



Longevity and Effectiveness of Nature-based Bank Protection for Reducing Sediment Loading to Rivers

Description

Bank stabilization using on-site wood has the potential to significantly reduce the costs of watershed regional sediment management. However, continued uncertainties about the effectiveness and longevity of these treatments cause unease and lack of adoption by many engineers. The project assesses the effectiveness and persistence of 20 to 25 year old cedar tree revetment bank stabilization projects in north and south-central Missouri. The amount of sediment these projects have prevented from entering their waterways will be quantified and the factors leading to success or failure will be identified.



Locust Creek in Locust Creek Conservation Area, North-Central Missouri

Issue/Challenge To Address

Eroding streambanks represent a significant, and in many watersheds the dominant, source of sediments to downstream channels. The NWK 2018 RSM project demonstrated that bank stabilization at erosion hotspots in Kansas can be significantly less expensive than reservoir dredging. Such a finding depends on the erosion rates and bank heights in the watershed, as well as the cost of rock, which can vary from watershed to watershed. Ongoing work in the Grand River Basin Ecosystem Restoration Study in Missouri has found that 200 – 600 bank stabilization sites would be needed to meet project objectives in that watershed. For that study, bank stabilization using rock was deemed too expensive for such a large number of projects.

State conservation agencies in Missouri, Kansas, Iowa, and elsewhere have begun to encourage (and in some instances, to cost-share with local land owners) a nature-based bank protection known as cedar tree revetments (see Figure 2). These revetments use on-site wood and low-cost instillation techniques to stabilize eroding river banks. The total costs for construction are minimal, often 1/10th the cost of rock toe protection (and much less the cost of a full rock revetment). Widespread application of these types of low-cost nature-based features could be



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cost-effective for reducing excessive sediment input to stream channels which then deposit on sensitive floodplain habitats and in reservoirs.

Successes Lessons Learned

Lessons learned from previous studies and projects will be a critical part of formulating the guidance and any additional lessons learned through this effort will be compiled during the duration of this study.

Projected Benefits Value Added

Many cedar tree revetment stream restoration projects have been installed over the past 30 years. General guidance on the suitability and longevity of the practice has not been analyzed. Updated guidance will provide a valuable resource to engineers, planners, regulators, operation managers, and project managers to ensure that if cedar tree revetments are used for stabilization, then the practitioner understands the limitations to applying the practice.

Expected Products

- Technical Report providing guidance and examples of practice
- Final Report and Presentation

Stakeholders/Users

All of USACE, Missouri Department of Conservation, University of Kansas, Illinois DNR.

Leveraging Opportunities

This effort will leverage available data from existing projects and resources to review and assess the performance of the cedar tree revetments. Many of these projects have been installed over 20 years ago.

Points of Contact

Chris Haring, ERDC-CHL
Research Physical Scientist
River and Estuarine Engineering Branch
christopher.p.haring@usace.army.mil

John Shelley, NWK
Hydraulic Engineer
River Engineering and Restoration Branch
John.Shelley@usace.army.mil

Participating Partners

ERDC, NWK, University of Kansas, Missouri Dept of Conservation