

# North Shore Management Board

## Erosion Forum Summary and Resource Guide

June 2009



### North Shore Management Board

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## North Shore Management Board Background

The North Shore Management Board (NSMB) is a joint powers agreement among 10 local governments (counties, cities, and townships) along Minnesota's Lake Superior coast. The NSMB was created in 1987 to develop a plan for uniform land use regulations for properties on and near Lake Superior (see inset below). The lake is valuable resource that provides natural, recreational, economic, and cultural assets to Minnesota. The NSMB completed and implemented its original plan in 1988 with an update in 2004. The Plan sets the minimum shoreland standards for the North Shore of Lake Superior including densities, lot size, setbacks and several other standards. Implementation of the Plan's minimum standards with local units of government is now nearly complete.

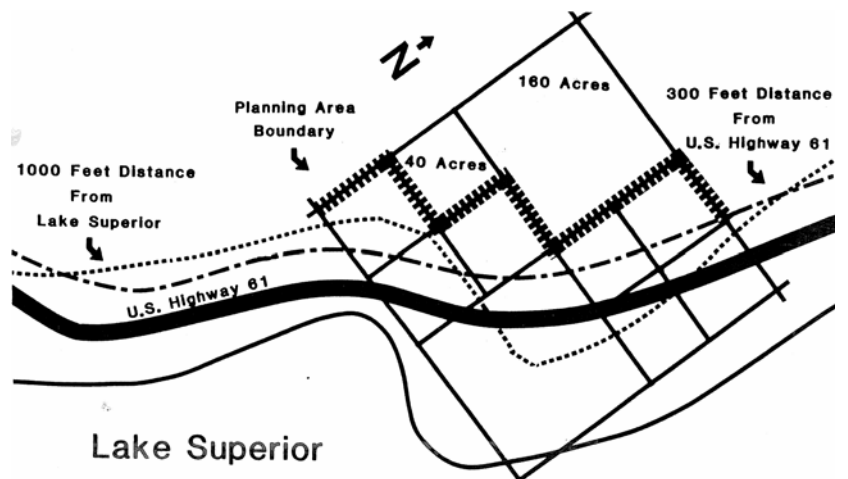
The NSMB is responsible for the North Shore Management Plan (NSMP). The NSMB serves as a forum for land use and environmental discussion between the member entities. The Board discusses development trends, newly identified issues, and other concerns that are common among the entities. The Board has organized a Technical Advisory Committee (TAC) of zoning professionals and agency officials to add expertise to the discussions.

The North Shore Management Plan area boundary is defined along the 40-acre subdivision lines of the rectangular coordinate system established in the U.S. Public Land Survey, nearest to the landward side of a line 1000 feet from the shoreline of Lake Superior or 300 feet landward from the center line of U.S. Highway 61, whichever is greater. However, the boundary between Lakewood Township and the western corporate limits of Two Harbors is the centerline of the U.S. Highway 61 Expressway. (See Figure 2 below).

**The North Shore of Lake Superior**



**Definition of the North Shore Management Plan Area Boundary**



Source: 1988 North Shore Management Plan

## **History of North Shore Erosion Efforts**

The North Shore Management Plan identifies erosion hazard areas along the shores of Lake Superior. The NSMP acknowledged that erosion was an issue along the North Shore and identified several areas to be considered as erosion hazard areas on maps. In 1988, the majority of the erosion was the result of high water levels, however there continues to be other factors that contribute to shoreline erosion. The NSMP did not identify specific properties as hazard areas, but left defining individual parcels up to the local governments. The goal for the NSMP regarding erosion was to properly manage erosion hazard areas to protect private property and protect public safety by guiding the development in areas prone to excessive shoreline erosion.

The erosion hazard areas were defined as areas that had a long term erosion rate greater than one foot per year. Soils maps and many surveys from a 1986 shoreline erosion survey coupled with revisiting fifty sites along the shoreline and taking measurements. Many of the areas that were identified as erosion hazard areas had high clay banks that continued to show signs of failure despite the two intervening years of relatively low, calm water.

The identified erosion hazard areas represent the more severe problems of erosion on the shore. Detailed mapping by local zoning officials was still needed before the erosion hazard areas could be effectively addressed in local zoning ordinances. As the result of this plan there were varying degrees of utilization. Some local governments went through and identified precise boundaries of the designated erosion hazard areas while others did not address the plan's erosion recommendations.

Since the 1988 erosion planning by the NSMB, there have been further efforts to address the shoreline erosion problems on the North Shore. Besides erosion work performed by Soil and Water Conservation Districts and other local efforts, Natural Resources Research Institute (Duluth, MN) completed a report called Erosion Hazard of Minnesota's Lake Superior Shoreline. This process identified areas of high, low, and unknown erosion potential. This process also used the determiner of erosion greater than one foot per year; equating to high erosion potential.

An outcome of the 2004 North Shore Management Plan Update process was a list of priority projects, that the Board, TAC, and NSMB Staff identified as relevant issues that needed to be addressed. Developing an updated Erosion Hazard Area Map was one of the priorities. Other objectives in the NSMP Update included promoting education, awareness,

and an understanding of shoreline erosion. The NSMP also calls for the designation of special provisions for erosion hazard areas.

In 2007, the NSMB began efforts to define a process for developing an Erosion Hazard Area Map for the North Shore. The NSMB established the steps needed to effectively update this map, with assistance from the NSMB Technical Advisory Committee. When a complete erosion hazard map is complete it will provide a useful tool to the local government's planning efforts. This process had input from Minnesota Department of Natural Resources, Coastal Program, Minnesota Pollution Control Agency, Lake and Cook Soil and Water Conservation Districts, and other contributors to the NSMB and the Technical Advisory Committee. The NSMB has yet to acquire funding to complete this map update.

### **Why is the NSMB addressing erosion?**

The Lake Superior shoreline is prone to erosion, due to large fluctuations in water levels and also the wave volume and force that can quickly destroy and relocate shorelines. Erosion continues to be an important topic because it can cause dangerous living conditions, property destruction, negative environmental effects and diminishing values of lakeshore properties. As



development pressure on the North Shore grows, there continues to be more development focused on the riparian lots.

Continued shoreline development is inevitable and may contribute to erosion problems. Erosion rates can accelerate with increases in impervious surfaces, changing and eliminating vegetation cover, and alterations to beach makeup. Serious situations are rare but massive/fast erosion can occur during one storm event leaving houses dangling from cliffs or beginning to slide down hillsides. The effective management of areas with high erosion potential is necessary to protect property owners, and provide measures for reducing erosion.

### **Why Hold a Forum?**

In 2008 the NSMB and NSMB Technical Advisory Committee began discussing holding local government education and/or outreach session that would provide planning insight into water and land use topics. After numerous discussions held by the North Shore Management Board and the Technical Advisory Committee, erosion continued to be a common topic.

It was expressed that the local governments don't currently have many resources at their disposal when new developments or structures are proposed. Often local governments (Boards, Planning Commissions, and Appeals Boards) are making decisions without having the ideal information/data at their disposal. Local officials are being ensured that stormwater and erosion mitigation efforts will be effective, yet they are not provided with relevant information to ensure this.

The Erosion Forum was planned to give local elected officials some background on erosion issues, especially those that are specific to the North Shore of Lake Superior. The intent was to show some "on-the-ground" type observations that provide insight to the attendees and to point out significant considerations when reviewing development proposals. This helps to reiterate that reviewing development proposals on paper may disregard important characteristics of the land. Overall, the forum was established to raise awareness of erosion hazards and to encourage local governments to plan with erosion concerns in mind.

## Erosion Forum Presentations

The North Shore Erosion Forum was held on June 18<sup>th</sup>, 2009 in Two Harbors at the Two Harbors Community Center. The event was attended by a range of citizens and officials from the region.

### **The Challenges of Erosion Control in the North Country**

*Wayne Seidel (Conservation Specialist, Lake County Soil & Water Conservation District Extension Educator, University of Minnesota Extension - Lake County)*



Mr. Seidel's presentation provided an overview of erosion issues along the North Shore. In his presentation he discussed that much of the shoreline along Lake Superior has red clay which tends to be fairly unstable, especially with wave and runoff action. Mr. Seidel also discussed the unique geology, variety of soil types, steep topography, and how these affect erosion and erosion efforts.

Increasing development can raise new issues within local planning agencies. Increased development can cause less time for review and can add political pressures as well. Planned Unit Developments propose higher densities which can lead to the need for additional erosion planning and efforts. With high percentages of publicly owned land, development is limited to the remaining privately owned land, causing increased development pressure.

Mr. Seidel gave several examples of efforts between public/private partnerships that led to benefits for the environment, property owners, and public entities. He was able to portray the differences that erosion efforts/projects make.



#### Recommendations:

- Seek and review technical recommendations before approving project proposals.
- Hold pre-construction meetings with both the Developers and the Equipment Operators. This gives a chance for more communication between the local entity and both parties.
- Conduct regular site visits. This helps planning agencies to envision the projects and consider things other than what is listed on a drawing.
- Work with Developers, not against them. Leaving room for flexibility could provide benefits for both sides.

#### **Sediment, Stormwater, and Land Use**

*Jesse Schomberg (Coastal Communities and Land Use Planning Extension Educator, Minnesota Sea Grant)*



Mr. Schomberg's presentation focused on the correlation between stormwater and land use and a review of local stormwater related efforts. He explained that more stormwater runoff contributes to greater velocities and volumes in streams which leads to high turbidity and sedimentation, erosion, nutrient and contaminant loading, and habitat loss. Development can contribute to more runoff as a result from removing water storage (removal of wetlands

and flattening low lands), removing forest cover (no roots to hold soil and soak up water), and adding impervious surface (less infiltration and faster run-off) if considerations aren't made to handle these issues properly. Increased stormwater run-off can also contribute to the destruction of streams by increasing the speed and volume which create erosion and streambank and streambed alteration, altering fish habitats.

Conservation design was another topic, Mr. Schomberg covered that provided positive results from incorporating conservation design techniques into developments. A Lakewood Township Buildout Scenario compared conservation design to standard zoning practices and identified

that the conservation design standards would be beneficial in the following ways:

- 42 percent less impervious surface
- 13 percent less forest clearing
- Decrease in total acre runoff over 50 years
- Lesser potential for run-off with smaller lots

Mr. Schomberg also summarized the developer cost savings that can add up when using conservation design.



#### Recommendations:

- Sediment in streams and Lake Superior is detrimental and should be controlled
- Land use changes cause increased erosion and sedimentation
- Best Management Practices alone can do only so much in preventing erosion
- Careful planning for future development can play a significant role in reducing run-off and erosion



## Cook County Stormwater Ordinance

*Tim Nelson (Planning Director, Cook County)*



Mr. Nelson gave an overview of the development and successes of the Cook County Stormwater Ordinance. The County had been reviewing plats and projects for years and regulated stormwater through the shoreland sections of the Cook County Zoning Ordinance. However smaller projects tended to fall through the cracks, so developing this ordinance was needed. After a major stormwater-caused erosion event happened because of minimal stormwater considerations, the decision to develop an ordinance was made.

Cook County formed a Committee to develop the ordinance. The Committee kept the following in mind:

- Avoid excessive levels of regulation
- Eliminate “under-the-radar” construction
- Avoid “after-the-fact” permits
- Develop provisions for both large and small projects
- Preserve public buy-in to avoid bad will
- Create simplified permitting system

The goal of the ordinance development was to address earth disturbance projects that would reasonably pose a potentially detrimental impact to nearby properties or area water resources.

Three types of projects were established (exempt, small, and large). This provides flexibility between projects that have little effect on stormwater and projects that heavily affect erosion. Small projects are required to submit a site plan in conjunction with grade and fill or land use permits. Also, an erosion and sediment control plan checklist is used to ensure all areas are addressed. Large projects are required to complete a Stormwater Management Plan, Stormwater Pollution Prevention Plan, Financial Security (125% of estimated project costs), and a National Pollutant Discharge Elimination System Permit if there is greater than 1 acre of disturbance. A special consideration is that no land disturbing activities are permitted on slopes  $\geq 18\%$  unless protective measures are developed and approved.

Outcomes:

- County maintains stormwater staff position
- Increasing compliance and buy-in from contractors
- Continued commissioner support even in current economic conditions

## Erosion Forum Site Tour

The NSMB gave the attendees a chance to get out to sites and see how stormwater and erosion projects function. Wayne Seidel led the field tour around the Two Harbors area.

### Site #1 Two Harbors Campground

Mr. Seidel gave a brief overview of Lake Superior shoreline projects and why erosion is a serious concern along the shore. Mr. Seidel reiterated that projects of this magnitude are better with strong partnerships. This project included Minnesota Department of Natural Resources, City of Two Harbors, and Lake Soil and Water Conservation District. The boulders were used from the Split Rock Tunnel project, providing great savings. Deeper water depths at this location led to a greater need for protection as it leads to massive waves. The project was also able to save the cobble beaches which are highly valued by the North Shore Communities.



Mr. Seidel also pointed out the outlet of Skunk Creek and reviewed the Skunk Creek Watershed map.

### Site #2 Flood Bay Shoreline Stabilization Project

This project was another shoreline stabilization project that benefitted from the public/private partnership. The boulders were again from a road blasting project; the Lafayette Tunnel. One learning experience from this project was the need for quality rocks that are used for protection. The rocks for this project are experiencing some breakdown, however they continue to protect the shoreline. This project also featured innovative access to the lake by using large flat boulders as steps down to the cobble beach.



### Site #3 Two Harbors Cemetery Detention Basin

After efforts in Two Harbors in developing a Stormwater Management Plan this project was constructed. The basin is designed to hold overflow water temporarily in order to keep Skunk Creek from overflowing and flooding businesses in Two Harbors. The project received funding from the Minnesota's Lake Superior Coastal Program, City of Two Harbors, Lake County Water Plan, Minnesota Department of Transportation, and



Lake County. The project collects stormwater and directs it through the cemetery and into the detention pond. There is an emergency spillway that allows water out of the basin safely during an over-capacity event.

#### **Site #4 19<sup>th</sup> Street Project**

This project was completed to settle out the contaminants that flow from upstream into the Skunk Creek. The project was designed to slow down the water by redirection. One item of note for this project was that it is not navigable for fish. While Skunk Creek is not a designated trout stream, it is important to note that projects that are located along rivers should consider fish migratory patterns.



#### **Site #5 Battaglia Parkway Project**

For a change of pace, Mr. Seidel then led the group to a project that received no public funding for its construction. The group reviewed two alterations that had been made to the project since the beginning. Both the rock inlet and rock chute that serve as the main entry points for water. There had been considerable soil erosion at these points mainly because the shape and rock size were not working. By adding smaller rocks and making sure the shape was correct- soil erosion at these two areas has been minimized.



#### **Site #6 Skunk Creek Streambank Stabilization Project**

Prior to work being completed by the City of Two Harbors, Lake County Soil and Water Conservation District, and Lake County there were many issues with the site. Skunk Creek travels under a utilized railroad track and then faces an abrupt shift. Approximately 108 tons of soil was being displaced per year at this site due to the velocity coming out of the culvert. The erosion was so great that it began to expose the city utility pipes. Rock riffles were also used to slow the speed of the creek down.



## Site Assessment

In order to recap what was learned throughout the forum and to put some of the education into practice—the forum attendees headed to an undeveloped lake shore lot. At this location the group discussed what stormwater and erosion considerations should be made on the site. The discussion included the following topics:

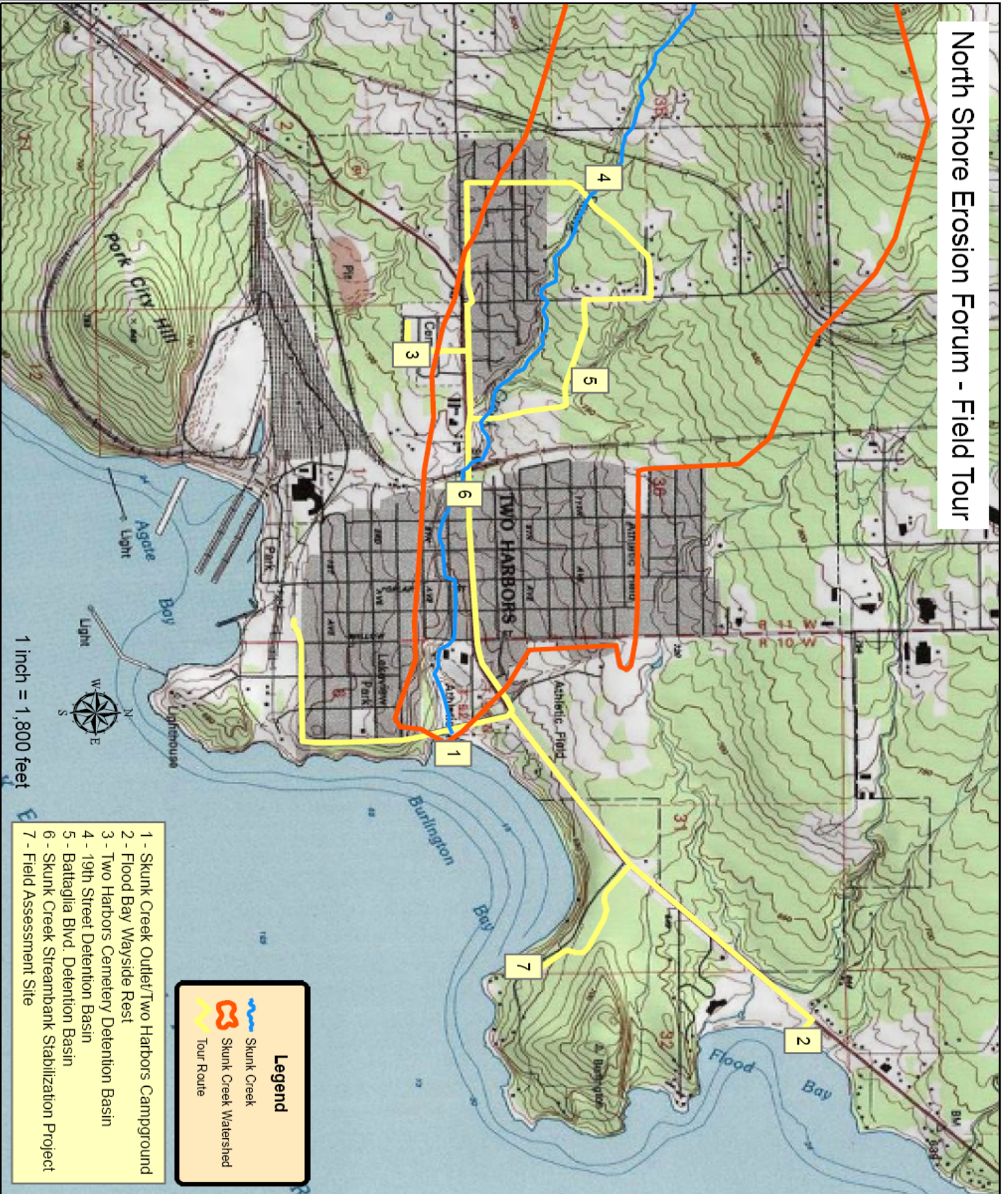


- Since trees are needed to soak up water as well as stabilize the soil, the regulation of tree clear cutting may be beneficial to properties.
- Setbacks should be carefully considered, especially considering high water or wave action from Lake Superior.
- At the site there was erosion of a path that looked to lead straight into the lake, an example of the need to consider erosion in all soil disturbing decisions.
- Septic systems need to be placed precisely to make sure they are not too close to lake or interfere with stormwater run-off.
- Making provisions for stormwater run-off can be equally as important than some wetland areas, however each individual case varies in its circumstances.
- Planting trees/vegetation along the bluff line could help to stabilize the bank.
- The importance of encouraging property owners or prospective property owners to engage with the local Planning and Zoning staff to know what is involved in developing a site, especially on Lake Superior.
- Local elected officials and planning commissioners should take advantage of resources including talking with local, state, and federal agencies about issues or questions.
- Local governments should carefully determine zoning setbacks and consider slope stability issues in all development proposals. The geotechnical aspect of slope stability is very complex and should be carefully considered.
- Requiring grading and filling permits is important because then local governments are “in-the-loop” to begin the process and are aware of issues that may develop, and also can begin to develop a history of property improvements.
- Litigation can be very expensive for local governments. Working with developers and finding common ground can prevent litigation.

- Local governments should evaluate projects they have approved and identify whether or not they are successful and if similar decisions should continue to be made in the future.
- The Coastal Program may be able to help local governments strengthen their ordinances to ensure protection from erosion.




# North Shore Erosion Forum - Field Tour



- 1 - Skunk Creek Outlet/Two Harbors Campground
- 2 - Flood Bay Wayside Rest
- 3 - Two Harbors Cemetery Detention Basin
- 4 - 19th Street Detention Basin
- 5 - Battaglia Blvd. Detention Basin
- 6 - Skunk Creek Streambank Stabilization Project
- 7 - Field Assessment Site

**Legend**

-  Skunk Creek
-  Skunk Creek Watershed
-  Tour Route

## Erosion Forum Attendees

Christopher Rousseau- MSA  
Cindy Hall- City of Duluth  
Myron Vold- Citizen  
Carol Vold- Citizen  
Andrea Crouse- NRRI  
Dave Gustufson-  
Clinton Little- Coastal Program  
Tim Musick- NSMB  
Mike Hoops- Silver Creek Board  
Susan Koschak- St. Louis County Planning  
Mark Johnson- St. Louis County Planning  
Cameron Bertsch- Douglas County Land and Water  
Ryan Hughes- BWSR  
Rich Sve- Lake County Board  
Cliff Bentley- DNR Waters  
Dan Tanner- Duluth Township Board  
Amy Seitz- Grand Portage  
Bill Vogel- Grand Portage  
Scott Smith- St. Louis County Planning  
Kara Davidson- Two Harbors Planning Commission  
Pat Collins- DNR Coastal Program  
Wayne Seidel- Lake County SWCD and MN Extension  
Jesse Schomberg- MN Sea Grant  
Tim Nelson- Cook County Planning  
Keith Anderson- Lake County SWCD  
Christine Ostern- Douglas County Land and Water  
Walt VanDenHeuvel- Lake County Planning and Zoning  
Sandor Piter- Citizen  
Lee Klein- City of Two Harbors  
Tom Gelineau- City of Two Harbors  
Ben VanTassel- ARDC  
Liz Sarabia- ARDC  
Bryan Anderson- ARDC





## Tools for Local Governments

The local governments along the North Shore have many tools that are available to them. The following is a summary of these tools to use in land use and erosion related decision making.

### **Erosion and Sediment Control Planning Checklist**

This checklist was developed by Wayne Seidel to help property owners develop their own sediment and erosion control plans. It provides a list of things to consider when developing a plan. The checklist is available in the Appendix of this document.

### **Minnesota Department of Natural Resources**

The DNR provides Ecological assistance to local governments including information about local original vegetation, existing native plant communities, and other ecological information. Information is available via electronic GIS data, hard copy maps, publications, assistance in drafting open space and comprehensive plans, and access to natural resource professionals with special expertise.

The DNR encourages local governments to consider natural resources when completing planning projects. They provide a variety of checklists that can be used when going through any kind of decision making processes.

A wide variety of additional resources are available on the Minnesota DNR website at: <http://www.dnr.state.mn.us/nrplanning/community/index.html>

### **DNR Watershed Assessment Tool**

This DNR Site provides education as well as information that would be very beneficial to local governments, especially when dealing with watersheds. Website: [http://www.dnr.state.mn.us/watershed\\_tool/hydrology.html](http://www.dnr.state.mn.us/watershed_tool/hydrology.html)

### **Decision Support Tools from NOAA**

National Oceanic and Atmospheric Administration has a Coastal Services Center that provides decision support tools for local governments. Some of the services include:

- Hazard assessment tools
- Risk and vulnerability assessment tools
- Nonpoint source pollution and erosion comparison tool
- Impervious surface analysis tool
- CanVis visualization tool

These tools can be accessed at <http://www.csc.noaa.gov/tools.html>

### **Minnesota Pollution Control Agency- Stormwater Manual**

The manual is meant for both professionals and homeowners that details Best Management Practices and other information that is beneficial to both partners. This resource can be found at:

<http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html>

### **Minnesota Erosion Control Association**

MECA works to advance effective stormwater management and erosion control practices and have numerous resources available on their website at: <http://www.mnerosion.org/resources.html>

### **Lake Superior Duluth Streams Website**

This website provides a variety of tools for both homeowners and communities to address water and stormwater type issues. An especially useful feature is the Site Design Toolkit which provides best management practices and other considerations for Lake Superior.

<http://www.lakesuperiorstreams.org>

### **Other Local Resources**

Cook County Soil and Water Conservation District

<http://www.co.cook.mn.us/index.php/soil-and-water>

Lake County Soil and Water Conservation District

<http://www.co.lake.mn.us>

South St. Louis County Soil and Water Conservation District

<http://www.southstlouisswcd.org/index.htm>

Minnesota Sea Grant

<http://www.seagrants.umn.edu/>

Natural Resources Research Institute

<http://www.nrri.umn.edu/default/>

Board of Water and Soil Resources

<http://www.bwsr.state.mn.us/>

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# APPENDIX A: SAMPLE CHECKLIST

## Erosion and Sediment Control Planning Checklist

**Goal:** To control erosion and prevent sediment and other pollutants from entering Lake Superior / stream / lake / wetland / storm drain system during construction.

**Note:** Attach a site map showing the location of all erosion control practices, access points, existing and proposed grades (with slope direction), property lines, roads, lakes, watercourses (run-off pattern), wetlands, sewage treatment systems and building locations.

### **Erosion & Sediment Control Principles and Measures (circle all that apply to your project)**

#### **Planning Prior to Construction:**

1. Maintain existing vegetation whenever possible and minimize the area of disturbance. Flag and protect trees to enhance future landscaping efforts and to reduce raindrop impact. (Vegetation is the best and most cost-effective erosion control practice).
2. To avoid soil compaction and damage to vegetation, stake and flag areas that need to be off-limits to construction equipment BEFORE construction begins. These areas include sewage treatment areas, infiltration basins, natural watercourses, valuable trees, and wetlands.
3. Install all sediment control practices BEFORE and soil disturbing activities occur (including clearing and grubbing). These may include silt fencing, bio rolls, rock check dams, and storm drain inlet protection. Silt fence can treat a maximum of 100 square feet per lineal foot of fence. Install silt fence, bio rolls, or rock socks in shorter reaches on the contour with each end curved uphill to more effectively filter water. Sensitive areas such as wetlands, drainage swales and shoreland areas should also be protected.
4. Phase construction activities to minimize the areas disturbed at one time. This will also allow completed areas to be stabilized and re-vegetated BEFORE disturbing adjacent sites. The need for temporary erosion control measures may be avoided by completing a phase of construction and installing permanent erosion control measures when the final grade is attained.
5. Minimize the use of impermeable surfaces such as roofs, driveways, parking lots and roads.

#### **Protecting Waterways:**

6. Maintain and protect all natural waterways. Retain at least a 20-foot wide strip of natural vegetation along all waterways to filter out sediment and other pollutants.
7. Divert run-off around the site, if practical (avoids treating clean water).
8. Use rock rip-rap at both the inlet and outlet ends of culverts to prevent scour erosion and use energy dissipaters at the outlet ends (e.g. plunge pools).
9. In areas of concentrated flow install rock check dams, triangular dikes, bio rolls or rock socks to slow runoff and trap sediment.
10. Use temporary slope drains or rock chutes to move water down steep slopes.
11. Construct sediment basins (>10 acre watershed or >5 acres near trout streams or Lake Superior) and/or infiltration basins.
12. Install water bars on access roads to prevent concentrated water runoff from flowing down the road, eroding gravel, and filling in the ditches.
13. To reduce mud transported onto paved roads, a rock construction entrance may be required (6" layer of 1-3" washed rock a minimum of 50' in length underlain by geo-textile fabric).
14. Cover any stockpiled topsoil with plastic (or other impervious covering) or use a temporary seed mix. Use stockpiled topsoil as earthen berms to serve as temporary sediment basins.

# APPENDIX A: SAMPLE CHECKLIST

## ALL PROJECTS : Restoring the Site After Construction

1. Mulch all disturbed areas at the rate of one 50-pound bale of straw per 500 square feet and disc anchor. On slopes greater than 10 feet in length and 4:1 or steeper, use the following erosion control blankets that have been properly anchored to the slope according to the manufacturer's instructions:

2:1 slopes or steeper	Straw/Coconut Blanket or High Velocity Wood Blanket
3:1 slopes or steeper	Wood or Straw Blanket with net on both sides
4:1 slopes or flatter	Wood or Straw Mulch blanket with net on one side
Flat areas	Straw Mulch w/disc anchoring

\* Use a 10 foot width in ditch bottoms

2. Apply fertilizer according to soil test recommendations prior to seeding.
3. Seed all disturbed areas within seven days of completion of land disturbing activities AND no later than 3 days after completion in shoreland areas. Do not seed later than September 1<sup>st</sup>. Areas that need to be seeded after September 1<sup>st</sup> should be stabilized immediately in another manner such as temporary seeding, straw mulch, installing erosion control blankets, or laying sod. Dormant seeding is most successful if done in late October or early November. The use of native plant materials, including trees and shrubs, is encouraged because these plants are adapted to our soils and climate.

## ALL PROJECTS: Inspection and Maintenance

1. Inspect the construction site every 7 days and within 24 hours after every ½ inch rain event to ensure the practices are working properly (i.e. silt fences, water bars). Keep records of inspection dates, inspector, and findings.
2. Clean out silt fences when they are 1/3 full of sediment (within 24 hours) or replace with functional silt fences.
3. Clean out sediment basins when ½ full of sediment (within 72 hours).
4. Maintain rock construction entrance and clean adjacent roads of any mud tracked onto them (within 24 hours).

I agree to install, inspect and maintain the above practices to accomplish the goals of controlling erosion and preventing sediment from reaching Lake Superior / stream / lake / wetland / storm drain system.

Name: \_\_\_\_\_ Date: \_\_\_\_\_  
(Person Responsible for Implementation)

Address: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_ Mobile/Cell: (\_\_\_\_) \_\_\_\_\_

For an electronic version send an e-mail request to: [seide002@umn.edu](mailto:seide002@umn.edu)

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