

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



September 2017

**Matt Van Eps, Watershed Conservation Resource Center
ANRC 2016 NPS Program Annual Meeting
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 Objectives

Objectives

- Reduce sediment and phosphorus loadings to the White River
- Develop a riverbank restoration plan that
 - addresses bank instability;
 - meets landowner and local objectives;
 - maximizes sediment & phosphorus reduction;
 - maximizes habitat restoration.
- Evaluate the effectiveness of riverbank restoration
 - quantify sediment and nutrient loads
 - assess aquatic habitat and fish communities
- Increase awareness and promote the use of natural channel design



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

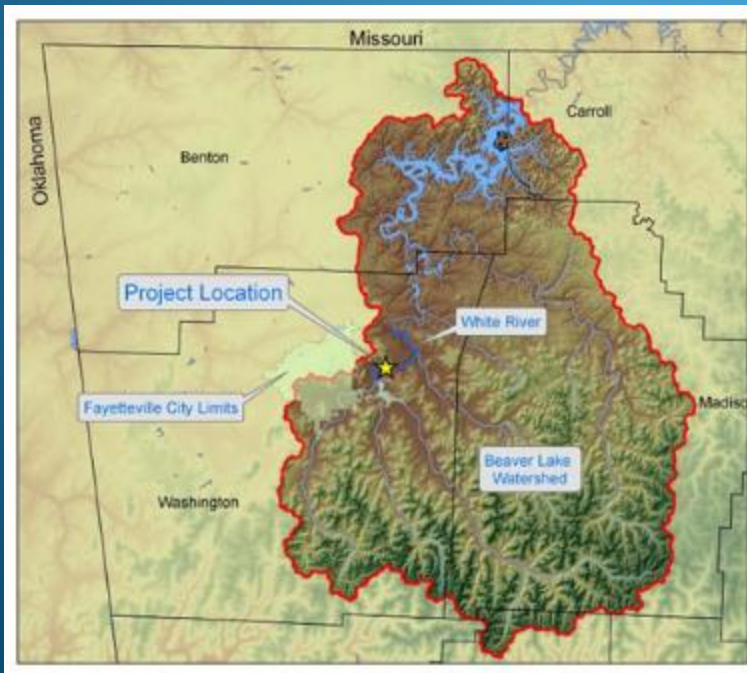


Project Site Specifics

Beaver Lake Watershed

- White River
- 400 mi² drainage area
- 18' tall banks
- 12,000 cfs Q_{bkf}
- 180' W_{bkf}

This River is BIG!



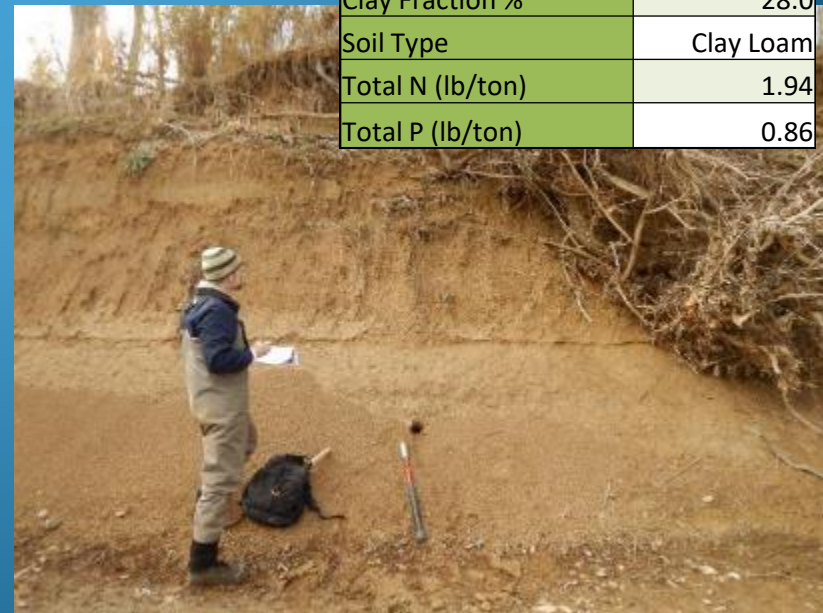
Streambank Material Sampling

Initial Monitoring

- Streambank Soil Samples Collected
 - 17 samples collected

Sampling Results

Parameter	Min	Max
Bulk Density (lb/ft ³)	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 ³)	82.8
Clay Fraction %	28.0
Soil Type	Clay Loam
Total N (lb/ton)	1.94
Total P (lb/ton)	0.86

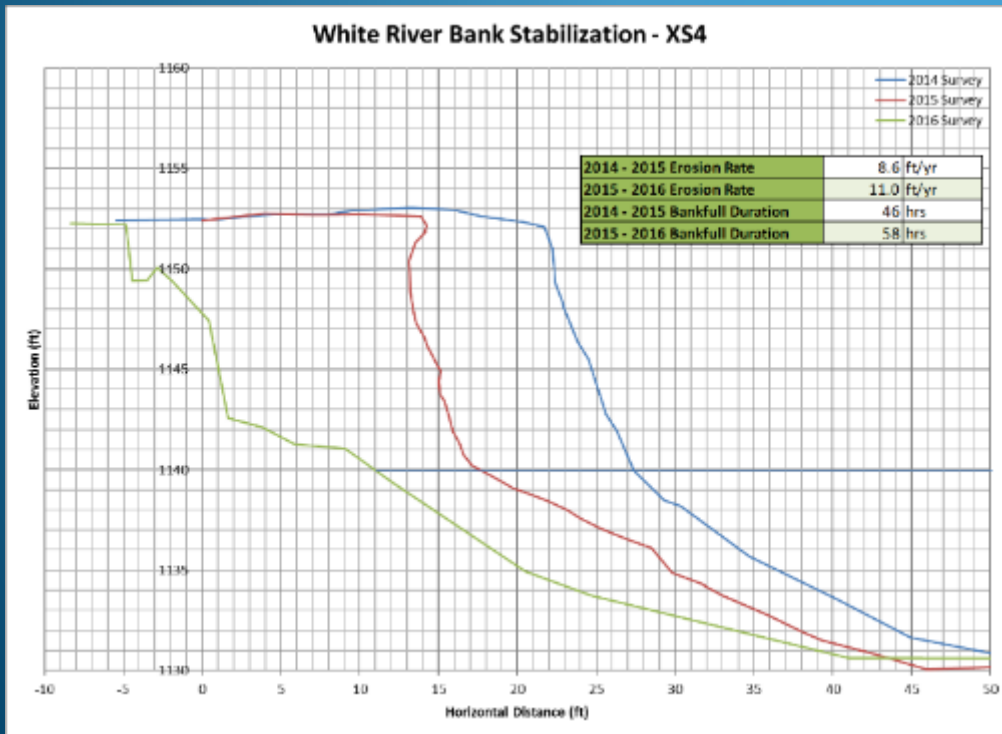
Streambank Profile Measurements

Pre-Restoration Monitoring

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

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

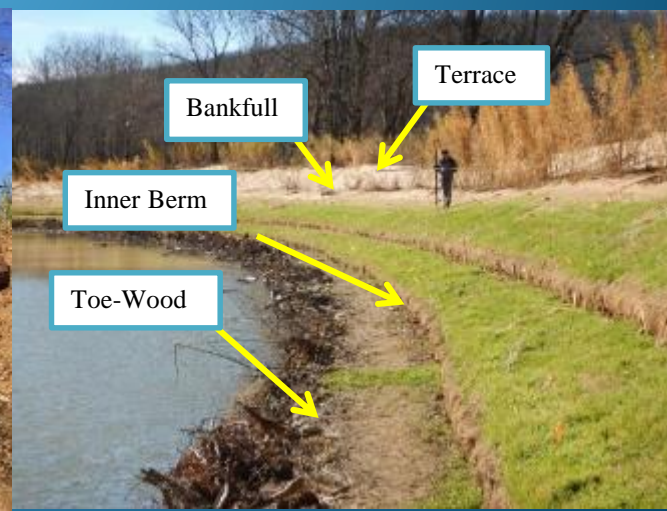
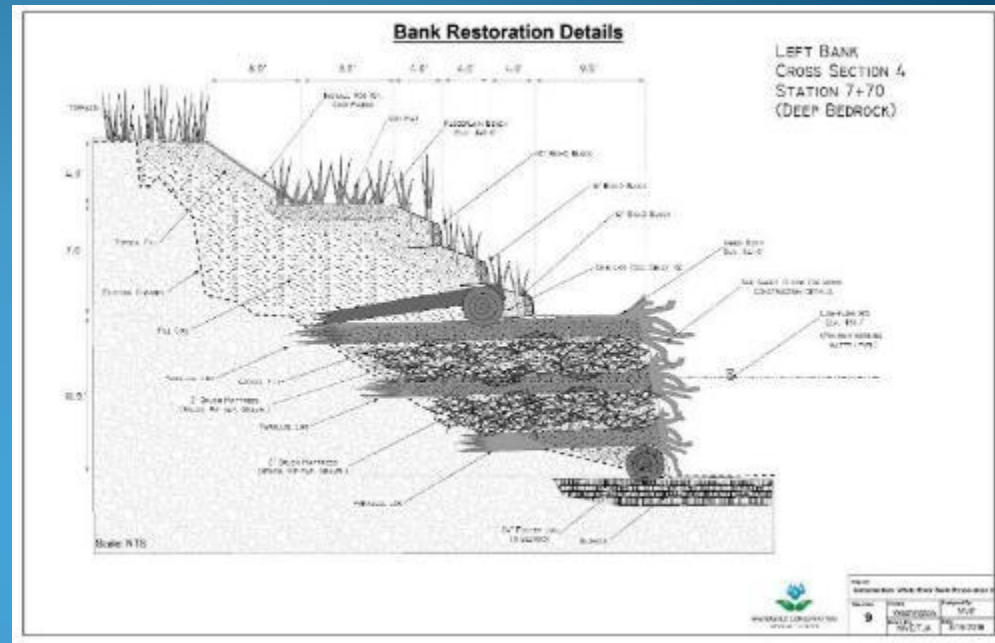


Volunteers collecting wild ryes on the White River

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 yd³ of Fill Earth
- 1,000 yd³ 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?

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