

# Great Lakes Basin Program GLRI Project

## Poplar River Watershed Erosion and Sediment Reduction Projects

**Size:** watershed

**Grant Amount:** \$757,305

**Year Awarded:** 2010

**Sponsor:** Cook County Soil and Water Conservation District

**Address 1:** Cook County Courthouse

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### Submitted Project:

#### *II. Project Background*

The Poplar River Watershed is impaired for turbidity and is on the 303(d) list. It is the subject of a Total Maximum Daily Load study currently and the projects listed in this workplan have been identified as priority projects by the various studies conducted under the TMDL. **The projects listed in this workplan have the potential to reduce enough sediment loading to make the Poplar River the first water body in Minnesota to be taken off the 303(d) list.**

The Poplar River watershed is located in the Northeastern Minnesota portion of the Lake Superior Basin. The entire watershed encompasses 114 square miles. The headwaters begins in the Boundary Waters Canoe Area wilderness and then flow through various lake and river systems to Lake Superior at Lutsen, Minnesota.

The upper portions of the Poplar River watershed are considered to be in good condition. This area of the watershed is densely forested and is dominated by a shallow gradient stream draining many wetlands and lakes. The U.S. Forest Service manages large tracts of forest in the upper watershed and has retrofitted roads and culverts for fisheries improvements. The upper watershed lakes and rivers have been evaluated via lake assessments and stream monitoring programs and meet water quality standards. Private property around the lakes has been developed. Lake associations have pursued water quality projects that are protective of water quality.

Near Lake Superior the river transitions quickly to a steep gradient channel confined by narrow valley walls. The river channel and valley walls at this transition area are defined by bedrock, lacustrine beach and glacial deposits of clay and till. The boundary that separates the upper and lower watershed areas is a foot bridge at the top of a 150 foot waterfall. From this waterfall to the confluence with Lake Superior the river is listed as impaired for turbidity, primarily caused by excess sediment. This lower watershed area of the Poplar River is developed with resort commercial businesses, townhome and condominium subdivisions, recreation facilities and road and trail accesses to these facilities.

This project was funded by the Great Lakes Restoration Initiative, and is maintained through the Great Lakes Basin Program for Soil Erosion and Sediment Control at the Great Lakes Commission.



The lower watershed includes 2.73 river miles and a land surface area of 1300 acres. This lower section of the river and adjacent slopes is predominated by steep valley walls with slopes varying between 10 and 25%. Clay, silt and clay loam soils abut river segments and provide erosion sites that represent sediment sources and impairment conditions. There are a number of slumps in this section that are the result of the meandering river running up against the steep valley walls. **Steep slopes, erodible soils in the watershed and flashy (extreme) stream flow conditions represent conditions that cause high sediment loads carried downstream and immediately into Lake Superior.**

In 2008, Research Triangle Institute was commissioned to provide an analysis of the turbidity problem of the lower watershed area. Their report defined the lower portion of the Poplar River as having many characteristics that make it more similar to mountain streams, rather than typical Midwestern streams.

The 1300 acres within the 2.73 river miles represents the lower Poplar River Project Area. From a watershed perspective, this is a very manageable project, and it **targets the most critical area of the full watershed in need of best management practices.** All landowners in the area are participating through the Poplar River Management Board toward implementing solutions, with a shared goal of removing the Poplar River from its impaired water status.

### **Erosion and Sediment Goal**

*Estimate the total amount of **erosion**, in tons, your project will save.*

Erosion from the land in the Poplar River Project area is transported as sediment to the Poplar River. Steep slopes and drainage courses cannot hold the eroded soils after detachment. The table below provides estimates of the sediment loads from all known sources during median, minimum and maximum river flow conditions. These sources are located across the full 1300 acres of the lower river watershed and reflect the combined upland sources, near channel sources and river valley wall sources.

Source	Median Sediment Load		Minimum Sediment Load		Maximum Sediment Load	
	Ton/year	%	Ton/year	%	Ton/year	%
Channel Incision	53	3%	18	2%	88	3%
Megaslump	522	26%	307	31%	737	25%
Other Landslides	204	10%	121	12%	287	10%
Golf	15	1%	8	1%	23	1%
Developed	25	1%	13	1%	38	1%
Ski Runs, Trails, and Roads	661	33%	330	33%	991	33%
Forest	280	14%	140	14%	421	14%
Gullies/ Ravines	225	11%	50	5%	400	13%
<b>Total</b>	<b>1,985</b>		<b>987</b>		<b>2,984</b>	

Table 1 Published Source: Poplar River Sediment Source Assessment, University of Minnesota, March 30, 2010 Original calculations from "Poplar River Turbidity Assessment" EPA Contract No.68-C-02-110, RTI International

*Estimate the total amount of **sediment**, in tons, your project will save.*

The sources of sediment to the Poplar River have been estimated as part of the TMDL process of the Minnesota Pollution Control Agency as shown in Table 1. The Mega Slump was a large sediment source and targeted for corrective action. The project was awarded state funding and in-stream and slump treatments were completed in 2009. The largest remaining sediment loads are from sources defined as ski runs, trails, roads, ravines and other landslides. See Table 1.

The projects proposed in this application, added to projects already completed, are estimated by consulting engineers and SWCD staff to result in a 48% cumulative reduction in suspended sediment in the river (960 tons/year from the median sediment load estimates). This will be significant progress toward sediment reduction and meeting water quality standards and removing the lower watershed from the 303(d) list. The projects proposed under this grant represent an **estimated 350 tons/year** of the reduction total. Because of their location in the watershed, and amount of sediment they are estimated to reduce, this application addresses the most critical of the priority projects to complete.

*Describe the major **sources** of sediment in your watershed and the types of sources you will be reducing (cropland, streambank)*

The major sources of sediment are briefly described in Table 1 above and the more detailed project locations and specific work to complete are described in Table 2 on page 5. The projects to be completed with this funding will address a significant ravine, and the majority of sediment sources coming from ski runs, trails, and roads. Most of these sources are located within the streambank of the river, the riparian corridor within 1000 feet of the river, or the critical river valley wall composed of highly erodible clay and glacial till within 1000 feet of the river. The ravine connects major developed areas (impervious surfaces) directly to the river via a significantly sized gully 10 feet by 40 feet in width/depth and 350 feet in length.

### **Watershed/ Project Work Area**

*Name of your watershed plan and the agency that approved the plan.*

While there is no watershed plan specific to just the Poplar River, there are numerous strategic documents, listed below, that outline priority project areas and management strategies for the Poplar River watershed. The Minnesota Board of Water and Soil Resources (BWSR) approved the Cook County Water Management Plan which lists goals and priorities for the Poplar River. The ongoing TMDL process continues to strengthen this planning and prioritization process. Also, the town at the mouth of the river, Lutsen, and the county government, have developed a special erosion and sediment control mitigation plan (Lower Poplar River Alternative Urban Areawide Review – AUAR) to address development impacts in the project area.

Additional plan documents relating to the Poplar River are listed below:

Also at the county level, the projects are approved in these plans: **Cook County Soil and Water Conservation District annual Workplan**, the **Cook County Water Management Plan**, and the **MN DNR Coastal Non-Point Plan**. The county plans required approvals by local elected officials and state reviewing authorities.

Regionally, this project supports goals of the **Lake Superior LaMP biennial plans** of the last eight years, the **EPA Strategic Plan 2006-2011**, **The Great Lakes Strategy to Restore and Protect the Great Lakes**, the **Lake Superior Basin Plan**, the **Minnesota Coastal NonPoint Plan** and **local plans for water management**.

The LaMP “vision for Lake Superior” is supported in that this project results in a clean environment that supports and sustains economic development with a strong citizen and business engagement, helps develop sustainability by engaging the local community in determining the future and managing resources, builds local communities’ capacity to engage in watershed planning and improved land use planning, strengthens partnerships among government and non agency partners, applies an

appropriate watershed scale for completion of the work, restores and protects water quality and conserves soil.

<b>Project Name/ Sediment Source</b>	<b>Outcomes</b>	<b>Outputs</b>	<b>Sediment Load Reduction</b>	<b>Other Expected Results</b>
<b>Ullr Tightline</b>	10' x 40' x 350' gully on steep slope repaired, runoff water collected, routed through a managed system, clean water routed to river via a measured, energy reducing conveyance	Install: 130,000 gallon collection basin; 1,050 feet of HDPE water pipe 18", 24", 36" x 48" diameter; 10,000 gallon concrete energy dissipater; riprap armored channel to River; 750' gully restoration and revegetation	90 tons per year	Will handle 100 year rainfall event. Tightline is a permanent solution. Gully repaired, slope stabilized, and vegetation becomes established in and beyond riparian corridor with habitat values. Overland flows managed. Phosphorus load to river and Lake Superior reduced.
<b>Caribou Highlands Flow Path</b>  <b>Caribou Highlands, cont.</b>	Stormwater flow paths from large resort re-aligned and armored; eroded ski run restored and stormwater flows controlled in entire corridor between resort and River.	5,500' of roadway re-surfaced with MN Department of Transportation Class 6 aggregate, ditches armored, and cut-banks repaired with coir logs; flow paths to River increased. 4,000' ski trail surface re-graded, ditches armored, all surfaces vegetated.	80 tons per year	Improves riparian corridor with habitat values. Overland flows managed. Phosphorus load to river and Lake Superior reduced.
<b>Lower Eagle Mountain Road</b>	Road improvements – surface covered in aggregate material, cross-sections repaired and improved, cut banks repaired and vegetation restored.	2,950' of roadway re-surfaced with rock, ditches armored, and cut banks repaired.	75 tons per year.	Overland flows managed. Improved groundwater recharge. Phosphorus load to river and Lake Superior Reduced.
<b>Mystery Mountain Road</b>	Road improvements – surface covered in aggregate material, cross-sections repaired and improved, cut banks repaired and vegetation	2,950' of roadway re-surfaced with rock, ditches armored, and cut banks repaired. 35 water bars installed.	40 tons per year.	Overland flows managed. Improved groundwater recharge. Phosphorus load to river and Lake Superior reduced.

This project was funded by the Great Lakes Restoration Initiative, and is maintained through the Great Lakes Basin Program for Soil Erosion and Sediment Control at the Great Lakes Commission.



	restored.			
<b>Lower Mystery Mountain Flow Path</b>	Flow path re-alignment and armoring. Revegetation of riparian corridor.	220' conveyance installed to re-direct storm water away from unstable river bank; 750 sq. ft. of revegetation in riparian corridor.	30 tons per year.	River bank restored. Riparian corridor improved with habitat values. Phosphorus load to river and Lake Superior reduced.
<b>Lutsen Resort Trails Project</b>	Pedestrian trail restoration. Eroded sections of trail repaired.	1,500 feet of trail, treated wood with crushed rock walkway. 500 feet of safety rail.	5 tons per year.	Will create safe public access to the river and beach area and reduce trails erosion. Phosphorus load to river and Lake Superior reduced.

Table 2

The Poplar River Watershed Erosion and Sediment Reduction Projects also support the goals of the **2006-2011 EPA Strategic Plan**. Specifically, the project will produce cleaner and safer water, preserve land and restore it to a better condition, and ecosystems and communities will be healthier. The proposed projects also help to attain longer-term goals of the plan like attaining water quality standards, reducing the number of impaired water bodies, and improving water quality conditions using a watershed approach.

Numerous elements of the “**Great Lakes Regional Collaboration Strategy to Restore and Protect the Great Lakes**” are supported in this proposal. The projects proposed will conserve and restore a stream improving fish and other biota, reduce sediment and nutrients in the river, and a more natural flow regime will be restored. The coastal habitat will benefit from less sediment entering coastal waters.

The state of Minnesota developed a regional plan intended to improve and protect Lake Superior, the **Lake Superior Basin Plan**. The projects proposed support several elements of the basin plan. An impaired water is restored using land-use tools and local laws to reduce runoff impacts.

*Watershed: list all 12 digit USGS HUC codes*

HUC Code: 04010101-613

*Describe the **Priority Areas** within the watershed where you are going to concentrate your efforts. List by area or narrative description of specific conditions.*

The priority areas listed in this narrative have been **chosen based on several scientific studies that have identified erosion sources and locations in the watershed that would benefit most from implementation of BMPs**. The most recent study, completed by University of Minnesota researchers in early 2010, built upon previous studies and is the foundation of the TMDL report now in completion. As part of the University work, the sediment sources described in Table 1 were evaluated in greater detail, ground truthed for specific locations and size of erosion or sediment producing area, investigated for connecting flowpaths, and given an index or ranking of need for repair.

The result of this work was more clearly identified sediment sources that are better defined by area of impact, and an understanding of the complexity of the problem areas and impacts. Interconnectedness to other nearby erosion sources like small ravines and gullies in the forest was investigated and the condition of infrastructure like damaged or compromised culverts was also noted. In addition, we completed a biological assessment of the river and sediment embeddedness of the stream channel bottom is clearly

evident at the base of some of these erosion source areas. **The most significant sediment sources found in the studies are those that are proposed for work.**

Each project proposed for funding is defined in Table 2 in greater detail along with some specifics about the project and estimated tons of sediment reduction. Their location is contained in the attached map.

As mentioned in the project background section, the upper watershed lakes and river have also been evaluated and meet water quality standards. Other projects that protect or improve the lakes and rivers of the upper watershed have been completed and will continue. The most immediate project needs to reduce sediment in the river are those defined in this application located in the lower river watershed area.

*How many acres are in the watershed?*

There are 72,960 total acres from headwaters to mouth of Lake Superior.

The impaired portion of the watershed is the “Lower Poplar River Watershed” encompassing 1,317 acres.

*How many acres are in:*

- *Agriculture including pasture landuse?* 0 acres
- *Forest including brushland landuse?* In the lower Poplar River Watershed, 997 acres
- *Urban, suburban, industrial, commercial and rural residential landuse?* 320 acres

**U.S. Congressional District(s)** where project is located, as listed at [www.house.gov/writerep/](http://www.house.gov/writerep/).

Eighth Congressional District of Minnesota.

### **III. Implementation**

**A written contract will be required between you and the landusers/landowners to fund conservation practices with GLBP funds.** *The contract will include among other items, the type, number and location of each practice to be installed as well as the cost-share/incentive rate to be paid for each practice. (We will also use the signed contract as proof of commitment of funding for reimbursement of your expenses.)*

The SWCD will use a cost-share contract similar to contracts it has used successfully in the past with Lutsen Mountains Corporation to install best management practices. The cost-share contract provides for SWCD board and engineer oversight of projects on an ongoing basis. The Cook County auditor’s office reviews all Cook SWCD monetary transactions and will provide additional oversight of the contract in this capacity.

*Fill out all that apply:* No agronomic, alternate incentives practices or easements will be installed. The bulk of the practices are engineering practices, see Item B, and the title for these practices comes from the Minnesota NRCS field office technical guide. BMPs numbers 1 and 4 complement each other in that the work will occur in the same locations. BMPs numbers 2 and 3 complement each other. One BMP is a riparian buffer re-vegetation.

**B. Engineering Practices installed by Landowners/Landusers with Financial Assistance provided by this grant (ex. Grass Waterway, Streambank Stabilization.)** *If you have more than three BMPEs, copy and paste BMPE1 section and change the number as appropriate. (NRCS equivalent or PE sign-off.)*

## BMPE1

**Description: Heavy Use Area Protection** – These areas include the access/maintenance roads, walking trails and ski runs. BMPs for heavy use areas include; road resurfacing, improved drainage including diversion and capacity improvements and water bars, broad based dips with armored outfalls, vegetative cover and temporary erosion control with coir logs and re-vegetation.

*Check the quarters the task is to be started and completed:*

Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Start/Complete	x		x	x	x		x	x	x		x	

*Number of acres/units of BMP to be installed during project:*

35 water bars  
16 dips and armored outfalls  
16,900 feet of combined access/maintenance roads and trails

*Incentive method:* cost-share contract

*and rates:* Standard state cost-share rate is 75% grant, 25% landowner match with some discretion to alter the rate. The SWCD may alter the rate to a lower landowner percentage due to the significant commitment of resources the landowners have already contributed in developing the pre-engineering work for these projects and the fact that these projects are more expensive than projects usually implemented in this way. Cost-share from landowners can be in the form of cash or in-kind work and will be documented on grant reports and in the contract.

*Expected soil savings in total tons:* on average 230 tons of sediment per year

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## BMPE2

**Description: Lined Waterway and Outlet** – The Ullr Tightline replaces a large and rapidly eroding gully/ravine with a Tightline and energy dissipater (10,000 gallon tank). A tightline is a large enclosed conveyance, like a culvert, often used on Western ski hills. In this case it will be embedded in the gully with engineered dissipaters and basins to capture and convey water. After placement, the ravine is stabilized and vegetation can stabilize the ravine banks and eventually the overall surface. The SWCD Joint Powers Engineer has already given preliminary review of the plans for this project.

*Check the quarters the task is to be started and completed:*

Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Start/Complete		x	x	x	5		x				x	

*Number of acres/units of BMP to be installed during project:* 750 foot gully restoration and revegetation

*Incentive method:* cost-share contract

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*and rates:* Standard state cost-share rate is 75% grant, 25% landowner match with some discretion to alter the rate. The SWCD may alter the rate to a lower landowner percentage due to the significant commitment of resources the landowners have already contributed in developing the pre-engineering work for these projects and the fact that these projects are more expensive than projects usually implemented in this way. Cost-share from landowners can be in the form of cash or in-kind work and will be documented on grant reports and in the contract.

*Expected soil savings in total tons:* on average 90 tons per year

### BMPE3

*Description:* **Water Sediment Control Basin** – located at the termination of the Ullr tightline (lined waterway, BMP 2) The steep grades and high topographic relief limit the application of this practice around the watershed except in the suitable locations like the terminus of the ravine the tightline will be located in.

*Check the quarters the task is to be started and completed:*

Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Start/Complete		x	x	x	x		x				x	

*Number of acres/units of BMP to be installed during project:* 750 foot gully

*Incentive method:* cost-share contract

*and rates:* Standard state cost-share rate is 75% grant, 25% landowner match with some discretion to alter the rate. The SWCD may alter the rate to a lower landowner percentage due to the significant commitment of resources the landowners have already contributed in developing the pre-engineering work for these projects and the fact that these projects are more expensive than projects usually implemented in this way. Cost-share from landowners can be in the form of cash or in-kind work and will be documented on grant reports and in the contract.

*Expected soil savings in total tons:* see BMP 2 – 90 tons

### BMPE4

*Description:* **Runoff Management Systems** –these practices will include drainage system improvement and conveyances within the heavy use areas of roads and trails. They may include conveyances to re-route water away from failing river slopes, road cut-slopes, ditch armoring, small basins, small gully repair adjacent trails/roads, and revegetation in key locations. All projects will be designed to 100 year rainfall event.

*Check the quarters the task is to be started and completed:*

Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Start/Complete	x		x	x	x		x	x	x		x	

*Number of acres/units of BMP to be installed during project:* See BMP 1, 16,900 feet of trails and roads corrected



*Incentive method:* cost-share contract

*and rates:* Standard state cost-share rate is 75% grant, 25% landowner match with some discretion to alter the rate. The SWCD may alter the rate to a lower landowner percentage due to the significant commitment of resources the landowners have already contributed in developing the pre-engineering work for these projects and the fact that these projects are more expensive than projects usually implemented in this way. Cost-share from landowners can be in the form of cash or in-kind work and will be documented on grant reports and in the contract.

*Expected soil savings in total tons:* 230 tons

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## **BMPE5**

*Description:* **Riparian Forest Buffer** – revegetation adjacent the river at the base of an unstable slope

*Check the quarters the task is to be started and completed:*

Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Start/Complete	x		x	x	x		x	x	x		x	

*Number of acres/units of BMP to be installed during project:* 750 sq feet

*Incentive method:* cost-share contract

*and rates:* Standard state cost-share rate is 75% grant, 25% landowner match with some discretion to alter the rate. The SWCD may alter the rate to a lower landowner percentage due to the significant commitment of resources the landowners have already contributed in developing the pre-engineering work for these projects and the fact that these projects are more expensive than projects usually implemented in this way. Cost-share from landowners can be in the form of cash or in-kind work and will be documented on grant reports and in the contract.

*Expected soil savings in total tons:* 30 tons average per year

## **IV. Media Campaign**

- A. You will be required to conduct a kickoff event in the first quarter of the project.** You are specifically to invite, among others, all members of Congress who have a portion of their district within your watershed project boundaries, the media and the chair of the Great Lakes Commission delegation from your state. Describe how and what you will do to meet this requirement.

Our project is located in the Eighth Congressional District of Minnesota. Members of Congress in this district are Congressman James Oberstar, Senator Amy Klobuchar and Senator Al Franken. All will be invited to our kickoff event. Minnesota state senators and representatives will also be invited. A media packet will be prepared to be approved by GLC prior to release. Media packets will be made available prior to the event with the opportunity for interviews with officials during the event.

The media and the chair of the Great Lakes Commission delegation from Minnesota, the Honorable Thomas Huntley, will be notified as well. The chair will be given a written invitation. There are other media outlets in the local community including a listserv and an online forum that may be utilized as well.

Minneapolis, St. Paul and Duluth television, radio and newspapers will be targeted for broad media coverage. The local media, newspaper and radio, will be given phone calls inviting them to the event so that the local public, landowners, users and local elected officials are fully informed about the projects and GLC support.

The kickoff event will be held on the shores of the Poplar River at an area resort. The river will be the backdrop for the event. Lutsen Resort, one of the oldest lodges located in the watershed and at the mouth of the river, will host the event. Donations from staff, local businesses and board members will be used to provide refreshments. A short presentation of where we have been and what this project means for the Poplar River will be made. Federal, state and local government staff involved with the project will also be invited.

**B. You are also required to establish an on-going outreach campaign. Describe your on-going outreach campaign strategy for:**

1. *The general public/media,*
2. *Landowners/landusers,*
3. *Elected officials*

The Poplar River Management Board (PRMB), Cook SWCD, Poplar River TMDL work team, and Cook County have well established and effective communications programs that include Poplar River activities. The **public, media, landowners, users and local elected** officials are aware of these programs and use these resources. Continuation and expansion of these tools will be the best way to establish the on-going outreach campaign. These resources include **monthly updates to the SWCD board** in written staff reports which are also emailed to the SWCD listserv. A **county commissioner** always attends SWCD monthly meetings and will be able to bring information back to the county board.

Updates regarding the project will be given via the **local newspaper, the radio (with possible on-air interviews), the community listserv, and attendance at various local meetings** such as the PRMB meetings, local Water Advisory Committee meetings, the SWCD website, the **Lake Superior Streams website** and the PRMB website. The PRMB is in the process of updating, expanding and publicizing the existing PRMB website. This process will reach all of the above stakeholders. If deemed advisable by the GLC, approved news releases will be made available to region and statewide media outlets upon completion of major projects. Quarterly progress reports will be available to the **public** through the Cook SWCD. The reports will be discussed at meetings and reference to their availability will be on the **agendas and minutes of the SWCD and PRMB meetings.**