

White River Streambank Restoration Project (FY 09 - 1900)

The Watershed Conservation Resource Center (WCRC) worked with project partners to stabilize a riverbank on the White River near Fayetteville, AR. A stabilization plan was developed and implemented for the eroding bank which was contributing an estimated 11,000 tons of sediment per year to the White River. Beaver Reservoir is located only a few miles downstream of the project site. The project was funded by an Environmental Protection Agency Section 319(h) grant administered by the Arkansas Natural Resources Commission with matching funds provided by the City of Fayetteville and other project partners. The project was initiated January 2011 and completed April 2012.

Project Partners

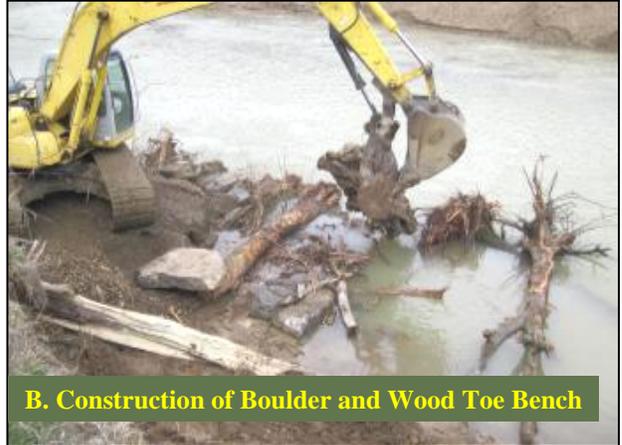
Arkansas Natural Resource Commission
U.S. Environmental Protection Agency
Watershed Conservation Resource Center
City of Fayetteville, Arkansas
CH2M Hill

Background and Streambank Erosion: The White River, located in Northwest Arkansas, eventually forms Beaver Lake, which is the primary drinking water source for over 400,000 people in Northwest Arkansas. The Arkansas Department of Environmental Quality placed the White River on the 1998 State 303(d) list of impaired waterways citing sedimentation and turbidity issues as a result of surface erosion, which includes streambank erosion, as the cause. The project is located on a section of the White River that remains on the impaired list in 2012. The project tasks included measuring the lateral streambank erosion rate at the project site. Based on the data collected, the bank was retreating at a rate of approximately 14 ft/year and generating an estimated 11,000 tons of sediment, which was contributing to high turbidity levels. The erosion of the riverbank also contributed nutrients to the waterway, and 10,500 lbs/yr of total phosphorus was estimated to be generated from the severe streambank erosion.

Design & Implementation: The WCRC utilized natural channel design principles to reduce streambank erosion and sediment loads. Approximately 1000 feet of streambank was improved at this site that included constructed 500 feet of 'toe-wood.' The toe-wood structure was constructed using large trees, boulders, and gravel and was built outward, with a maximum width of 40 feet, from the existing eroded bank at two distinct levels or benches that allow flood waters to spread out. Trees used in the structure were donated from a nearby highway project. The exposed root wads and boulders at the water's edge provides excellent fish habitat and reduces the power of the passing floodwaters. A portion of the river channel was excavated to offset the lost capacity that resulted from construction of the toe-wood bench. Soil mattresses, a soil layer consisting of topsoil wrapped in a coconut fiber blanket, were constructed on each level of the toe-wood bench. The soil mattresses or lifts provide a medium for plants to take root and additional weight to secure the trees used in the structure. They were seeded with a mix of native plant riparian seed suitable for the local Ecoregion. Over 700 native plants (potted) including Alder, Witch Hazel, False Indigo, Blackhaw Viburnum, and American Beauty Berry, to name a few, were planted with help from volunteers. Also, several hundreds of river oat plugs, willow whips, and sycamore and button bush cuttings were incorporated into the benches. As plants mature, they will help to bind the structure together through root growth and they will also help to dissipate water velocity as the leaves, branches, and stems of the plants interact with the flooding river. An irrigation system was designed and installed and is being used to help insure the survival of the planted vegetation during the maturation process. In addition, over an acre of pasture land adjacent to the streambank restoration was converted to riparian vegetated with native grasses, shrubs, and trees.



**A. Eroding Bank
Before Construction**



B. Construction of Boulder and Wood Toe Bench



C. Construction of Bankfull Bench



**D. Heavy Construction Completed;
shows soil mattresses on benches**



E. Volunteer Planting Day



F. Two Months After Construction

Post Restoration: Although only recently completed, the stabilized bank is providing water quality benefits. A flooding rain event took place one week after the heavy construction phase of the implementation plan was completed. Inspections conducted after this flood indicated that no erosion occurred along the previously eroding riverbank. Prior to this project, the same event would have resulted in significant erosion releasing several thousand tons of sediment into Beaver Lake watershed. A minimum of a 95% reduction of sediment and nutrient loads from this site is expected, annually. For more information on this project, visit the WCRC web site at www.watershedconservation.org or call the WCRC at (479) 444-1916.