

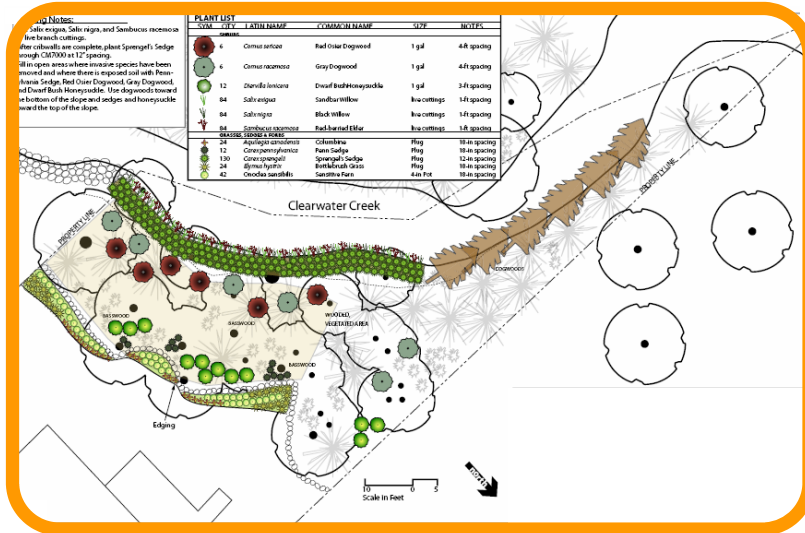


## Project Planning

Riverbank stabilization planning requires experience and often design engineering. Be sure to contact your respective Soil and Water Conservation District (see list on back) with questions or for assistance.

### Keys to a Successful Plan

- **Compliance with Regulatory Restrictions**  
- Prior to project planning be sure to understand the necessary permits and associated restrictions.
- **Protect Your Property Value and Ensure Public Safety**  
- A properly designed project will secure your property from the risks of excessive erosion and ensure public safety is not compromised.
- **Balance Desired and Sustainable Property Use**  
- Landowners must understand that projects can be designed to incorporate their own desires as well as practices that will create a cost effective, successful, and long-lasting solution.
- **Improve River and Ecosystem Health**  
- The ultimate goal of a restoration or stabilization project is to improve the quality of the river and the surrounding habitat, thereby improving overall river health.



### The Planning Process

- **Assessment and Understanding**  
- Evaluation of the issues and understanding the scale of the problem, whether system-wide or local, are a crucial first step in the planning process.
- **Design Considerations**  
- It is important to ensure the project will remedy the problem, and not just the affected property. This often times results in the cooperation of multiple land owners to most effectively treat a section of river.
- **Stabilization Practice Selection**  
- Severity of the problem, site access, finances, desired outcome, and treatment are all important factors when considering the most effective stabilization practice to employ.
- **Plant Community Selection**  
- This decision must incorporate factors such as soil type, moisture levels, sun exposure, aesthetics, and the potential use of native species. Consult the Native Plants Brochure for additional information when compiling a list of species you want to include in your restoration or stabilization project.
- **Compliance and Installation**  
- Finally, landowners should ensure they are in compliance with regulations and restrictions, determine the source or sources of funding, and coordinate installation.



## Technical Assistance

Expert assistance may be available to homeowners interested in determining the best methods for managing their riverbank for stability, fish, wildlife, and water quality. Assistance may include on-site consultations, project design, cost estimation, and guidance throughout project installation and maintenance. Contact your respective conservation district for assistance (see list below).



## Financial Assistance

Cost-share grants may be available from your conservation district for restoring riverbanks with native vegetation and correcting or preventing riverbank erosion (see list below). Grants may cover 50-75% of the cost for plants and other materials on projects that will provide benefits to the stream or river, and therefore the public.



## Regulatory Compliance and Permitting

Federal, state, and local permitting authorities have different permit requirements, fees, and timelines. Federal and state agencies accept a single Joint Notification Form (JNF) application. Local governments often have unique forms but may accept the JNF as well.

### Some Permitting Authorities

- National Park Service
- United States Army Corps of Engineers
- Minnesota Department of Natural Resources
- Respective City
- Watershed Management Organization

## Metro Conservation Districts

Anoka Conservation District  
1318 McKay Dr. NE, Suite 300  
Ham Lake, MN 55304  
763-434-2030  
www.anokaswcd.org

Ramsey Conservation District  
1425 Paul Kirkwood Dr.  
Arden Hills, MN 55112  
651-266-7270  
www.co.ramsey.mn.us/cd/index.htm

Carver Soil & Water Conservation District  
11360 Highway 212 Suite 6  
Cologne, MN 55322  
952-466-5230  
www.co.carver.mn.us/departments/LWS/swcd.asp

Scott Soil and Water Conservation District  
7151 West 190th St., Suite 125  
Jordan, MN 55352  
952-492-5425  
www.scottswcd.org

Chisago Soil & Water Conservation District  
38814 Third Ave.  
North Branch, MN 55056  
651-674-2333  
www.chisagoswcd.org

Sherburne Soil & Water Conservation District  
14855 Highway 10  
Elk River, MN 55330  
763-241-1170 Ext. 3  
www.sherburneswcd.org/index.html

Dakota County Soil & Water Conservation District  
4100 220th St. West, Suite 102  
Farmington, MN 55024  
651-480-7777  
www.dakotaswcd.org

Washington Conservation District  
1380 West Frontage Road, Hwy. 36  
Stillwater, MN 55082  
651-275-1136  
www.mnswcd.org

Hennepin Conservation District  
417 North 5th St., Suite 200  
Minneapolis, MN 55401  
612-348-9938  
www.hcd.hennepin.mn.us

Wright Soil and Water Conservation District  
311 Brighton Ave. South, Suite C  
Buffalo, MN 55313  
763-682-1970  
www.wrightswcd.org

Isanti Conservation District  
380 South Garfield St.  
Cambridge, MN 55008  
763-689-3224  
www.isantiswcd.org



# RIVERBANKS

## Restoration and Stabilization



## Metro Conservation Districts

A partnership between the eleven soil and water conservation districts of Anoka, Carver, Chisago, Dakota, Hennepin, Isanti, Ramsey, Scott, Sherburne, Washington and Wright Counties.



## Introduction

This brochure provides a starting point for understanding the potential problems and solutions common to riparian (river margin and bank) landowners. Some problems can be addressed by individual landowners but many require the assistance of an engineer or local government entity. The root cause and severity of the problem will dictate the best strategy.



## Understanding Rivers

If you live on a river or stream and want to protect your riverbank, and the quality of the river or stream, you must first understand how rivers work.

### Watersheds

Watersheds are areas that drain rain water through streams, ditches, pipes and gutters to lakes and rivers. Rain water carries with it whatever it comes in contact with. Therefore, proper landscape management throughout a watershed is important to the condition of water bodies.



Center for Watershed Protection

### Flowing Water

Flowing water in a river is among the most powerful forces in nature. River paths naturally weave across the landscape over time because the energy contained within flowing water allows it to erode the banks and bed of the river, transporting sediment downstream. The power of a river is a function of both the speed and amount of flowing water.



### Erosion

Erosion occurs naturally on the outside banks of river bends (cutbanks) where water flows the fastest, and sandbars are created on the inside bends (depositional banks) where water slows down and can no longer carry the sediment load. This natural process causes the course of the river to change as the decades roll by, snaking through the landscape.



### Imbalance

Imbalance occurs when development in the watershed causes more water to flood through the river system faster, speeding up erosion, and eating away not only at the riverbanks, but also the bed of the river, causing it to cut deeper into the landscape (down-cutting). This not only threatens your property but also impacts water quality and habitat.



## Off-Site vs. Local Problems

Identifying the source of the problem will help determine potential solutions. Problems are either local or off-site in origin. They differ by whether the cause lies within a particular property or elsewhere in the watershed. Most properties have a combination of local and off-site problems at work.

Local problems have a root cause on the property and can be solved by the landowner with fairly simple approaches.

Off-site problems generally relate to increased river power by increasing flow amount and speed. Landowners can treat the symptoms but the root cause must be dealt with on a larger scale by cities and watershed organizations via stormwater management throughout the watershed to reduce stormwater volumes and velocities.

Local Problem	Off-site Problem
Overshading	Extreme water level fluctuations and flooding
Foot traffic damage	Down-cutting of riverbed
Diverted flow (within river or in upland areas)	Scouring of riverbank
Vegetation removal	Wave action
Vegetation smothering	Ice damage

Once you've identified the type of problem on your property, local or off-site, you can develop a plan that will improve the situation. If you suspect the problem is off-site in nature, you should contact your local conservation district for technical assistance. Local problems can be addressed immediately using the methods outlined below.

In all cases, the goal is to decrease erosion and provide long term riverbank stability. This is achieved through two general approaches; promotion of healthy vegetation to provide root structure to hold soils in place and stems to slow down flowing water, and structural armoring to absorb the river's energy or deflect it away.



## Riverbank Property Practices

- Avoid mowing near the edge of the bluff or riverbank. Turf grasses have very shallow root systems, providing little soil stability. Deeper rooted species are also better at filtering out excess nutrients and sediments in runoff.
- Remove fallen trees because they can redirect water toward the bank.
- Prune lower branches on trees to increase the amount of light that penetrates to the ground. This will increase plant growth at ground level where the stems, roots and foliage will help keep soil in place.
- Remove buckthorn, which is an invasive plant that is believed to release a natural herbicide that suppresses nearby plant growth.
- Remove grapevines, which smother trees, shade out understory species, and provide little soil stabilizing benefits.
- Plant desirable species with preference for multi-stemmed plants with deep, dense, fibrous root systems, but make sure they are well suited to the soil type, moisture level and available sunlight or they will not thrive.
- Control runoff from downspouts and other hard surfaces to prevent it from flowing over the riverbank. Promote infiltration of rain water into the soil but away from the riverbank where possible, or provide a pipe conduit down to the water's edge to transport water if necessary.
- Dispose of yard waste properly to avoid smothering riverbank vegetation and contributing nutrients to the river, which commonly occurs when leaves and grass clippings are thrown over the riverbank.



## Stabilization

### The Basics

The goal of most riverbank projects is to correct or prevent excessive erosion or under-cutting through bank stabilization. Bioengineering is a practice that combines engineering techniques with ecological principles to provide a natural solution to these challenges. It relies heavily on deep-rooted native plants along with a variety of other natural materials to reinforce and stabilize riverbanks. In contrast to traditional engineering techniques that were designed for the sole purpose of erosion control and water retention, bioengineering incorporates the goals of fish and wildlife habitat restoration, maintenance of water quality, and aesthetic considerations.

### Benefits

Combining living plants with other natural materials to achieve riverbank stabilization has many positive effects:

- Improve aquatic and terrestrial habitat
- Increase connectivity among habitats along the riverbank
- Decrease water temperatures through shading
- Improve overall soil and water quality

However, bioengineering practices may be inappropriate in extreme circumstances, and larger scale structural engineering solutions may be required with assistance from a professional. Nevertheless, the relatively low cost, native species, and ability to self repair all make bioengineering a functional and long lasting management strategy.

### Examples:

#### Restoration of Native Vegetation

Creates a vegetated buffer with deep-rooted plants that stabilize the riverbank and minimize erosion

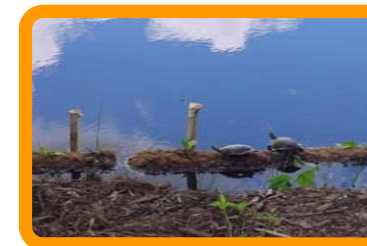


#### Tree Revetments

Decreases toe and bank erosion while promoting sediment accumulation to help rebuild the bank

#### Live Stakings

Provide an inexpensive method for establishing a dense plant community that will stabilize the riverbank



#### Coconut-fiber Biologs

Absorb water energy, build riverbank, and create a smoother shore, while becoming incorporated into the riverbank over time