By: Representatives House, Branscum, Tucker, *Hillman, D. Douglas, Boyd, Sabin*

For An Act To Be Entitled

AN ACT TO CREATE THE ARKANSAS UNPAVED ROADS PROGRAM ACT; TO PROVIDE GRANTS TO COUNTIES FOR UNPAVED ROAD PROJECTS; TO CREATE THE ARKANSAS UNPAVED ROADS PROGRAM FUND; AND FOR OTHER PURPOSES.

ARKANSAS
Economic Development Commission
RURAL SERVICES

APPLICATION PACKET

FISCAL YEAR 2017

ARKANSAS UNPAVED ROADS GRANT PROGRAM

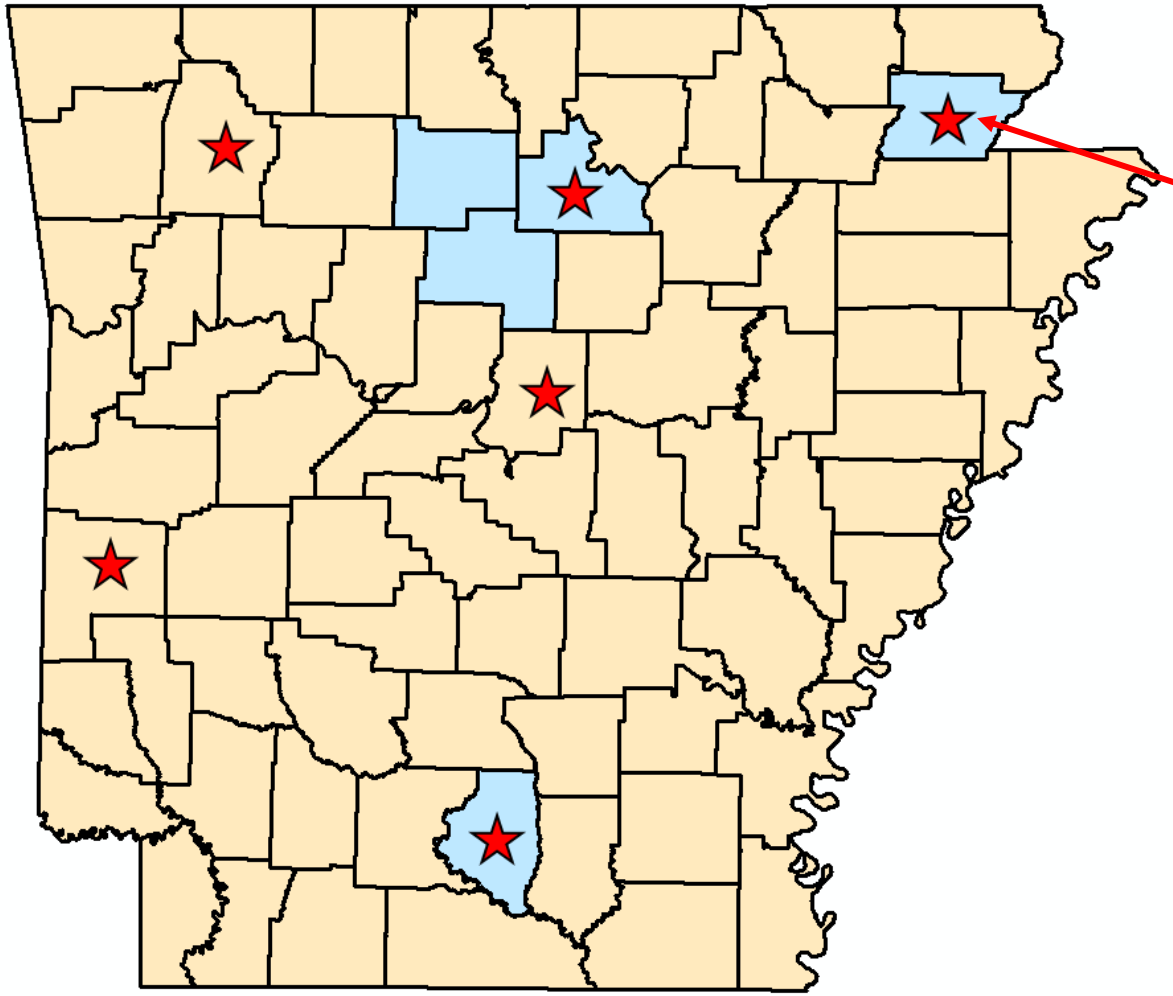
DEADLINE:
MARCH 9, 2017

ARKANSAS ECONOMIC DEVELOPMENT COMMISSION, DIVISION OF RURAL SERVICES
ARKANSAS RURAL DEVELOPMENT COMMISSION

For Questions Contact:
Brenda Rowell, Grants Manager
900 West Capitol, Suite 400
Little Rock, AR 72201
(501) 682.6011 | 1-888-RURAL-AR
Email: RuralServices@ArkansasEDC.com


MACK
STONE COUNTY

2016 Arkansas Unpaved Roads Program



- 2016 AURP Funded Projects

★ - 2016 ESM Workshop Sites

By the Numbers:

9 ESM Project Proposals

5 Projects Funded

$500,000 in total ESM projects

6 ESM workshops

100 Road Professionals

50 Counties and Municipalities

Calhoun County Road 20
2016 Arkansas Unpaved Road Program Project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