

# Restoring Our Edge: Rehabilitating the Mississippi Shoreline in Ramsey



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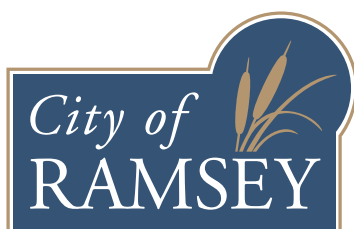
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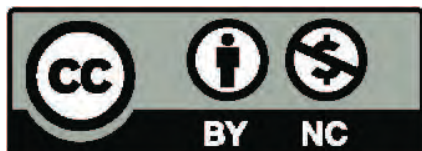
Resilient Communities Project

UNIVERSITY OF MINNESOTA

Building community-university partnerships for sustainability

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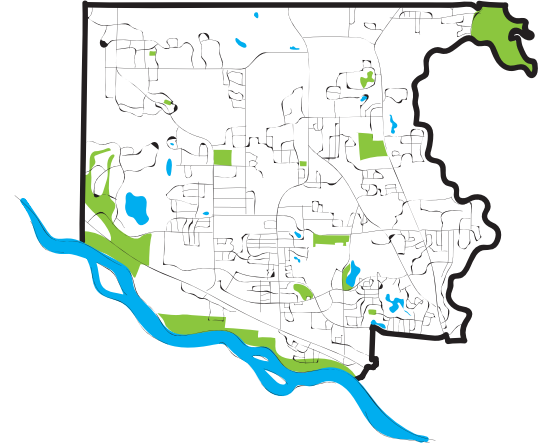
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# RESTORING OUR EDGE

## Rehabilitating the Mississippi Shoreline in Ramsey

### Erosion and the City of Ramsey

In 2015, the City of Ramsey hired the Anoka Conservation District to conduct a shoreline inventory, detailing the riverbank conditions in terms of erosion severity. This study provided a comprehensive understanding of property owners affected by shoreline issues. As a result of the inventory, segments of Ramsey's shoreline were classified under three erosion severity categories: **slight to moderate**, **severe**, and **very severe**.



The Mississippi River stretches 5.8 miles along the southern boundary of Ramsey, primarily through residential development.

### PROJECT GOALS

- 1 **Identify** best shoreline restoration practices for property owners in Ramsey
- 2 **Identify** available funding options to assist property owners
- 3 **Identify** most effective engagement tools to increase property-owner participation
- 4 **Provide** case studies of real-world implementation of shoreline restoration projects



### KEY COMPONENTS FOR SHORELINE RESTORATION IN RAMSEY

Shoreline erosion affects property owners through loss of land, but it also contributes to water quality issues that affect a much broader population. The extent of the problem has been identified and documented, so the next step is identifying and implementing solutions, as highlighted in this series of posters.



#### Restoration Practices

##### Best Land-Use Practices

- Vegetative plantings
- Buckthorn removal
- Limit mowing
- Branch pruning
- Proper yard waste disposal

##### Restoration Techniques

- Native vegetative plantings
- Log bank
- Bank grading
- Cedar tree revetment
- Live staking
- Hard armoring



#### Project Funding

##### Agencies

- MN Board of Soil and Water Resources
- Anoka Conservation District
- Conservation Corps of MN and IA
- Lower Rum River Watershed Management Organization (WMO)

##### Funding

- Non-point engineering assistance
- Water quality cost share

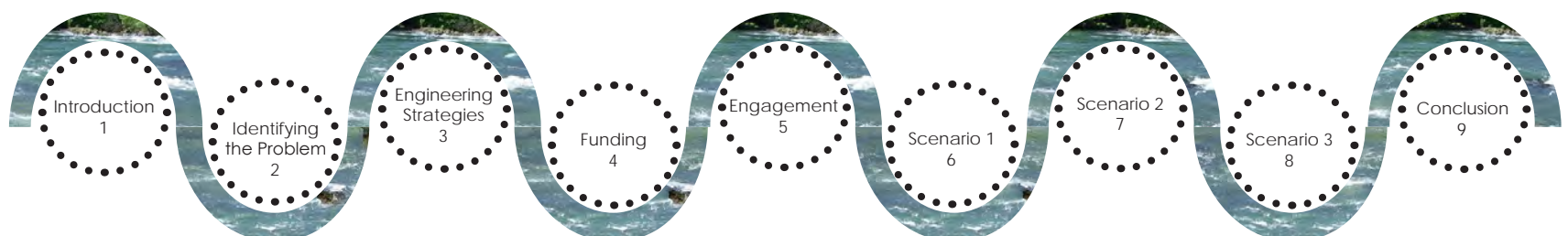


#### Public Engagement

##### Outreach Opportunities

- Host public meeting
- Send direct mailing
- Host community workshop
- Provide site tours
- Create a website
- Host a pop-up event

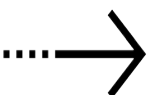
### PROJECT OUTLINE



### RESTORING THE EDGE



Management strategies, funding resources, and engagement tools are essential to successfully restore our edge. Quantifying the shoreline erosion problem will ensure that appropriate strategies, funding, stakeholders, and engagement opportunities are identified. The next poster illustrates and quantifies the problem of shoreline erosion—specifically as it relates to Ramsey, but also at a larger scale.



# RESTORING OUR EDGE

## Rehabilitating the Mississippi Shoreline in Ramsey

### What is the current condition of our edge?

In 2016, the Anoka Conservation District (ACD) documented the presence of **shoreline erosion** along the Mississippi River in Ramsey. They reported that both private and public land in Ramsey had **severe** and **very severe** rates of erosion in some areas, contributing to **tons of soil** entering the Mississippi River each year.

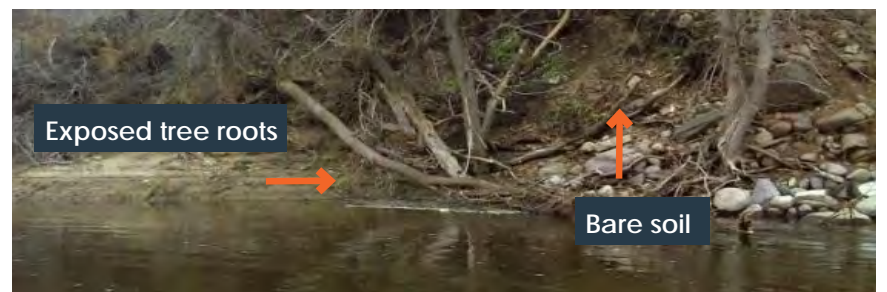
### STATUS OF SHORELINE EROSION IN RAMSEY

- **0.64 miles** of Ramsey's shoreline has **severe erosion**
- **0.60 miles** of Ramsey's shoreline has **very severe erosion**
- **5,148 tons** of sediment enters the Mississippi each year due to shoreline erosion in Ramsey
- **77%** of this sediment enters the Mississippi from private properties with very severe erosion

### PRESSING CONCERNS for Ramsey's Shoreline Property Owners

#### Property Loss

- Natural factors such as accelerated flow rates, waves, wind, and ice cause shoreline erosion.
- Unstabilized shorelines are unprotected from erosion and vulnerable to property loss.
- Property owners along Lake Itasca lost 6 inches of shoreline per year prior to shoreline stabilization.



Property loss due to shoreline erosion in Ramsey

#### Decreased Water Quality

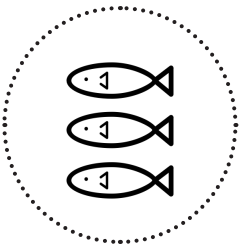
- Shoreline erosion deposits sediment in the river, which is carried downstream.
- Increased sediment concentration decreases the clarity of the water.
- This in turn reduces the depth to which light can penetrate through the water, impacting aquatic ecosystems.



The Mississippi River has a high concentration of suspended sediment, affecting water clarity

#### Ecosystem Impacts

- Reduced water clarity leads to a reduction in light absorbed by aquatic plants, which is critical for growth.
- Without plants, fish communities are threatened by habitat loss, which reduces reproduction.
- Sediment and other pollutants carried down the Mississippi have created a dead zone in the Gulf of Mexico.

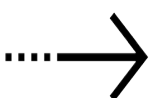


Sediment and other pollutants carried by the Mississippi enter the Gulf of Mexico at the Mississippi River Delta

### WATER QUALITY MATTERS



The water quality of the Mississippi River is greatly influenced by land uses along the river, from the Minnesota headwaters to the Mississippi River Delta in Louisiana. Fortunately, effective shoreline restoration options exist. The City and property owners can collaborate to limit shoreline erosion in Ramsey, while simultaneously improving the Mississippi's water quality both locally and downstream.



# RESTORING OUR EDGE

## Rehabilitating the Mississippi Shoreline in Ramsey

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Shoreline Restoration Techniques

### What causes shoreline erosion in Ramsey?

Shoreline erosion is caused by natural factors and land use practices. To prevent erosion, avoid excessive mowing and removing vegetation along your property's edge. If erosion already exists on your property, effective restoration techniques can be implemented. Below are illustrations of the three categories the Anoka Conservation District uses to define shoreline erosion severity.



Slight to Moderate Erosion



Severe Erosion



Very Severe Erosion

### Shoreline Restoration Techniques

#### Staking

**Where it Works:** Slight to Severe Erosion  
**Basic Idea:** Take cuttings of woody plants (live stakes) like willow and dogwood and drive them into the substrate of the eroded area. They will sprout roots and grow. Typically this is done in early spring or late winter.  
**Cost:** Low  
**Difficulty:** Easy, can be done by landowner.



#### Grading

**Where it Works:** Moderate to Severe Erosion  
**Basic Idea:** The objective of bank grading is to reduce the steepness of the bank slope and decrease erosion caused by waves striking the bank.  
**Cost:** Moderate  
**Difficulty:** Moderate



#### Hard Armor

**Where it Works:** Severe to Very Severe Erosion  
**Basic Idea:** A layer of stones (riprap) is laid along a slope face or bank to prevent erosion caused by wave action.  
**Cost:** Moderate to high  
**Difficulty:** Moderate



#### Vegetation

**Where it Works:** Slight to Moderate Erosion  
**Basic Idea:** This method involves re-planting native vegetation that will naturally stabilize the shoreline. The deep roots of these plants tightly binds the earth below, effectively protecting the shoreline from erosion.  
**Cost:** Low  
**Difficulty:** Easy, can be done by landowner.



#### Cedar Revetment

**Where it Works:** Slight to Moderate Erosion  
**Basic Idea:** The technique involves cable-anchoring cut cedar trees alongside the bank. The tree's dense branches and naturally rot-resistant wood provide years of bank armoring, and allows for the build-up of sediment over time.  
**Cost:** Low  
**Difficulty:** Moderate, can be done by landowner.



#### Log Bank

**Where it Works:** Slight to Moderate Erosion  
**Basic Idea:** Place coarse woody debris, such as brush bundles or logs, along the shoreline to reduce wave action and allow natural regeneration of plants.  
**Cost:** Low  
**Difficulty:** Easy, can be done by land owner.



# RESTORING OUR EDGE

## Rehabilitating the Mississippi Shoreline in Ramsey

### What funding is available for restoration projects?

Although private property owners are financially responsible for landscape alterations on their land, financial assistance can offset shoreline restoration costs. Funding for engineering designs, materials, and labor is available through the Anoka Conservation District.

#### FUNDING AGENCIES

MN Board of Water and Soil Resources (BWSR)	Anoka Conservation District (ACD)	Lower Rum River WMO (LRRWMO)	Conservation Corps of Minnesota and Iowa (CCMI)
BWSR is the state agency that funds Soil and Water Conservation Districts (SWCD) and programs to prevent sediment and nutrients from entering water resources. → <a href="http://www.bit.ly/BWSR_MN">www.bit.ly/BWSR_MN</a>	ACD is Anoka County's SWCD. This agency provides technical assistance, tools, and funding for property owners to manage and protect water resources in Anoka County. → <a href="http://www.bit.ly/ACD_MN">www.bit.ly/ACD_MN</a>	LRRWMO is a government unit that protects and improves water resources in Ramsey, Anoka, and portions of Andover. Funding assistance is provided to ACD and then passed to applicants. → <a href="http://www.bit.ly/LRR_MN">www.bit.ly/LRR_MN</a>	CCMI provides natural resource-based community-service projects for local governments with the help of young adults interested in natural resource management. → <a href="http://www.bit.ly/CCMI_MN">www.bit.ly/CCMI_MN</a>

#### AVAILABLE FUNDS for Property Owners

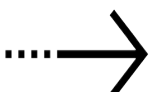
Non-Point Engineering Assistance Program (NPEAP)	Water Quality Cost Sharing Program	Conservation Corps Funding
This program provides financial assistance to contract with consulting engineers for the design of conservation practices. <b>Disbursement Method</b> Applicant applies through ACD. Residents from eleven counties are eligible for these competitive funds. → <a href="http://www.bit.ly/ACD_NPEAP">www.bit.ly/ACD_NPEAP</a>	ACD, LRRWMO, and BWSR provide financial assistance for implementation of shoreline restoration projects. <b>Disbursement Method</b> Applicant applies through ACD for funds that cover 50–75% of material and labor expenses. → <a href="http://www.bit.ly/ACD_CostShare">www.bit.ly/ACD_CostShare</a>	BWSR provides the CCMI \$500,000 annually to fund labor for restoration projects that protect water resources. <b>Disbursement Method</b> ACD applies on behalf of the property owner for funds that cover 100% of labor costs. → <a href="http://www.bit.ly/CCMI_Funding">www.bit.ly/CCMI_Funding</a>

#### CASE STUDIES of Funded Private Restoration Projects in Ramsey

Smith Property: Cedar Revetment	Geldaker Property: Hard Armor/Riprap
 <p><b>Project Funding</b> CCMI grant: \$3,850 ACD in-kind: \$2,236 Landowner: \$914 ACD cost share \$533 Community donation: \$475 ----- Total project cost: \$8,009</p>	 <p><b>Project Funding</b> LRRWMO cost share: \$1,431 Ag Preserves cost share: \$5,746 NPEAP: \$9,722 ACD in-kind: \$4,086 Landowner funds: \$23,100 ----- Total project cost: \$44,085</p>



We encourage the City of Ramsey to spread awareness of available funds to property owners through outreach activities presented in the next poster. Additionally, property owners interested in funding opportunities may contact the City or ACD for more information.



# RESTORING OUR EDGE

## Rehabilitating the Mississippi Shoreline in Ramsey

### What are the best engagement strategies for Ramsey?

Engaging landowners to participate in shoreline restoration is essential to ensure success in restoring our edge. **The City of Ramsey may consider implementing a combination of the six public engagement strategies identified below.** Depending on the relationship with the property owners, certain engagement strategies can generate increased participation.

#### Direct Mailing

Direct mailings can include letters, pamphlets, and surveys.

- Simplicity
- Wide range of audience
- Loaded with information

- Indirect
- Lack of enticement
- Easily disregarded

- Primarily Adults

#### Public Meeting

Public meetings allow the City to address the issue and shoreline owners to voice their opinion.

- Promote discussion
- Brainstorm alternative solutions
- Opportunity to create consensus

- Attendance is voluntary
- Less vocal participants overshadowed by the more vocal

- All levels

#### Workshop

Workshops can include presentations, breakout sessions, and interactive activities.

- Enhanced understanding of topic
- Visualization of solutions
- High participation rate

- Can require an extended amount of time
- Can require outside materials/trainers

- All levels



Case Studies

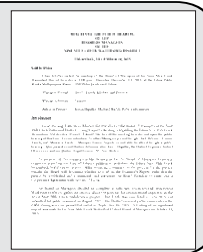
#### Anoka Conservation District

- Mailed a brochure of restoration strategies to residents
- Included technical and financial resources



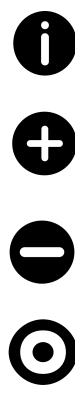
#### The City of Edina

- Nine Mile Creek Stream-bank Stabilization Project
- Addressed public comments about the engineers' report and easements



#### Scott County SWCD

- Held a workshop for landowners to learn about stabilizing shorelines with native buffers and available financial assistance



Case Studies

#### Site Tours

Site tours present an opportunity to see first-hand possible solutions.

- Participatory appeal
- Visualization
- Promote action

- Amount of time
- Extensive organization

- All Levels

#### Pop-Ups

Pop-up events rely on individual responses to surveys, questions, and ideas in exchange for a giveaway

- Inclusive of less vocal participants
- Encourages honesty
- Unique and engaging

- Reliant on appropriate time frame
- Informal

- All levels

#### E-Based

E-based engagement comes in many forms, such as websites, social media, emails, and mobile apps

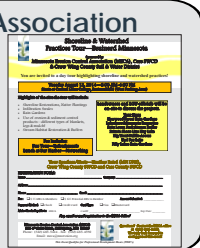
- Accessibility to information and involvement
- Minimal time commitment

- Inefficient sharing of information
- Lack of direction and potential for exclusion

- Technologically literate

#### Minnesota Erosion Control Association

- Held a tour to highlight shoreline and watershed practices
- Hosted by MN DNR, Crow Wing SWCD, and Cass SWCD



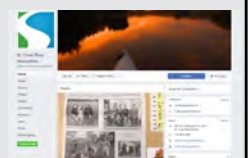
#### City Popsicle Truck (St. Paul)

- In exchange for answering questions, surveys, and quizzes, participants received a popsicle



#### The St. Croix River Association

- Has a Facebook page with over 1,600 likes
- Posts relevant events, informative articles, and photographs related to the river



## ENGAGEMENT TOOLS



Given these engagement options, the best approach for Ramsey is a combination of direct mailings, social media, and site tours. The next three posters will help landowners understand potential implementation strategies and funding opportunities using several shoreline restoration scenarios.



# RESTORING OUR EDGE

## Rehabilitating the Mississippi Shoreline in Ramsey

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Restoration: Slight to Moderate

### How to address slight to moderate erosion?

The following three posters present example restoration projects for the three erosion-severity categories: slight to moderate, severe, and very severe.

#### Erosion Severity Category: Slight to Moderate Erosion

Slight to moderate erosion includes areas with some bare banks, but where active erosion is not readily apparent. Some vegetative overhang and some exposed tree roots may be present, but no slumps or slips are visible.

#### EXAMPLE RESTORATION PROJECT



Before



After

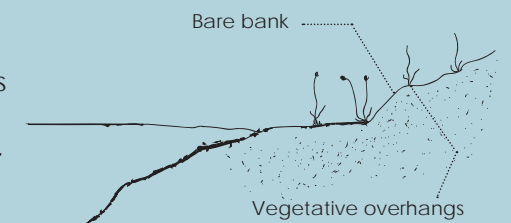
#### Slight to Moderate Erosion

##### Edge Conditions:

- 1 Bare bank
- 2 Vegetative overhangs

##### Potential Causes of Erosion:

- Removal of vegetation
- Excessive mowing



Case study cross section, NTS

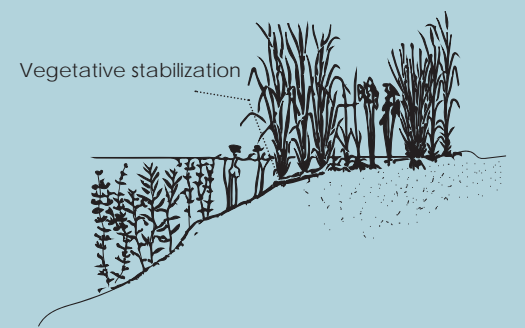


Please note that the shoreline depicted in this example is only for the purpose of illustrating commonly used restoration techniques, and has not been approved by an engineer.

#### Restored Shoreline

##### Description:

Revegetation, which involves replanting with native vegetation, was used to stabilize the shoreline. The deep roots of these plants bind the earth below tightly, effectively protecting the shoreline from erosion.



Case study cross section, NTS

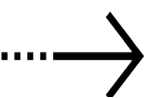
##### Why This Strategy Was Used:

This strategy was chosen because it is a relatively easy and cost-effective method of shoreline restoration for areas with slight to moderate erosion. After consultation with an engineer, this method can be completed by the landowner.

#### KEY TAKEAWAYS



Both natural edge conditions and land-use practices on adjacent land may lead to slight to moderate erosion. In this example, a moderate slope, wave action, and ice abrasion from the river increased the shoreline's susceptibility to erosion. When shorelines are unmanaged and vegetation is removed, slight to moderate erosion is likely to occur. Before beginning a restoration project, an engineer should be consulted to review and approve the restoration plan. To see a completed restoration project in Ramsey involving revegetation, visit <http://arcg.is/2ArNvae>



# RESTORING OUR EDGE

## Rehabilitating the Mississippi Shoreline in Ramsey

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Restoration:  
Severe Erosion

### How to restore severe erosion?

#### Erosion Severity Category: Severe Erosion

Severe erosion is identified as a bare bank with visible vegetative overhang and rills. Often there will also be exposed tree roots and even fallen trees. A cross-section view of the river channel would show a U-shaped slope rather than an uneroded V-shape. The Anoka Conservation District considers shorelines that lose 0.3–0.5 feet per year to be experiencing severe erosion.

### EXAMPLE RESTORATION PROJECT



#### Severe Erosion

**Edge Conditions:**

- 1 Bare bank
- 2 Vegetative overhang
- 3 U-shaped slope

**Potential Causes of Erosion:**

- Tall bank
- Steep slope
- Excessive mowing

! Please note that the shoreline depicted in this example is only for the purpose of illustrating commonly used restoration techniques, and has not been approved by an engineer.

Case study cross-section, NTS



#### Restored Shoreline

**Description:**

Cuttings (live stakes) of woody plants like willow and dogwood are driven into the substrate of the eroded area. They will sprout roots and grow. Typically this is best done in early spring or late winter.

Case study cross-section, NTS

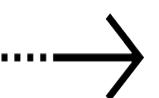
**Why This Strategy Was Used:**

Live staking establishes native, woody shrubs that catch sediment and begin to rebuild the shoreline. Bank grading and revegetation were also used to recontour and stabilize the upper section of the shore. This is an effective restoration solution for this shoreline because there is minimal human use.

### KEY TAKEAWAYS



Both natural edge conditions and land-use practices may lead to severe erosion. In this example, a steep slope, wave action, and ice abrasion from the river increased this shoreline's susceptibility to erosion. When shorelines are unmanaged and left with bare soils, severe erosion is likely to occur. Before beginning a restoration project, an engineer should be consulted to review and approve the restoration plan. To see a completed restoration project in Ramsey involving live staking, visit <http://arcg.is/2ArNvae>.



# RESTORING OUR EDGE

## Rehabilitating the Mississippi Shoreline in Ramsey

8

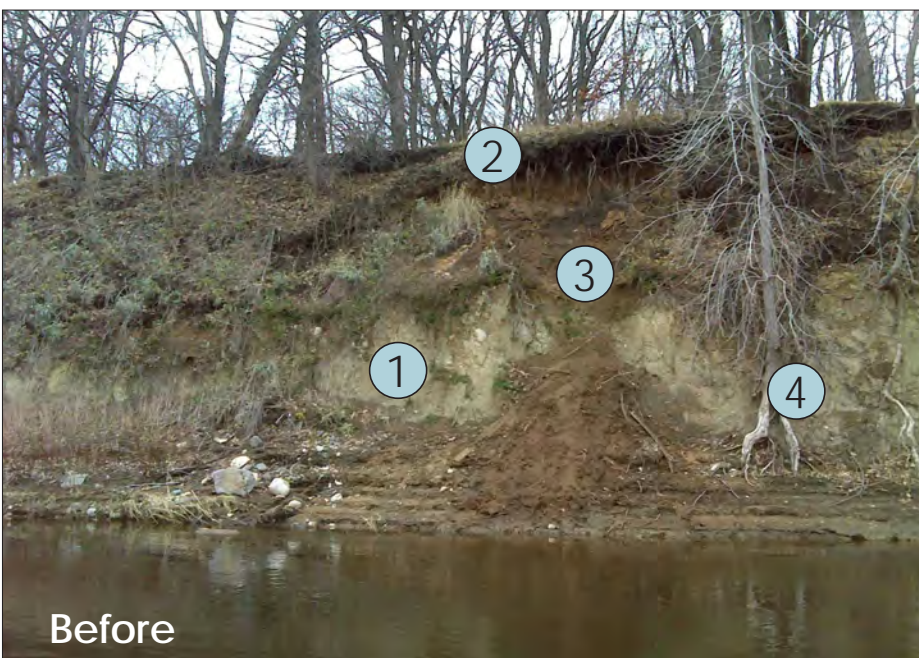
Restoration:  
Very Severe

### How to restore very severe erosion?

#### Erosion Severity Category: Very Severe Erosion

The Anoka Conservation District considers shorelines that lose 0.5 feet or more per year to be experiencing very severe erosion. Shorelines with very severe erosion typically have bare banks with severe vegetation overhang. Very severe erosion can cause tree roots to become exposed and may result in these trees falling over time. Very severe erosion will also cause drains and culverts to wash out. Massive slips, where a large portion of the shoreline breaks off, are another indication of very severe erosion.

#### EXAMPLE RESTORATION PROJECT



#### Very Severe Erosion

**Edge Conditions:**

- 1 Bare bank
- 2 Vegetation overhang
- 3 Shoreline slip
- 4 Tree root eroding

**Potential Causes:**

- Steep slope
- Tall bank

Case study cross-section, NTS

Please note that the shoreline depicted in this example is only for the purpose of illustrating commonly used restoration techniques, and has not been approved by an engineer.



#### Restored Shoreline

**Description:**

The bank was backfilled with soil and graded to reestablish a gradual slope. Riprap (mixed-size rock) was then laid over geotextile fabric to further protect the edge. Native vegetation was also planted.

**Why This Strategy Was Used:**

Hard armoring with riprap is a common restoration technique for severely eroded edges. This strategy was chosen to stabilize the bare soil and prevent erosion caused by wave action. Native vegetation was also added in adjacent areas with less severe erosion to stabilize the edge and provide wildlife habitat.

#### KEY TAKEAWAYS



In this example, a steep slope and wave action from the river increased the shoreline's susceptibility to erosion. If riprap and native vegetation are used as restoration techniques, it is important to occasionally eliminate weed growth and check for dislodged rocks and bank failures. Before beginning a restoration project, an engineer should be consulted to review and approve the restoration plan. To review a hard armoring restoration project that has been completed in Ramsey, visit [www.bit.ly/HardArmor](http://www.bit.ly/HardArmor)



# RESTORING OUR EDGE

## Rehabilitating the Mississippi Shoreline in Ramsey

### What are the key takeaways?

The City and Ramsey's shoreline property owners should consider the following key components when collaborating on a shoreline restoration initiative.

### HOW DO YOU RESTORE YOUR EDGE?

Below are six restoration strategies that could be deployed to rehabilitate your edge.

#### Which Restoration Method Should I Use?

**Slight to Moderate Erosion**

- Revegetation
- Cedar Revetment
- Staking
- Log Bank

**Severe Erosion**

- Hard Armor
- Grading
- Staking

**Very Severe Erosion**

- Hard Armor

### WHO PROVIDES FUNDING FOR RESTORATION PROJECTS?

Although private property owners are financially responsible for landscape alternations on their land, financial assistance can offset shoreline restoration costs. Funding for engineering designs, materials, and labor can be obtained through the Anoka Conservation District. Funding availability may change on an annual basis as funds are allocated by state legislation. Property owners are encouraged to contact the Anoka Conservation District to determine which grant funds would be most appropriate for their shoreline restoration project.

MN Board of Water and Soil Resources (BWSR)	Anoka Conservation District (ACD)	Lower Rum River WMO (LRRWMO)	Conservation Corps of Minnesota and Iowa (CCMI)
BWSR is the state agency that funds Soil and Water Conservation Districts (SWCD) to prevent sediment and nutrients from entering water bodies. <a href="http://www.bit.ly/BWSR_MN">www.bit.ly/BWSR_MN</a>	ACD is Anoka County's SWCD. This agency provides technical assistance, tools, and funding to property owners to manage and protect water resources in Anoka County. <a href="http://www.bit.ly/ACD_MN">www.bit.ly/ACD_MN</a>	LRRWMO is a government unit that protects and improves water resources in Ramsey, Anoka, and portions of Andover. Funding is provided to ACD and then allocated to applicants. <a href="http://www.bit.ly/LRR_MN">www.bit.ly/LRR_MN</a>	CCMI performs natural resource-based community-service projects for local governments with the help of young adults interested in natural resource management. → <a href="http://www.bit.ly/CCMI_MN">www.bit.ly/CCMI_MN</a>

### HOW DO YOU ENGAGE STAKEHOLDERS IN THE PLANNING PROCESS?

The best stakeholder engagement approach for Ramsey is a combination of **direct mailing, public meetings, social media, and site tours**. A **direct mailing** consisting of an informational brochure explaining the impacts of shoreline erosion could be effective in helping landowners understand the significance of the problem. **Social media** could foster discussion and interaction among shoreland owners. A **public meeting** would give landowners a chance to learn more about restoration options and grants that are available to assist landowners with projects. Finally, a **site tour** would allow landowners to see firsthand completed shoreline restoration projects, and talk to those property owners about their experiences.

