

# White River Bank Restoration and Monitoring Project ANRC Project No. 13-1100



September 2017

Matt Van Eps, Watershed Conservation Resource Center  
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September 27 and 28, 2017

# Project Goal

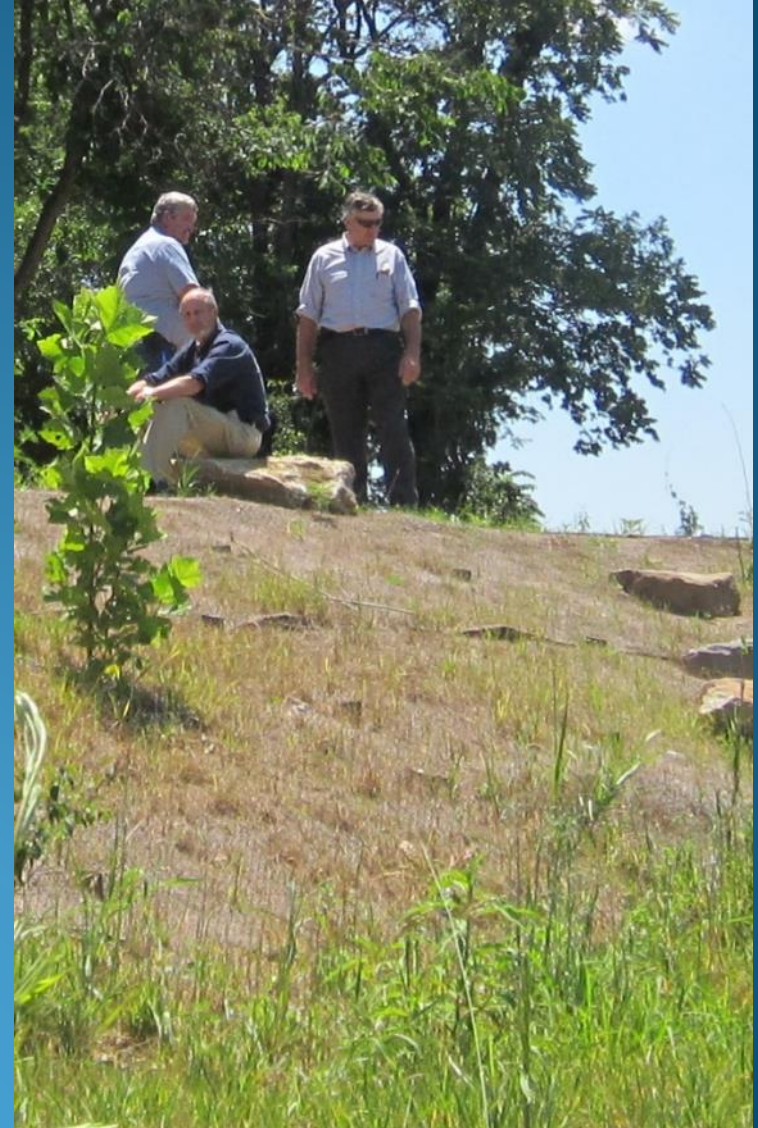
Reduce streambank erosion and associated sedimentation along a minimum of 1,250 feet of riverbank on the White River



# Project Partners

## Project Funding

- Section 319 (h) NPS Grant
  - Administered by ANRC
  - Funding Through US EPA
- Matching Funds
  - City of Fayetteville & CH2MHill
  - Beaver Water District
  - Beaver Watershed Alliance
  - ADEQ

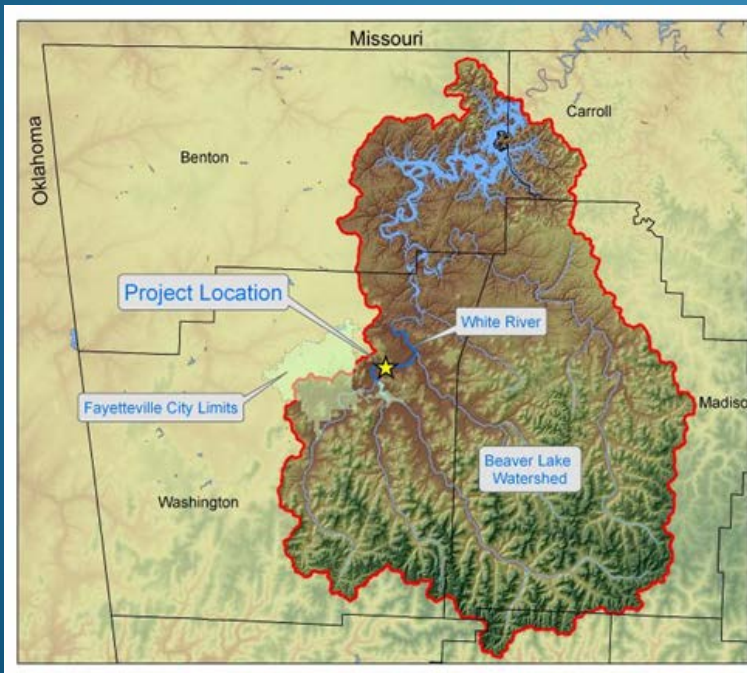


# Project Site Specifics

## Beaver Lake Watershed

- White River
- 400 mi<sup>2</sup> drainage area
- 18' tall banks
- 12,000 cfs  $Q_{bkf}$
- 180'  $W_{bkf}$

*This River is BIG!*



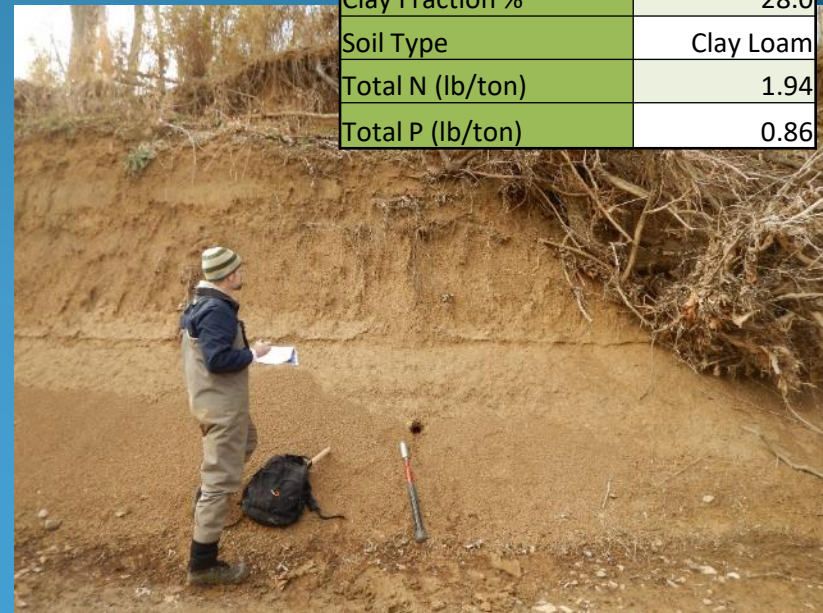
# Streambank Material Sampling

## Initial Monitoring

- Streambank Soil Samples Collected
  - 17 samples collected

## Sampling Results

Parameter	Min	Max
Bulk Density (lb/ft <sup>3</sup> )	74.9	93.1
T. Phosphorus (lb/ton of sediment)	0.55	1.2
T. Nitrogen (lb/ton of sediment)	1.5	3.3



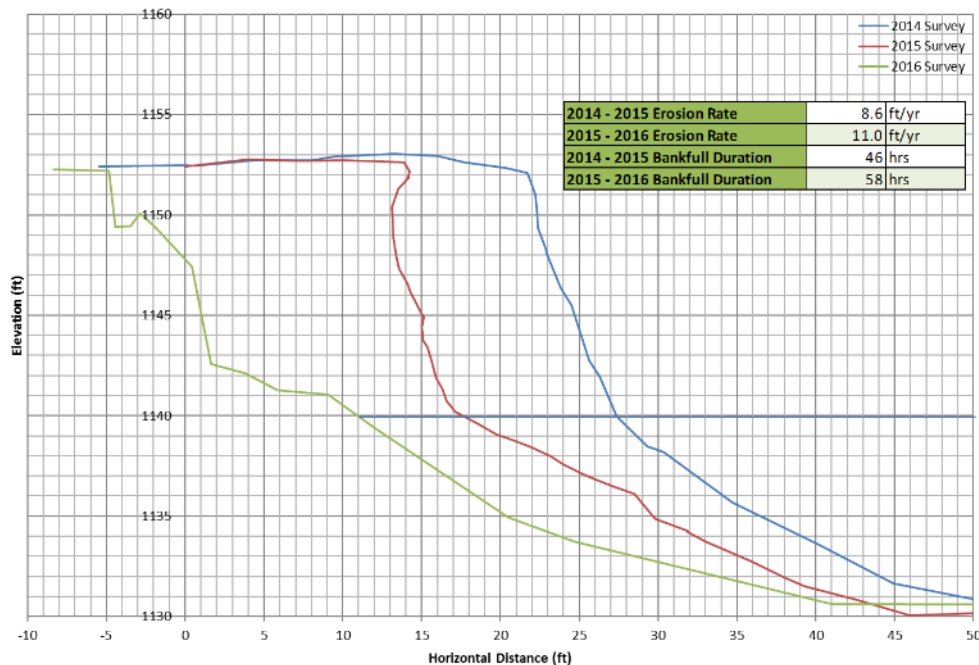
Sample ID	WWTP 03-02
Bulk Density (lb/ft <sup>3</sup> )	82.8
Clay Fraction %	28.0
Soil Type	Clay Loam
Total N (lb/ton)	1.94
Total P (lb/ton)	0.86

# Streambank Profile Measurements

## Pre-Restoration Monitoring

- Streambank Profiles Collected
  - Seven Sites Evaluated
  - Bank Profiles Surveyed 3 times
    - 2014, 2015, 2016
  - Erosion Rates Determined
  - Potential Load Reduction Estimated

White River Bank Stabilization - XS4



Erosion Rate (ft/yr)	2014-2015	2015-2016
xs1	5.3	3.8
xs2	1.6	7.2
xs3	1.0	10.8
xs4	8.6	11
xs5	12.7	5.3

Sediment Load (ton/yr)	3,618	4,862
Total P Load (ton/yr)	3,184	4,278



# Fish Sampling

- Initial Fish Sampling Conducted
- October 2014
- Fish numbers and species varied by habitat type
- Resampled July 2017
- Data is being evaluated



# Project Outreach

## Outreach

- Two seed collection and education events have been conducted (2015 and 2016)
- Primary seed type collected was Wild Rye
- Additional outreach events and tours are scheduled



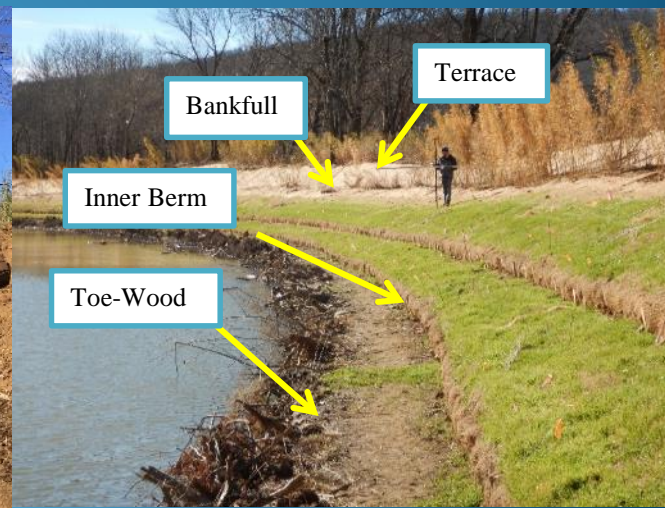
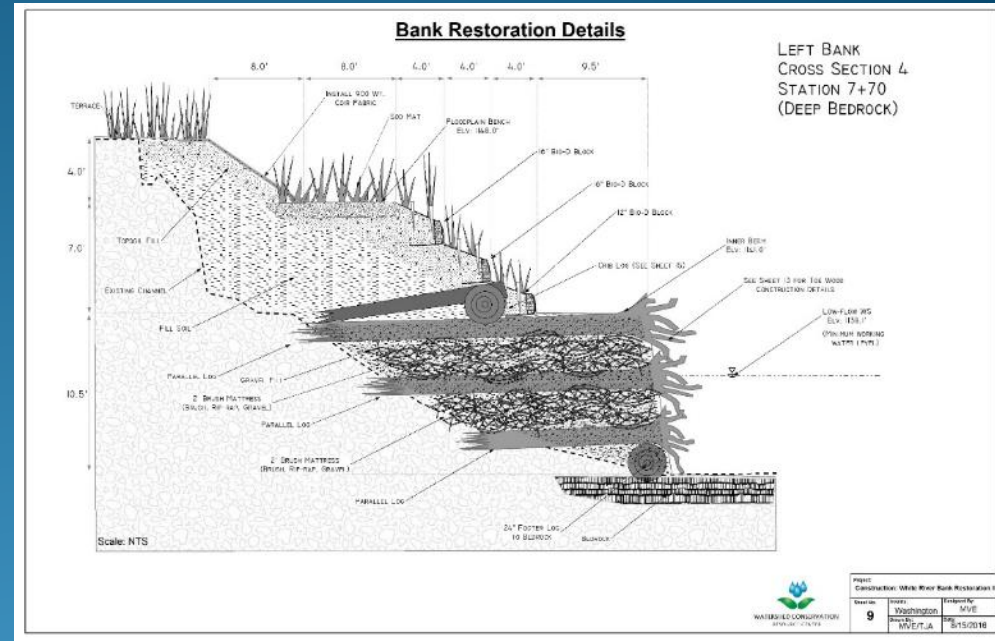
Volunteers collecting wild ryes on the White River



# Project Design

## Restoration Plan Development

- Site Geomorphology Data Collected
- Topographical and Other Survey Data Collected
- Restoration Design Complete
- Permits Were Received
- Construction Bids Received



# Project Implementation

## Restoration Plan Implementation

- 600 Trees (reclaimed)
- 4,000 yd<sup>3</sup> of Fill Earth
- 1,000 yd<sup>3</sup> of Rock
- Construction Began October 14, 2016
- Heavy Construction Completed December 12, 2016
- 4,500 Tree and Shrub Seedlings
- 1,000 Grass Plugs
- Planting continued through March 2017



# Site Transformation



One Growing Season

# White River: Before and After



**XS1 After**

# White River: Before and After



XS2 After

# White River: Before and After



XS3 After

# White River: Before and After



**XS4 After**

# The Floods Did Come



March 25, 2017 (6,000 cfs)

April 26, 2017 (29,400 cfs)

April 30, 2017 (28,300 cfs)



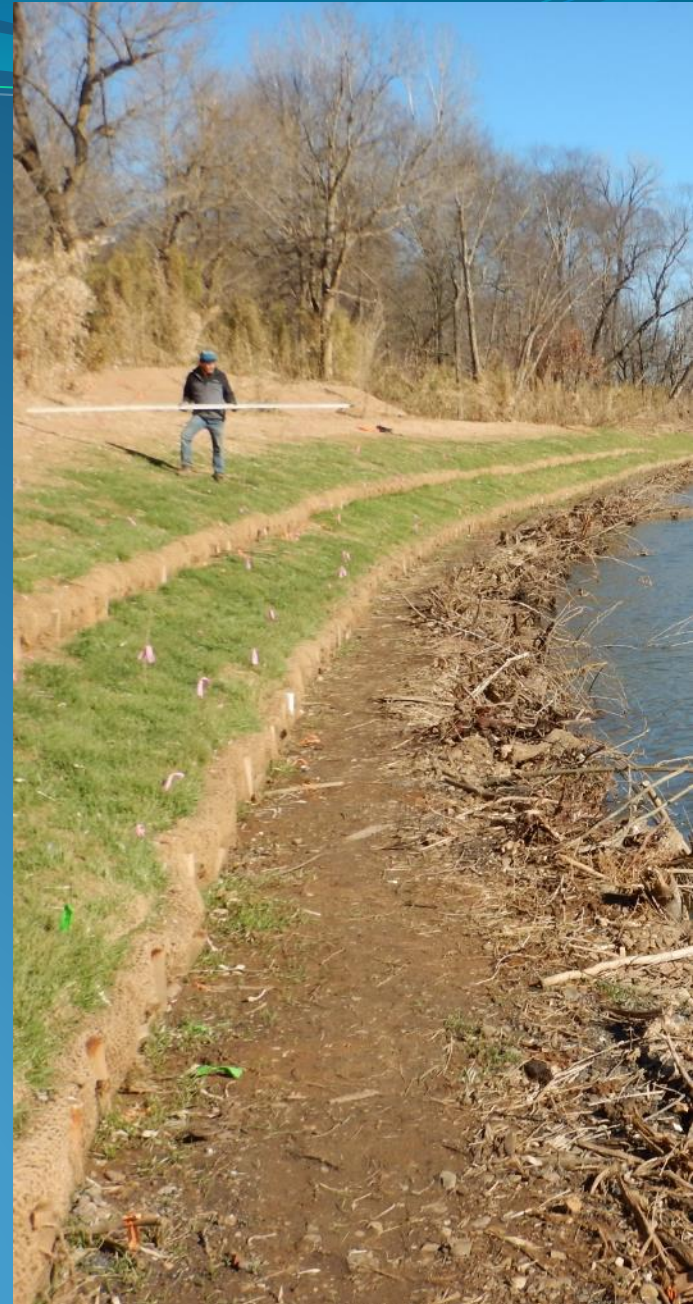
# Project Outcomes

- Over 1,200 Feet of Riverbank Restored
- Reduced Annual Sediment Loads by 3,600 ton
- Reduced Annual TP Loads by 3,200 lb
- Improved Aquatic Habitat
- Established Native Riparian Area
- Protected Civil Infrastructure



# Next Steps

- Post construction monitoring
  - One-year as-built survey
  - Fish sampling data analysis
- Make minor repairs
- Conduct tours
- Develop final report



Thank You Partners!!!



Questions?

Matt Van Eps, PE  
[vaneps@watershedconservation.org](mailto:vaneps@watershedconservation.org)