

A Case Study Involving Restoration of Critical Stream Bank and Riparian Areas Via a Multi-Agency Cooperative Project

G. Levesque¹ and J. Burroughs²

¹Oklahoma Conservation Commission

²Oklahoma Department of Wildlife Conservation



Cooperative/Collaborative Opportunities

- SARP – Southeast Aquatic Resources Partnership
(U.S. Fish and Wildlife Service)
- OCC – Oklahoma Conservation Commission
 - EPA (U.S. Environmental Protection Agency 319 Program)
- ODWC – Oklahoma Department of Wildlife Conservation





SARP's Mission:

SARP will, with partners, protect, conserve and restore aquatic resources including habitats throughout the Southeast for the continuing benefit, use and enjoyment of the American people.

[READ MORE](#)

Species Spotlight:



Atlantic Sturgeon
(*Acipenser oxyrinchus*)



[Learn more about this species](#)

Featured Project:



Welcome to SARP's new website

Learn more about the new site features

1 2 3 4 5

Southeast Aquatic Resources Partnership

The Southeast Aquatic Resources Partnership (SARP) is a regional collaboration of natural resource and science agencies, conservation organizations and private interests developed to strengthen the management and conservation of aquatic resources in the southeastern United States. [LEARN MORE](#)

News and Announcements

- Watershed Decision Tool Webinar Series Coming**
 Please consider participating in a conversation about the wide array of watershed tools and... [More](#)
- SARP Seeks Partnership Coordinator - Apply Now!**
 The Southeast Aquatic Resources Partnership (SARP) is searching for a new



Upcoming Events

- Southeast Connectivity Assessment Project (SEACAP) Fish Passage Prioritization Workshop at the Southern Division American Fisheries Society Meeting**
 The Southeast Connectivity Assessment Project (SEACAP) will demonstrate the tool to assess and... [More](#)
- SEACAP Workgroup Meeting #8 - July 7, 2014**
 This call focused on the current state of our resident fish

Participate in



How you can be involved with this conservation effort...



Purpose of Project

To enhance stream habitat by:

- Stopping stream bank erosion due to anthropomorphic causes
- Create riparian buffers
- Reduce sediment, nitrogen and phosphorus inputs to improve water quality
- Improve stream function and channel morphology

Impacts of Stream Bank Erosion on Fisheries and Water Quality

➤ Excess Siltation

- Disruption of normal reproduction
- Interruption or destruction of the food supply
- Decreased feeding visibility
- Clogging of gills
- Decreased habitat diversity

➤ Greatest Impact

herbivores, benthic insectivores and simple lithophilous spawners.

➤ Excess Nutrients

- Increase in biological production
- decrease in dissolved oxygen

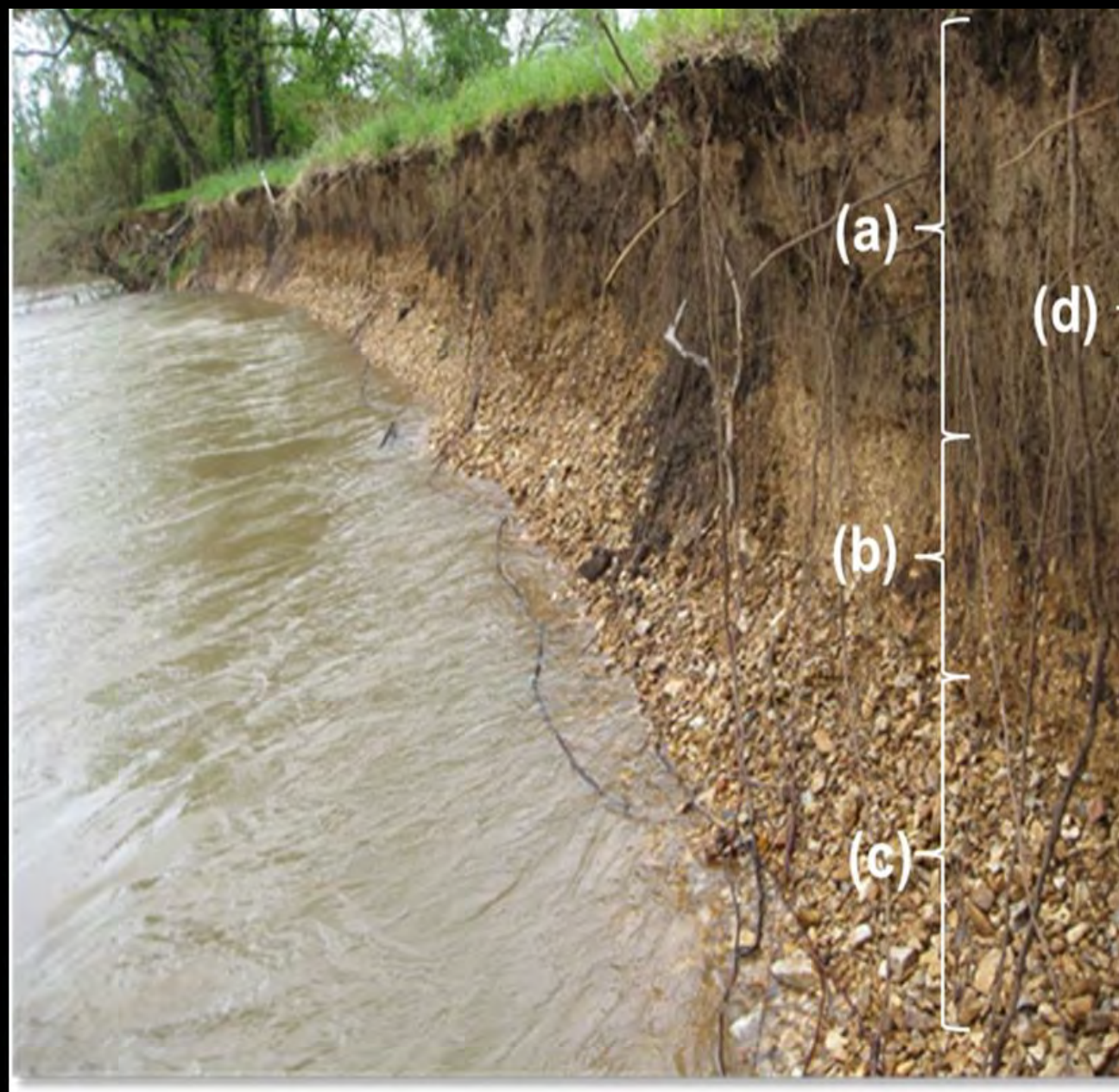


Factors Contributing to Stream Bank Erosion

1. Removal of Riparian Vegetation
2. Geology of the system
3. Farming and Livestock
 - Clearing of banks to increase size of pastures
 - Livestock trails to water
 - Overgrazing of vegetation

1. Removal of Riparian Vegetation





2. Geology of System



2. Geology of System



3. Farming and Livestock



Proposed Project Location

➤ Barren Fork

- Scenic River
- A 57-km tributary of the Illinois River. 936km² drainage area.
- The Ozark Highlands region, includes parts of Oklahoma, Arkansas, and Missouri, characterized by cherty, gravelly soils and gravel bed streams with clear cool water.
- Oklahoma is home to over 170 species of fish. The Barren Fork/Illinois drainage alone is home to 80 species.
- Western range of the Neosho Smallmouth Bass.



Photo credit Brandon Brown

Barren Fork/Erosion

- Documented stream bank migration rates are 8 m for protected and 45 m for unprotected.
- Unprotected failing banks responsible for approximately 1540 kg per year of water soluble phosphorus.
- An estimated 3300 grams/meter/year of total phosphorus entering the stream.
- Total phosphorus = 93,000 kg/year from the entire stream.



Priority Two Area

Priority One Area

0 0.05 0.1 0.2 Miles



Natural Channel Design and Stabilization Methodology

- What?
- Why?
 - Works with nature, not against it
 - Aesthetically pleasing
 - Creates habitat for aquatic life
 - Less expensive

Natural Channel Design Techniques

- No visible use of rip –rap
- Use of natural materials
 - Native rock for large structures
 - Re-use of trees removed during construction
- Instream structures
 - J-hooks
 - Step-pool designs
 - Cross bars
 - Toe wood
- Bank sloping to reconnect stream with flood plain
- Re-vegetation of banks with native plants
- In-stream pattern of meanders and riffle/pool/glide sequences maintained

Bank Sloping 3:1

Before



After



In Channel Structures - J-Hooks



Toewood Placement



Added Insurance

Conservation Reserve Enhancement Program (CREP)

- Enrollment of natural flood plain area
- 50 – 300 feet from top, or edge, of stream bank
- Annual rental payment on acreage
- Regeneration of Woodlands
- Best Management Practices
 - Cost-share 50% + 40% Practice incentive Payment = 90%



CREP \$\$\$\$

- Annual Rental Payment (up to 15 years)
 - 150% rental payment for marginal pastureland
 - Cherokee County: $\$42/\text{acre} \times 150\% = \$63/\text{ac}$
- Maintenance Payment
 - $\$2\text{-}5/\text{acre}$
- Sign-up Incentive Payment
 - One time
 - $\$100/\text{acre}$

Total:

- Up to $\$63 + \$5 + \$100 = \$168/\text{acre}$ first year
- $\$68/\text{acre}$ each year thereafter



Basic Buffer Management

- Restricted Activities:
 - No Haying
 - No Grazing (total exclusion)
- Maintenance:
 - Fences
 - Establishment of trees
 - Natural regeneration
 - Planting of bare root seedlings
 - Brush Management:
 - Cedars, thistle, honey locust, osage orange



Proposed Time Line for Project

- Pre-construction surveys this summer
- Construction – Late Summer/Fall 2015
- Vegetation established by March 2016
- Enrollment in CREP – Spring 2016
- Ongoing surveys and project monitoring post-construction





Questions?