Streambank Erosion Control Measures

Information found in the Ohio Stream Management Guides provided by the Ohio Department of Natural Resources and the Soil and Water Resources.
Guide No. 03, 07, 13, 15, 16, 17

Natural Stream Processes

(Guide No. 03)

Here are a few things to remember when there is a stream/creek on your property. Streams in their natural state are dynamic ecosystems that perform many beneficial functions. Natural streams and their flood plains convey water and sediment, temporarily store excess flood water, filter and entrap sediment and pollutants in overbank areas, recharge and discharge groundwater, naturally purify instream flows, and provide supportive habitat for diverse plant and animal species. The stream corridors wherein these beneficial functions occur give definition to the land and offer "riverscapes" with aesthetic qualities that are attractive to people.

Humans do have an impact to stream ecosystems and can often cause problems by impairing stream functions and valuable uses to the resource. Solving stream management problems requires knowledge and understanding of the stream's natural processes.

Reading through the Ohio Stream Management Guides, they provide an overview of streams natural processes and of the human impacts on stream ecosystems. Landowners, local officials, and others concerned with streams need to work together across property lines and jurisdictional boundaries to find suitable solutions to stream problems and to implement practices to protect, restore and maintain healthy stream ecosystems. ***Guide No. 03.***

Human Impacts on Stream Systems

(Guide No. 03)

Stream systems are impacted by human activities that make use of stream resources, and by human occupancy and use of flood plains and uplands. Impacts can result from direct disturbance of natural streams through such things as channelization and point discharge of pollutants to receiving waters. Impact may also arise more indirectly through damaging land management practices and nonpoint source pollution in watersheds. Some more severe damaging impacts are results from changes in the basic structure of the stream ecosystem. (Doppelt, et al., 1993).

- Modification of channel and riparian ecosystem morphology by channelization, damming, and removal of streamside vegetation;

- Degradation of chemical water quality by addition of contaminants;
- Excessive nonpoint source pollution including siltation and nutrient enrichment;
- Deterioration of stream substrate quality and stability;
- Destabilization of stream banks and channel bottom directly by such things as livestock grazing and instream mining or indirectly by land use changes and damaging land management practices. ***Guide No. 03.***

Stream Management Objectives

(Guide No. 03)

Overall, the objective to stream management coincides with the Clean Water Act – to restore and maintain the physical, chemical and biological integrity of the water resource and achieve full attainment for designated areas. ***Guide No. 03.***

Restoring Streambanks with Vegetation

(Guide No. 07)

Woody vegetation planted along streams can be extremely useful in controlling soil erosion, providing wildlife habitat and improving water quality. Dormant woody stakes/posts can be used to stabilize eroding banks and bare root or transplanted trees can be used on top of the

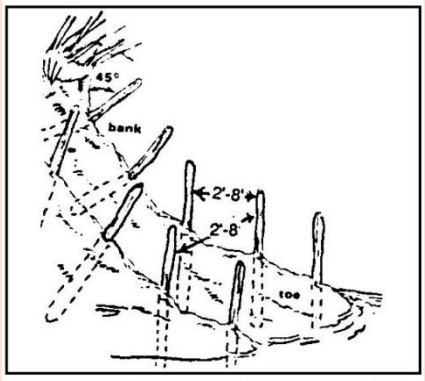

Figure 1. Stake spacing and angles.

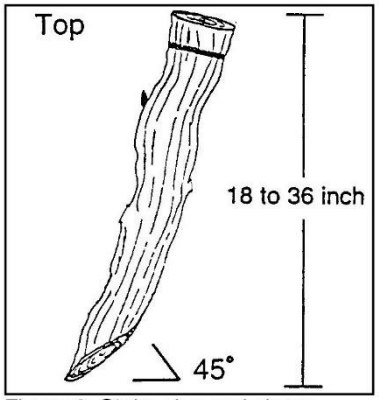

Figure 2. Stake size and shape.

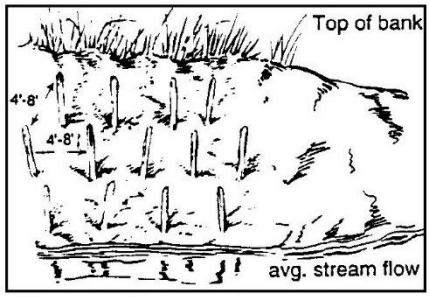

Figure 3. Post spacing on stream bank.

bank in the riparian/flood plain area. **See Figure 1** above, for stake spacing and angles, **Figure 2** above, for stake size and shape and **Figure 3** above, for post spacing on-stream banks. ***Guide No. 07.***

Cuttings should be made after leaf drop when trees become dormant (December) and before the buds swell and leaf out, (late March). February to early March is a good time for planting dormant cuttings in Ohio. ***Guide No. 07.***

Forested Buffer Strips

(Guide No. 13)

Trees along streams are vital to the integrity of streams in climates like Ohio's. They are given the name "forested buffer strips". The Ohio Stream Management Guides are full of vast information for streams. Through these guides, they help landowners, land managers and volunteer groups the resources and guidance on the creation, protection and enhancement of areas along streams.

Positives of forested buffer strips	Negatives of forested buffer strips
Removes pollutants	Encroachment (clearing of trees) from adjacent land uses
Reduces water temperature by sheltering/shading	Overuse can reduce the integrity of the buffer through soil compaction and vegetation loss. High uses can coexist with water quality and damage limited by establishing trails and damage access points to the stream
Provides wildlife habitat	
Provides basic sources of energy for stream ecosystems (leaves and woody debris)	
Reduces streambank erosion	

Species Selection:

- It is best to use a diverse mix of tree and shrub species with an emphasis on native species.
- Species should be mixed randomly across the site.
- In areas of partial shade, use a large proportion of shade-tolerant species.
- Ideally a mix of dominant tree species, under-story trees and shrubs, and herbaceous plants should be planted.
- In open areas, it may be useful to mix hardier pioneer species (two-thirds) with later succes-sional species (one-third) in recognition of the difficult environment for new plants.

Pioneer Species	Later Successional Species
Cottonwood	Swamp white oak
Box elder	Pin oak
Red maple	Black walnut
Ash (green)	Silver maple
Red osier dogwood	Hawthorn
Gray dogwood	Black haw viburnum
Silkey dogwood	Maple leaf viburnum
Sycamore	

Different Practices to Control Streambank Erosion

(Guide No. 15, 16, 17)

Gabion Revetments: Gabions are stone filled galvanized or coated wire baskets that are placed along a streambank. They are particularly effective for protecting the submerged part of the streambank. ***See Figure 1 and Figure 5*** *below.* ***(Guide No. 15)***

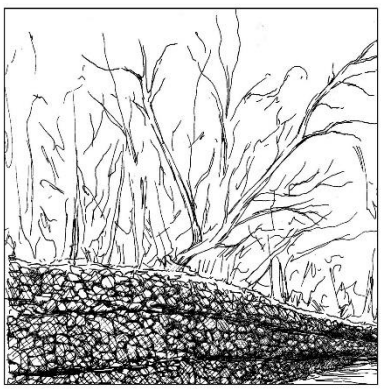

Figure 1. Gabion revetment on streambank

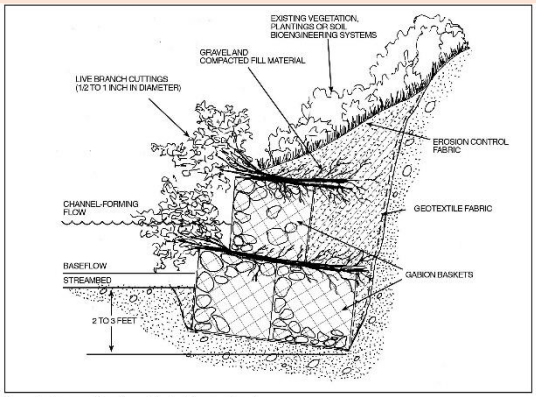

Figure 5. Cross section of vegetated gabion revetment

Riprap Revetments: Riprap revetments are a very effective and popular method of controlling erosion. This practice consists of layered, various sized rocks placed on a sloping bank. ***See Figure 1*** *below.* The most commonly used material for riprap is broken limestone, dolomite or quartzite. The variance in size and the rough angular surfaces of the rock allow the revetment to absorb the impact of flowing water instead of deflecting the flow which could cause erosion to an adjacent streambank area. ***(Guide No. 16)***

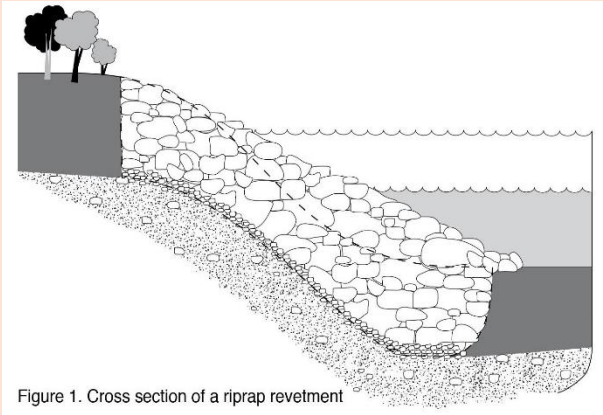

Figure 1. Cross section of a riprap revetment

Live Cribwalls: A live cribwall is a wooden log cabin-type structure that is built into a streambank which is then filled with rock, soil and cuttings of willow. The cuttings will sprout

and develop a root mass that, in conjecture with the log structure, will armor the streambank and protect it from erosion. ***See Figure 1 and 2*** *below****. (Guide No. 17)***

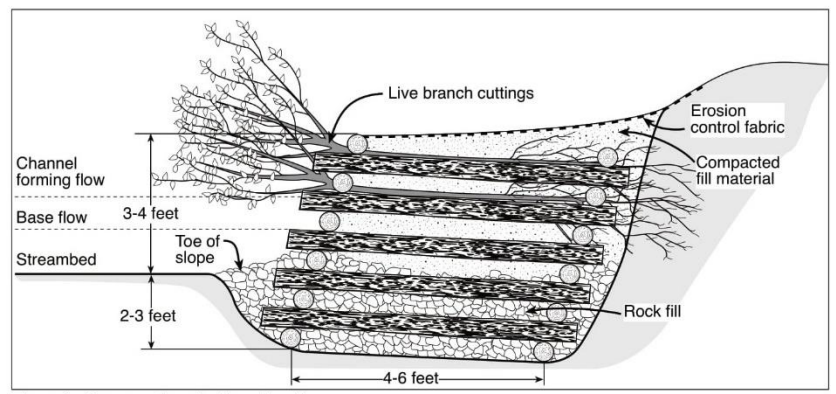

Figure 1. Cross section of a live cribwall.

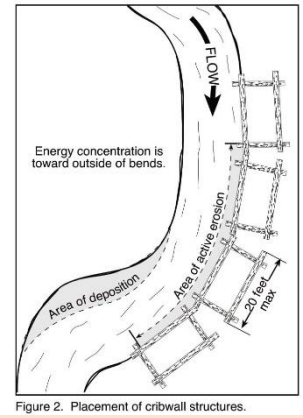

Figure 2. Placement of cribwall structures.

Contact the Wayne Soil & Water Conservation District for more information!

Address: 428 W. Liberty Street, Wooster, Ohio 44691

**In the lower level of the Administration Building*

Hours: Mon. - Fri. 8:00am - 4:30pm

Phone: 330-263-5376

Email: info@wayneswcd.org

Website: www.wayneswcd.org

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