BUTLER SOIL & WATER CONSERVATION DISTRICT

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You can also contact the Butler Soil & Water Conservation District for assistance with:

- Ponds
- Trees
- Stream Bank Erosion
- Drainage Assistance
- Erosion Problems
- Wetland Identification
- and much more

You can also visit the Ohio Stream Management Guide for more info. It is available from the Ohio Division of Soil and Water Conservation

http://www.agri.ohio.gov/divs/SWC/SWC.aspx#tog

BUTLER SOIL & WATER CONSERVATION DISTRICT

Stream Bank Modification and Stabilization:

Engineered Solutions

Stream Bank Erosion: Know the Law

Fixing a stream bank problem doesn't involve jumping straight in. Yes, the stream may be running through your property, but do you know the law?

There are two components to a stream, the water flowing in it and the land beneath the water. The nature of flowing water makes it impossible for a landowner to exercise the kind of control over it that is essential for it to be considered private property. Water is a "public good" and not ownable as private property.

Under Ohio common law the owner of the land beside the stream also owns the land beneath it. If the land on each side is owned by two different owners, then each owns to the center of the stream unless otherwise specified by the landowners' deeds. On navigable streams, boaters have the right to navigate on the stream, regardless of who owns the land beside it.

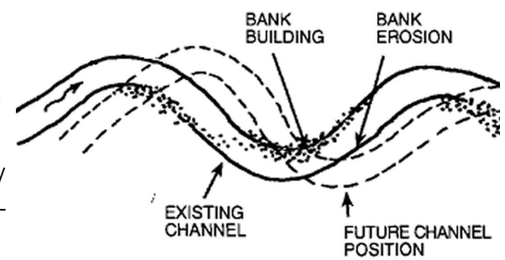
Ok, so you may own the land beneath the stream, but can you bring in the heavy equipment? No not yet. Any in-stream work requires permits from the US Army Corp of Engineers and the Ohio EPA depending upon the size of the stream and the project. You also need to check with the local Flood Plain Manager and the Zoning department to determine if there are any other requirements.

The Ohio Stream Management Guide has a wealth of information on this. It is available at the ODNR: Division of Soil and Water's website under the water tab www.dnr.state.oh.us/water

Natural Stream Processes

Streams are dynamic systems that convey surface water, provide habitat and recreation. Sediment is carried into the stream from the surrounding drainage area, and this is balanced by the stream transporting and discharging this sediment downstream. A natural stream exists in a dynamic equilibrium maintaining itself through annual floods that clear the channel of sediments, debris, and vegetation that may have accumulated. With the increase in built areas, such as roads, driveways, parking lots, buildings, etc,, it becomes harder for water to soak into the ground. More and more of this water is directed towards our streams. This has increased the number of high flow events increasing the volume of water during these storm events. Due to this, our streams can experience more erosion as they are no longer in equilibrium.

Occasionally this dynamic nature can pose problems, with stream banks eroding, cutting back reducing yard space, or even putting structures into harms way. When we look at a stream bank problem, we must remember that erosion is a natural process. Stream banks naturally move over time with some areas being built up with sediments deposition, and others eroding away.



What is Causing Your Erosion?

You need time to analyze what is causing erosion. Its not always as simple as saying let's stop the water from hitting the stream bank. The speed of the water, both during low and high flow, the flashing of the water during rain events, in-stream obstructions, poor stream bank management, and many more issues can play a role.

In-Channel Obstructions

Downed trees and other obstructions can change the flow of the water, which can then lead to stream bank erosion and the eventual change of the water channel.

Increase in Impervious Surfaces

In impervious surface is one that does not allow water to pass through it. With increases in urbanization we have greatly increased the number of roads, driveways, buildings and parking lots. Due to this, the speed and volume of water arriving in our creeks has increased. We can even view flashes where the water rapidly rises shortly after the storm begins.

Poor Stream Bank Management

A reduction in the amount of vegetation along a water's edge, commonly known as the riparian zone, leads to erosion. This is the area of trees, shrubs, and other groundcover adjacent to the water's edge. A well developed and diverse riparian zone's roots bind the soil together, greatly reducing erosion. Some ornamental plants and lawn grasses typically do not have the extensive root systems found in native vegetation.

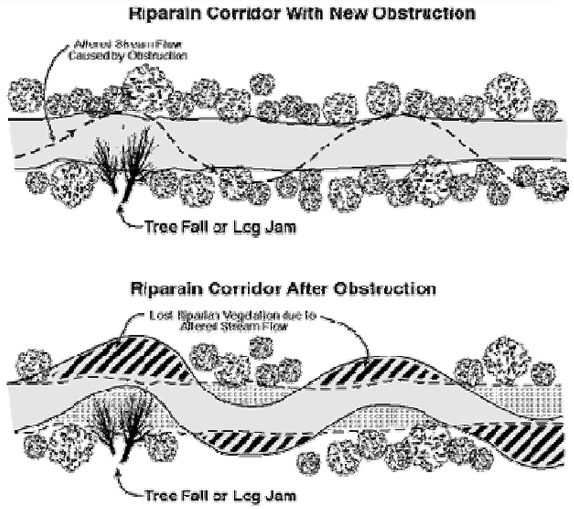


Image courtesy of ODNR

Traditional Methods

While placing stone rip-rap, railroad ties, or concrete on an eroding stream bank may appear to solve the problem, these practices often fail because they do not stabilize the bank properly. Water flowing near the rip-rap generally moves fast often with turbulence near the bank. As water hits and deflects off the riprap it gains velocity and is more likely to erode nearby unprotected areas. Rip-rap also tends to require ongoing maintenance to correct instances where the rock is being undermined and either peeling away from the bank, or slumping into the stream

These structures, if installed incorrectly, may narrow the creek or stream, which increases the speed of the flow further increasing erosion. Inappropriate solutions may cause more long-term damage than doing nothing at all.

Erosion Control Possibilities

Live Stake Planting

... is the placement of woody plant and tree cuttings on a graded streambank to grow and stabilize the streambank by the formation of roots and aboveground brush.

Joint Planting

... is a combination of covering a streambank with rock and live stakes.

Live Fascine

... is the placement of bundles of branches in trenches on the streambank to reduce erosion across the bank and establish soil stability.

Brushmattress

... is the combination of riprap, live fascine, live stakes, and brush to form a covering over the entire slope.

Live Cribwall

... is a structure made of live materials to reconstruct the streambank where extreme erosion has occurred. A combination of timbers, live branches, soil, rocks, and logs are used to rebuild a bank and eventually establish a root network. The roots will eventually take over the structural purpose of the timbers. This method is best used on the outside bend of a stream because the strongest currents act on this side of the stream.

Branchpacking

... is the layering of live branch cuttings and compacted soil to fill small holes and slumps in a streambank.

Coconut Fiber Rolls (coir)

... are cylindrical structures made of coconut husk fibers bound together with coconut husk twine. The roll is staked to the toe of the slope. Rolls are about 12 inches in diameter and up to 20 feet long.

Dormant Post Plantings

Dormant post plantings and the willow post method are very similar methods of bank stabilization, in which medium-sized trees are placed in the slope next to the stream. The dormant posts are placed in rows adjacent to the stream and form a permeable barrier.

Vegetated Geogrids

... are the covering of soil with erosion control fabric (geotextile) on the slope of the bank. The erosion control fabric is secured by tucking it into the slope. Live cuttings are placed between the geogrids, and a root structure is established to bind the soil within and behind the geogrids. The toe of the bank is stabilized by layers of rock on top of the same geotextile fabric.

Rock or Log Crass Vanes

Cross vanes are rock structures that stabilize the streambed while aiding in streambank stabilization. Rock or log vanes redirect stream flow away from the toe of the streambank and help to stabilize the bank upstream and downstream from the structure.