

# White River Bank Restoration and Monitoring Project

## ANRC Project No. 13-1100



Matt Van Eps, Watershed Conservation Resource Center  
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September 23 and 24, 2015



# Project Goal & Objectives

## Goal

- Reduce streambank erosion along a minimum of 1,250 feet of riverbank on the White River
  - 750 feet of bank reconstruction using toe-wood techniques
  - location near the City of Fayetteville waste water treatment plant





# Project Goal & Objectives

## Objectives

- Reduce sediment and phosphorus loadings to the White River
- Develop a site specific, riverbank restoration plan which
  - 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 among landowners and the public



# Severe Streambank Erosion Source of Sediment and Nutrients to Rivers



What does bank erosion look like?



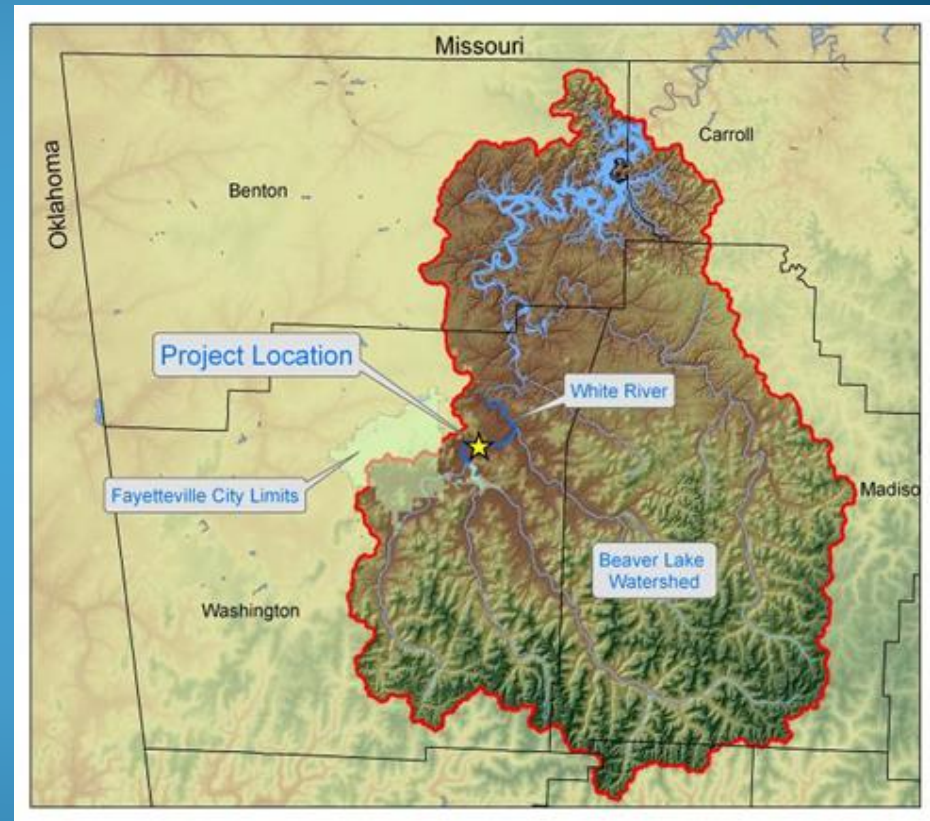
# Project Location and Funding

## Beaver Lake Watershed

- White River
- City of Fayetteville Noland Wastewater Treatment Plant

## 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 Partners

- Watershed Conservation Resource Center
- Arkansas Natural Resource Commission
- US Environmental Protection Agency
- City of Fayetteville
- CH2M Hill
- Beaver Water District
- Beaver Watershed Alliance
- Arkansas Department of Environmental Quality

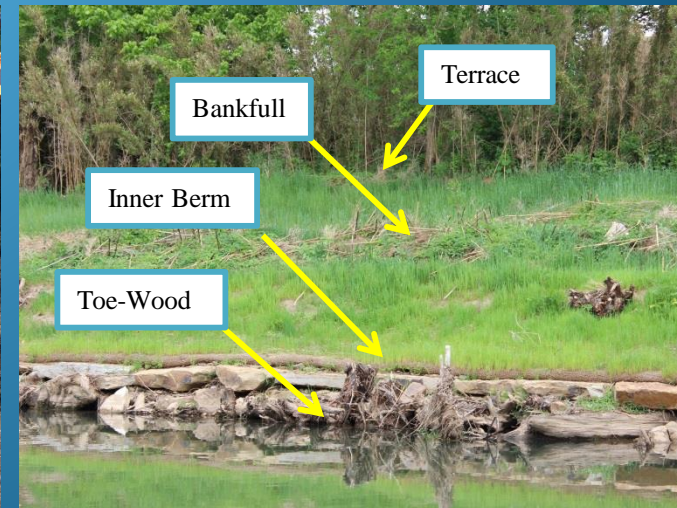
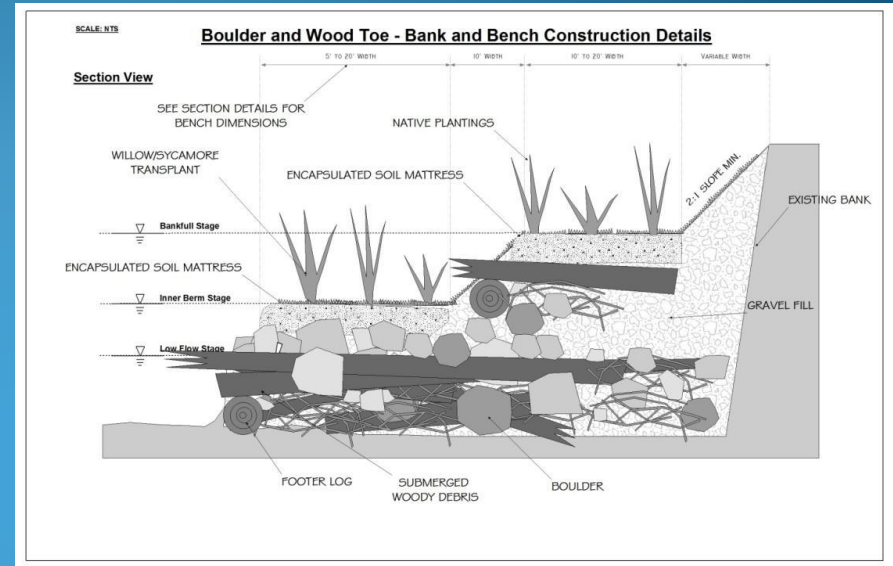




# Project Status

## Restoration Plan Development

- Site Geomorphology Data Collected
- Topographical and Other Survey Data Collected
- Toe-wood structure will be the basic design technique

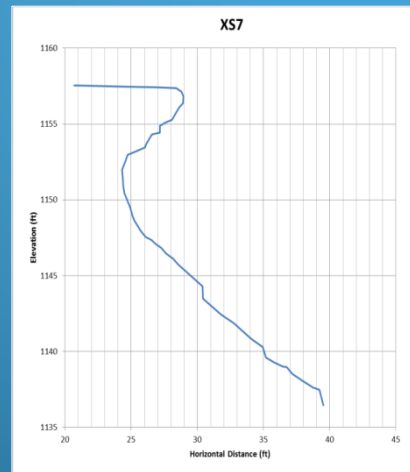


# Project Status

## Initial Monitoring

- Streambank Profiles Collected
  - Seven Sites Evaluated
- Determined
  - Bank Erosion Hazard Index
  - Near Bank Shear Stress

Bank ID	XS7
Bank Location	Bend
Root Depth (ft)	1.5
Root Density	20%
Bank Angle	64°
Surface Protection	0%
Bank Material Points	0
Stratification Adjustment	0
Bank Height Ratio	1.5
Bank Length(ft)	270
Bank Height (ft)	21
NBS	MODERATE
BEHI Rating	VERY HIGH





# Project Status

## 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



# Project Status

## Initial Monitoring

- Initial Fish Sampling Conducted
- October 2014

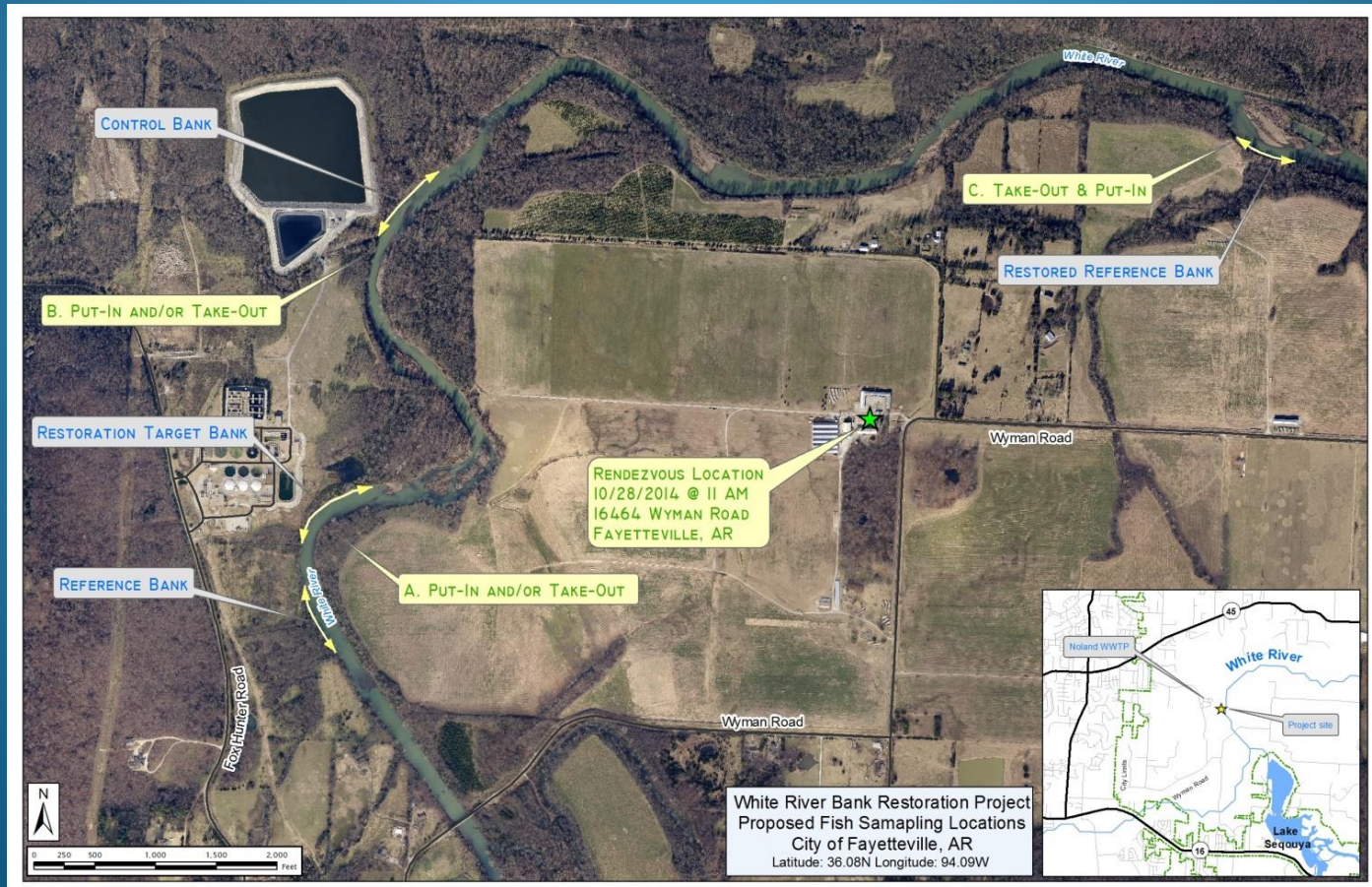




# Project Status

## Four Streambanks Selected to Monitor

- Eroding Streambank - Control
- Eroding Streambank - To be Restored
- Restored Streambank
- Reference Streambank





# Project Status

## Outreach

- Scheduling two native seed collection events with volunteers to be used at restoration site

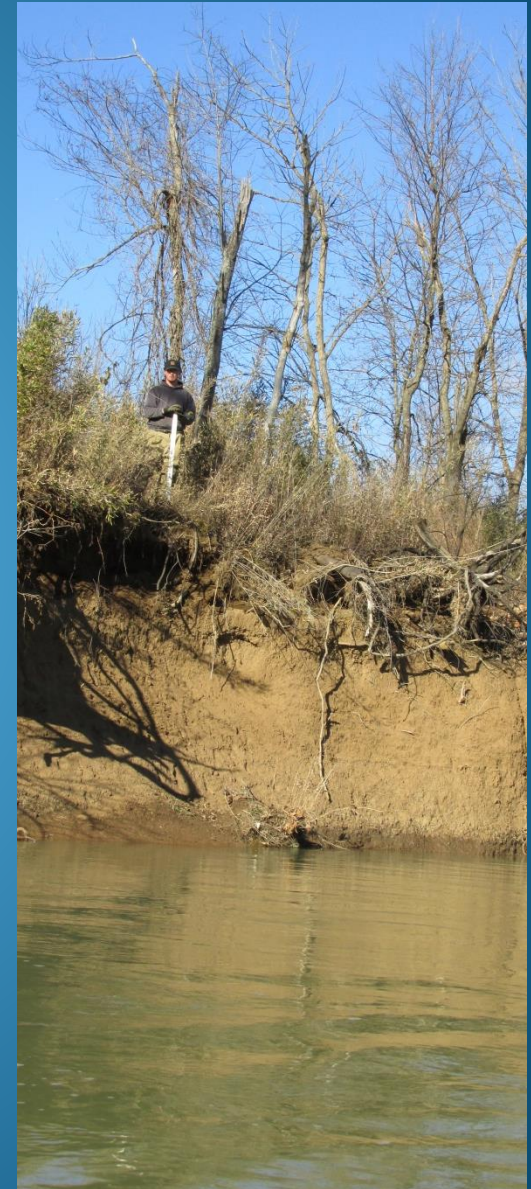


Volunteers collecting wild ryes on the White River



# Next Steps

- Follow-up erosion monitoring (Oct 2015)
- Gather construction materials (Ongoing)
- Design development (Winter 2016)
- Obtain Permits (Spring 2016)
  - ADEQ STAA
  - Corps of Engineers 404 Permit
  - Fayetteville Floodplain Development Permit
- Develop bid documents/select contractor (Spring 2016)
- Construct project (Summer 2016)
- Post construction monitoring
  - As-built survey
  - Fish sampling





# 2012 White River Streambank Restoration Update





# Site Transformation



**3 Years After Construction**



# 2012 White River Streambank Restoration Update

## View From the River





# 2012 White River Streambank Restoration Update

## Sediment & Phosphorus Reduction to Date

Bankfull Flow: 12,500 cfs

Water Year	Hours Above Bankfull	Max Discharge (cfs)	Date	Number of Bankfull Events
2008	19	28,100	9/14/2008	2
2009	15	18,400	9/22/2009	2
2010	31	38,100	10/9/2009	4
2011	85	52,900	4/25/2011	4
2012	12	13,000	11/8/2011	2
2013	0	11,800	8/10/2013	0
2014	10	16,400	3/16/2014	1
2015	49	22,200	5/24/2015	4



### Three + Years Since Construction

- Sediment Reduction: 3 yr X 3,600 ton/yr
  - 10,800 tons
- T. Phosphorus Reduction: 3 yr X 3,500 lb/yr
  - 10,500 lbs







Questions?

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