



# Low Impact Development Demonstration and Education Project for the Illinois River Watershed

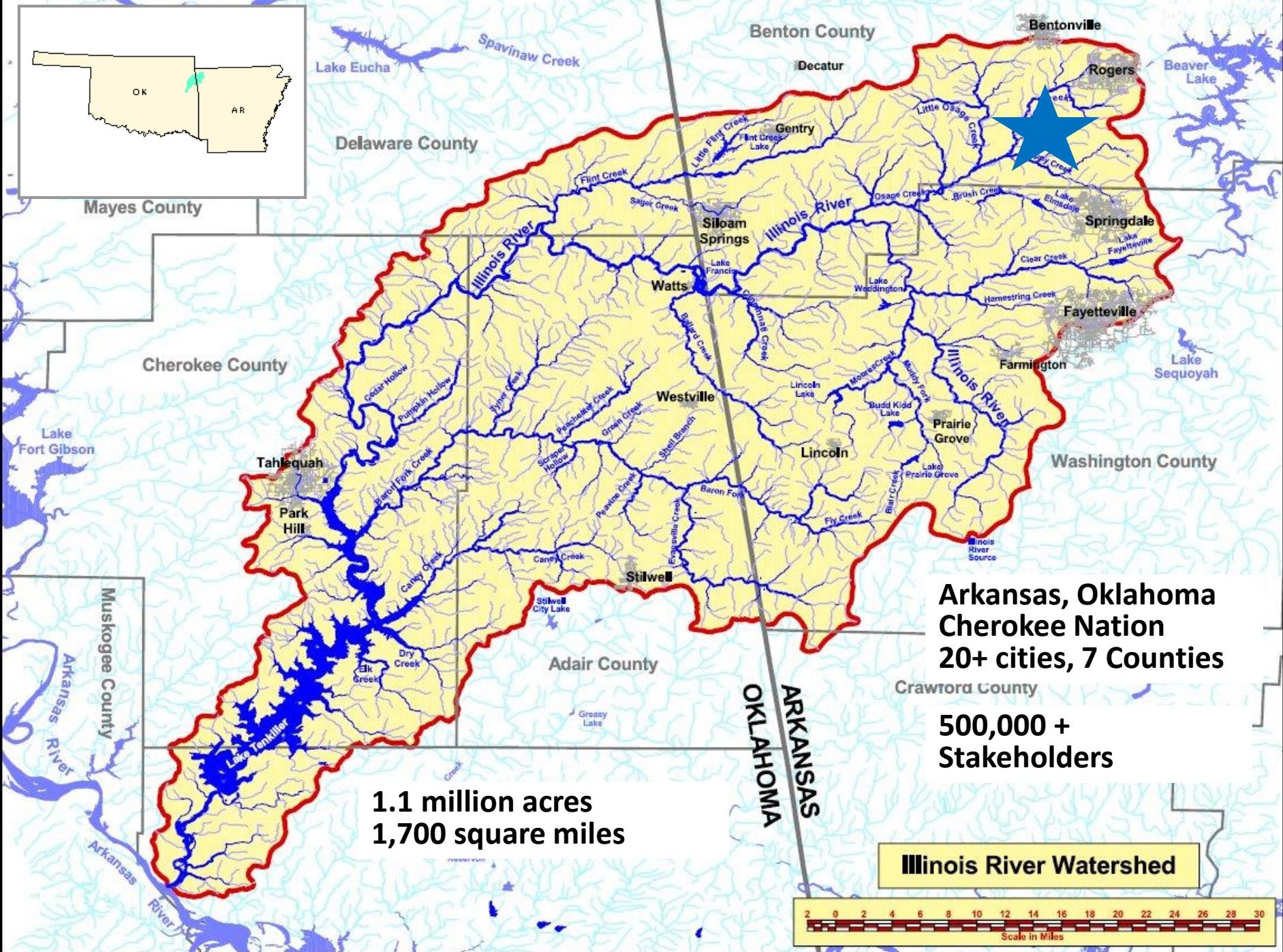
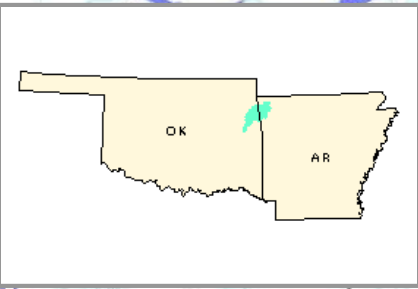
**Grant #13-1300**

**Project Period: July 1, 2013 – June 30, 2016**

**2016 Nonpoint Source Pollution Stakeholder & Project Review Meeting**







**1.1 million acres  
1,700 square miles**

**Arkansas, Oklahoma  
Cherokee Nation  
20+ cities, 7 Counties**

**500,000 +  
Stakeholders**

**Illinois River Watershed**





# Watershed Sanctuary







S. MAIN ST. (HWY. 112)

MIDWAY AVE.

GLENWOOD AVE.

PARTNERS LAKE

WOODLAND WAY TRAIL

SPRING LOOP TRAIL

SPRING LOOP TRAIL

SPRING LOOP TRAIL

HIGHFILL AVE.

SPRING LOOP TRAIL

PARKING AREA

S. MAIN ST. (HWY. 112)

WOODLAND WAY TRAIL

# ILLINOIS RIVER WATERSHED SANCTUARY CAVE SPRINGS, AR



Trail Mapping by Helen Tyson Middle School EAST

E. HWY. 264 (TO LOWELL)





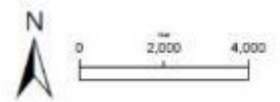
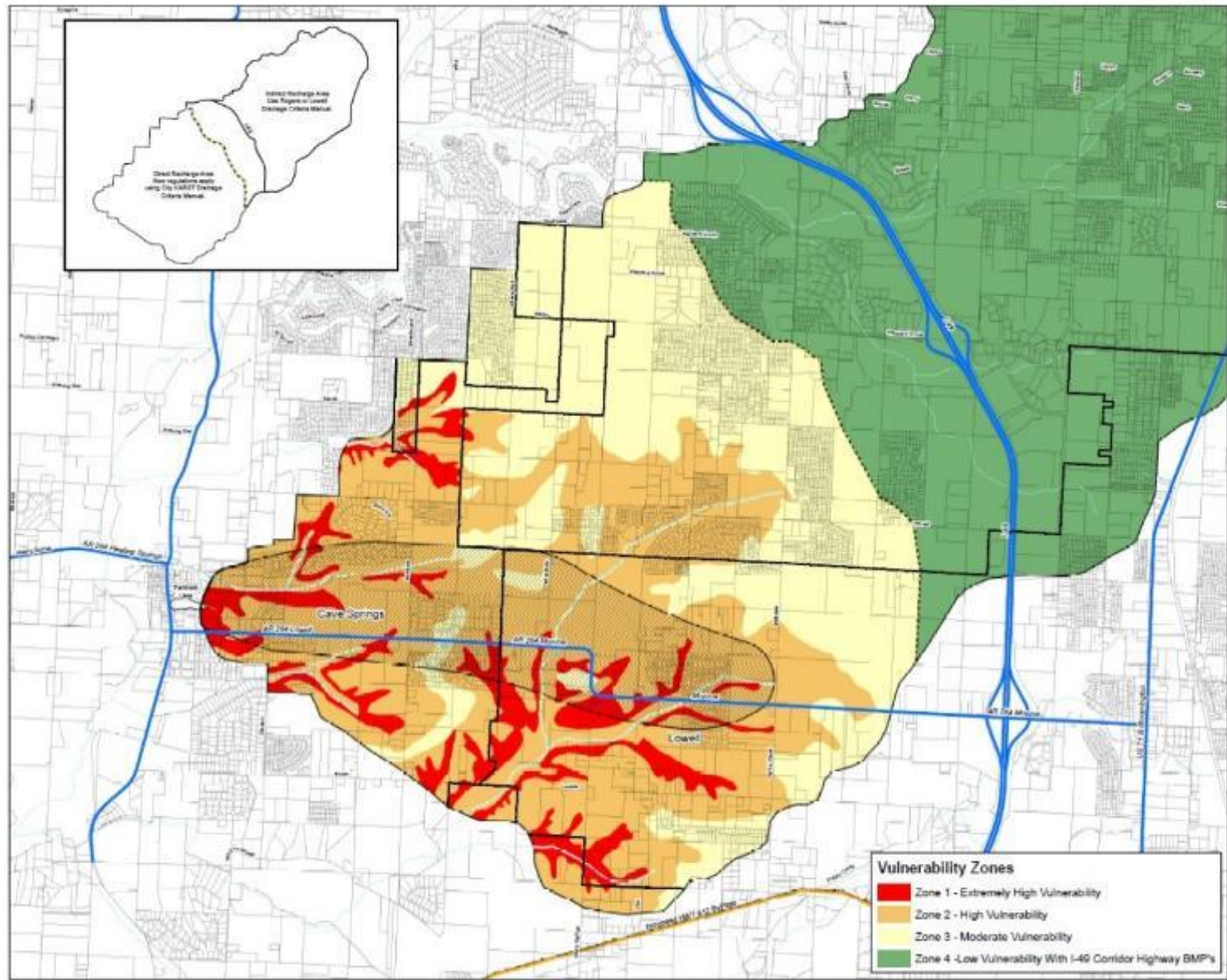


Blind cave fish  
Photo by Rick Olsen





## Cave Springs Direct Recharge Area Vulnerability Zone Map Exhibit "L"



**Vulnerability Zones**

- Zone 1 - Extremely High Vulnerability
- Zone 2 - High Vulnerability
- Zone 3 - Moderate Vulnerability
- Zone 4 - Low Vulnerability With I-49 Corridor Highway BMP's

**Legend**

- Losing Stream Corridor
- Streams & Rivers
- Cave Springs Recharge Area (Boundary) (2014)
- Direct-Indirect Division
- Cave Springs Groundwater Trough



ILLINOIS *River*  
WATERSHED PARTNERSHIP

# Watershed Learning Center











**Native Plant Workshop 2016**





IRWP Art & Nature Camps 2016



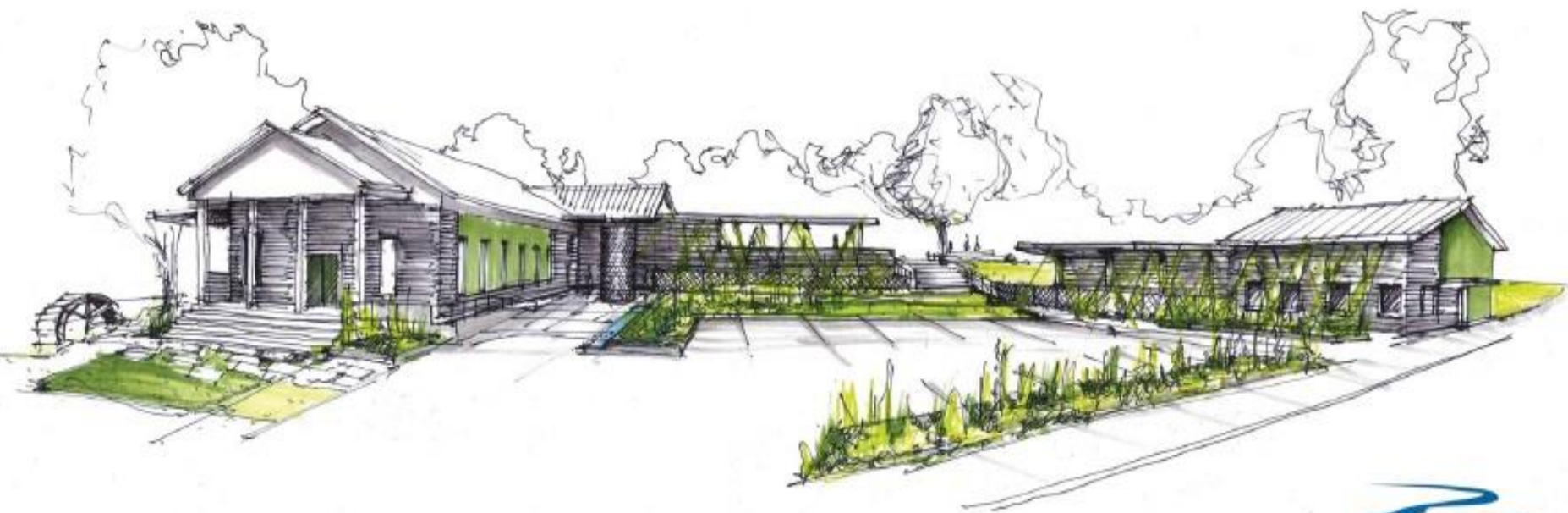
Project Goals:

**Design and Build Low Impact Development**

**Demonstration Projects on Site:** Determine design for rain garden, green roof pavilion, and raised bed agricultural demonstration, porous pavers for parking spaces, phosphorous removal structure, and vegetated wall.

**Educate and motivate** stakeholders to implement similar LID practices on their property and change behaviors that contribute to water pollution and improvement of water quality.





Illinois River Watershed Partnership  
[Watershed Learning Center]

modus studio  
architecture + prototyping





## Rain Garden:

685 SF rain garden installed to capture water from hwy and overland flow.

Native plant species used.

Educational signage installed.











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Grant 13-1300**





685 SF rain garden to capture water from hwy and overland flow.



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# Serviceberry Tree

*Amalanchier*

*“supports 119 different species of moths  
and butterflies native to the United States  
as either a larval host or source of nectar”*

*-Doug Tallamy*

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# Purple Coneflower

*Echinacea purpurea*

*Nectar source for butterflies and hummingbirds, songbirds feed on seed heads*

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# Blue Vervain

*Verbena hostata*

*Insects and bees, particularly bumblebees, collect nectar and pollen, and many birds, such as sparrows and cardinals, eat the seed*

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## Rush

*Juncus*

*clump forming wetland plant, attracts wildlife and provides nesting material and shelter*

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# Little Bluestem

*Schizachyrium scoparium*

Important food source for tiny butterflies - grass skippers and wood nymphs, and their abundant seed stems along road sides and in wild areas provide forage for many songbirds through winter



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## Pollutant Removal Rates:

- Copper: 50-89%
- Zinc: 62-88%
- TSS: 60-90%
- Total Phosphorus: 65%

## Volume Reduction

Reduce flow rates 70-90%  
Almost pre-development  
conditions!





PERMEABLE  
PAVER

BEDDING

BASE

SUB-BASE

SUB-GRADE

CONCRETE CURB

The Bio-Aquifer Storm System (BASS) allows for natural stormwater drainage and groundwater recharge, making the paved surface ecologically sound and economically smart.

In fact, the BASS method is an acceptable post-structural best Management Practice (BMP) used to meet the federal stormwater requirements. Roads and parking lots created using BASS with these permeable pavers offer vast benefits.

DRAINAGE PIPE

**Low Impact Development at WLC**







## POROUS PAVERS

### LOW IMPACT DEVELOPMENT





1



2



3

- 1 Porous pavers provide 80% surface runoff by allowing rain runoff to pass through when water flows through between holes. High-strength, durable, concrete pavers.
- 2 Porous paving also allows an additional unobstructed concrete pavement, is composed of a layer of concrete pavers separated by joints that will swell slightly. Water passes between pavers and flows through a layer of crushed stone. The spaces among the crushed stones allow water and infiltrate it back into the soil. The depth of the joints provides 100% surface permeability and the base stone will travel and remove sediments. It is an SUDS best-management practice (BMP) while providing a benign, safe to pedestrian surface that helps protect our watershed.
- 3 Porous infiltration rates in well-installed porous paver surfaces can typically average 4 to 6 inches of rain per hour, thereby infiltrating the local storm sewers. This meets Low Impact Development (LID) goals for decreasing site infiltration - helping reduce hydrologic groundwater erosion, promote tree survival and growth, contribute to local storm reduction through evaporation and be cost-effective, reducing the need for retention and other traditional pipe infrastructure.

For more information, visit [www.lidp.org](http://www.lidp.org)



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## Low-Impact Development at the Learning Center Grant 13-1300





## Low-Impact Development at the Learning Center Grant 13-1300





Sedum





Cost: \$10 – 24 per square foot

<http://www.eco-roofs.com/>





The P removal structure removed 23%, or 7.5 lbs of dissolved P during the 2.5 yrs in which it was monitored. (2016 Report)

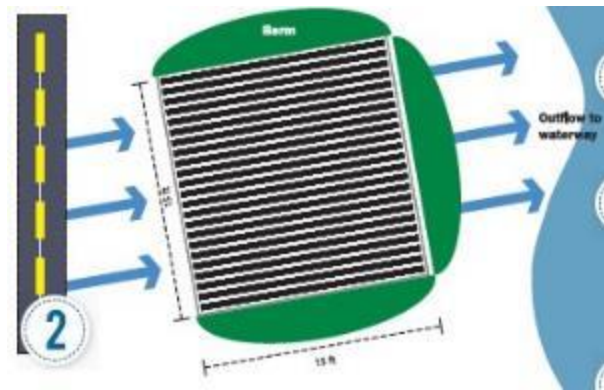
## Phosphorous Removal Structure with OSU Westville, OK





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# PHOSPHORUS REMOVAL STRUCTURE LOW IMPACT DEVELOPMENT



- 1 A phosphorus removal structure is an innovative new watershed best management practice designed by Oklahoma State University to reduce phosphorus levels in non-point source runoff and drainage waters to improve water quality.
- 2 Excessive phosphorus concentrations in surface waters lead to eutrophication, or a condition that results in poor aquatic ecosystem health through decreased oxygen levels and excessive plant and algae growth. This can cause fish kills, odors, and problems with water treatment processes and recreation. (Diagram: <http://web.ktriglepointwater.com>)
- 3 Phosphorus removal structures are strategically placed in phosphorus-rich areas in order to intercept and treat non-point source runoff before it reaches waterways. This structure contains steel slag, a locally-sourced, recycled material which binds with incoming dissolved phosphorus and allows filtered water to escape at the outflow.

For more information, visit [www.irwp.org](http://www.irwp.org)



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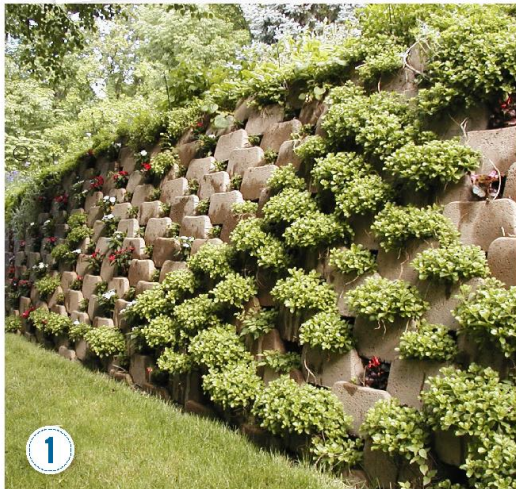




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# VEGETATED WALL LOW IMPACT DEVELOPMENT



1



2



3

- 1 A vegetated or "green wall" system helps reduce surface water runoff and filters pollutants from the water and air around it. A green retaining wall minimizes the impact of a needed structure.
- 2 Students from Kirksey Middle School in Rogers, Ark. helped to build this green wall by placing a special soil blend of compost, topsoil and sand mixture in the structure, helping to plant native plants along the wall and learning about watershed protection through Low Impact Development projects such as this!
- 3 A variety of native plants can be planted vertically! Here are some examples:

Vines:	Perennials:		Edible Plants:	
Virginia Creeper	Coreopsis 'Moonbeam'	Ajuga "Bugleweed"	Strawberries	Fennel
Trumpet Creeper	Aster	Coral Bells	Pumpkins	Parsley
Clematis	Sedum (all species)	Phlox	Squash	Rosemary
	Wild flowers	Salvia	Tomatoes	Sage
			Basil	Thyme

For more information, visit [www.irwp.org](http://www.irwp.org)



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# Rain Water Collection System





**November 2014: 35' x 800 Linear Feet Planted**

**Riparian Buffer Enhancement**



# 2014-2016 Outreach Education & Conservation Project Implementation TD:

**Participants: 10,744**  
**Hours: 24,145**

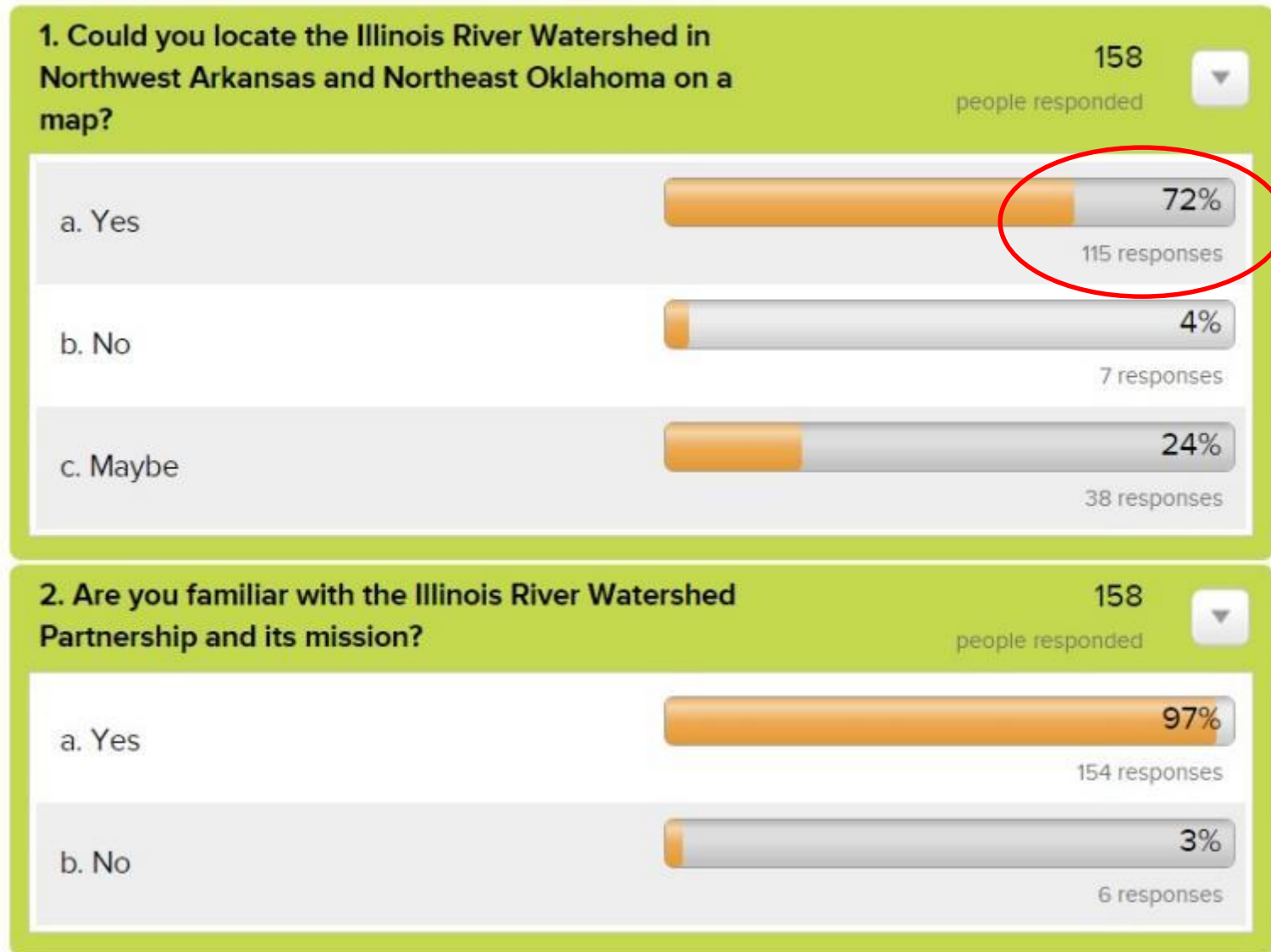
**Economic Value/Match: \$507,045**

\* Outreach Hours at \$21

<http://www.handsonnetwork.org/tools/volunteercalculator>



How people responded to the questions





4. What is your perception today of the water quality of the Illinois River Watershed?

158

people responded



a. High Water Quality



28%

45 responses

b. Medium Water Quality



58%

93 responses

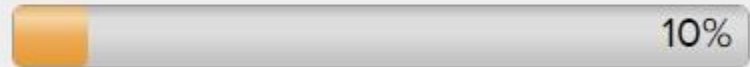
c. Low Water Quality



1%

3 responses

d. Don't know



10%

16 responses



**8. What conservation practices would you like to learn more about?**

158

people responded



**9. Have you participated in a conservation project or event in the Illinois River Watershed in the past:**

158

people responded





## WATERSHED CONSERVATION



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### OUR PASSION

We all live, work and play in the Illinois River Watershed. Like you perhaps, our passion for the land and waters of Northwest Arkansas and Northeast Oklahoma drives us to preserve and restore it for future generations — our children and yours — to enjoy. We hope you'll join us on this journey of discovery, appreciation and action. Learn what makes your watershed special and how each of us contributes to sustaining it.

### OUR TEAM



Our team leaders commit to protect and improve the quality of the watershed through personal actions. We respect and believe in the power of the individual and the personal impact each of us has on our surroundings. We invite you to become a part of this diverse group of people to make things happen!

### A LOOK BACK IN TIME

[Throwback Thursday](#)

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**2014/15 Newspaper/Radio/Interview Features = 25+ Articles**

**NWA Democrat Gazette readers = 187,600**

**Digital and Print Media Outreach**





**IRWP Approach: Education  
Motivation  
Action  
Watershed Protection**

*Illinois River, OK*

**Thank you!**