



US Army Corps
of Engineers®

Flood & Coastal Storm Damage Reduction R&D Program

Streambank Protection Measures

Description

U.S. Army Corps of Engineers design guidance will be extended to cover streambank protection techniques that are suitable for projects with ecosystem restoration goals. Criteria will be developed for selection of the most effective method for different site conditions. Initial work is focused on two methods: longitudinal stone toe protection and bendway weirs. These methods were selected from a wide array of techniques in use because of their proven effectiveness, low cost, and wide applicability. These two methods also represent the two major groups of streambank protection techniques. Stone toe protection is a “direct” method that acts by armoring the eroding streambank, and bendway weirs are an “indirect” method that act by redirecting the flow away from the eroding bank. Design criteria will be developed for key variables, such as height, length, and spacing. The results of this research will be included in reports, training, and guidance.



Recently constructed stone toe protection and grade control, McKinstry Creek, Delevan, New York.

Benefits

There is a strong need for extension of Corps design guidance to cover streambank protection techniques suitable for stream and watershed restoration projects. Existing Corps guidance has excellent design criteria for techniques such as full-bank revetment, but lacks coverage for techniques that offer more environmental benefits. According to the National River Restoration Synthesis Study, bank stabilization was one of the five most commonly stated goals for river restoration projects. Even where not stated as a primary goal, bank stabilization is often a critical component in meeting other restoration objectives, such as channel reconfiguration, watershed sediment management, and instream habitat improvement. Although many innovative techniques are being applied,

their performance is difficult to evaluate due to lack of monitoring, lack of documented design and construction data, and lack of an adequate period of performance. The two methods selected for initial work (stone toe and bendway weirs) have the advantage of low cost, ease of construction, and applicability to a wide variety of sites (urban, rural, small, or large streams, all regions). They have a history of successful application, but without nationally coordinated design criteria. Standard design guidance for these techniques will result in Corps projects that are more effective, economical and environmentally friendly.



A successful low-cost erosion control project, using stone toe and stream barbs, Jo Daviess County, Illinois, five years after construction. Stone is almost completely covered by vegetation.

Status Activities completed to date include a literature review, assessment of structures in the Demonstration Erosion Control Project (north-central Mississippi), site visits, and data collection. A technical note on urban streambank protection has been completed (*Innovative Streambank Protection in an Urban Setting, Accotink Creek, VA*, in press). Activities in progress include technical transfer of streambank protection course material by means of videos and technical notes. The overall work effort is being conducted in collaboration with the U.S. Bureau of Reclamation (USBR) to meet joint goals of providing sound technical guidance for streambank protection techniques. A contract report has been completed for publication in 2010 that provides a synthesis of existing design methods for stone toe and bendway weir design, along with recommended design guidance. Proposed future work includes producing guidance that is jointly authored with USBR.

Distribution Source(s) Results will be incorporated into Corps design guidance (EM 1110-2-1601, Hydraulic Design of Local Flood Control Channels).

Available Training Research conclusions will be incorporated into streambank stabilization workshops and the introductory and advanced PROSPECT classes on streambank protection.

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Partners U.S. Bureau of Reclamation; USACE Urban Flood Demonstration Program.