

Great Lakes Basin Program GLRI Project

Knife River Watershed Sediment Reduction Project

Size: watershed

Grant Amount: \$293,000

Year awarded: 2012

Sponsor: Lake County Soil & Water Conservation District

Address: 616 Third Avenue

City: Two Harbors

State: Minnesota

Zip: 55616

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Submitted Project:

Size: watershed

Budget: \$293,000

Savings: 18,750

Background

Sediment Sources

The Knife River was listed on the 1998 303 (d) list as impaired for excess turbidity. This listing prompted a Total Maximum Daily Load Study (TMDL), completed in 2010, that determined the current sediment load, source of sediment, and the cause of the impairment. The TMDL study discovered that the dominant source of turbidity was suspended clay, and the stream was exceeding water quality standards during high flow events (spring melt and storm runoff). The TMDL study concluded that during the high flow events, which contribute the majority of the sediment load to Lake Superior, 59 percent of the sediment was coming from eroding banks and 29 percent was coming off the bluffs. Several storms used to calibrate the modeling efforts revealed sediment loads of 30 - 881 tons per storm event - which is currently exceeding its turbidity TMDL by 90%.

This project will fund construction of a series of high priority bank stabilization projects that will be identified during a formal review process. One of the project sites that is already shovel-ready and will use natural channel design and will save approximately 253 tons of sediment per year from polluting the river, or 7% of the reduction needed to achieve the TMDL. A minimum of two additional projects will also be constructed using this funding, for a project goal of a reduction of 750 tons of sediment per year (21% reduction of total river sediment load).

The Knife River is within the Lake Superior watershed. Lake Superior is designated as an Outstanding Resource Value (ORV) water body by the Minnesota Pollution Control Agency. The ORV designation requires that no additional discharges are allowed to flow into Lake Superior. The proposed bank stabilization projects are necessary to reduce the potential for the Knife River to inadvertently violate ORV protections during high-flow storm events.

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 Knife River is considered the highest priority watershed for turbidity reduction along Minnesota's Lake Superior Shore. The Knife River TMDL and Implementation Plan will be used as a model for other Minnesota streams with turbidity impairments within the Lake Superior Basin. It is important that TMDL implementation projects, such as streambank stabilization, are completed quickly along the Knife River, so that other TMDL projects can be completed on other high-priority streams within the Lake Superior Basin.

Readiness to Implement Project

The Lake County SWCD is poised to successfully complete this watershed project based on the completion of a multitude of similar state and federally funded projects in the Knife River, Stewart River and Skunk Creek watersheds. The five primary staff who will contribute to the project have a combined 62 years of experience in erosion and sediment control projects. The SWCD Supervisors place a high priority on this effort and have provided leadership in developing and administering the Lake County Water Plan - a plan that provides guidance for SWCD efforts.

The Lake County Water Plan identifies seven Priority Concerns, three of which directly apply to this project: Work on TMDL Projects; Increased Development Pressures; and, Lake and Stream Water Quality. With the approval of the recently completed TMDL for the Knife River, this project will begin targeting implementation of best management practices to markedly reduce the turbidity impairment through restoration of critical reaches of eroding streambank. Furthermore, the Knife River is one of five High Priority Watersheds identified in the recently amended Water Plan on which to focus a major portion of Lake County's work efforts to address priority water concerns. The Knife River was included as a High Priority Watershed because it is undergoing significant development pressure, has more intensive land use, and has steep gradients through the Superior Lobe Clay Plain. The St. Louis County Water Plan has also identified the Knife River watershed as a Priority Concern and the South St. Louis SWCD spearheaded the Knife River TMDL Study.

Though initiated by Lake County SWCD, the success of this project (as with previous projects) will be based on the continued high level of participation by the following project partners: South St. Louis SWCD, Lake County Forestry Department, St. Louis County Land Department, Minnesota Pollution Control Agency, Minnesota Board of Water and Soil Resources, and Minnesota Department of Natural Resources. The Knife River Stewardship Committee is also strongly supportive of efforts to reduce sediment yield into Lake Superior. This committee is a coalition of local, state and federal natural resources professionals that meet regularly to assess water quality needs and potential projects in the Knife River Watershed. Two citizen-based groups, Advocates of the Knife River Watershed, and Lake Superior Steelhead Association, are also highly supportive of this initiative and would assist in locating additional project sites.

Lake County SWCD has successfully completed (or is in the process of completing) the following watershed restoration efforts within the last three years:

Knife River Watershed Protection Project (on-going since 2012) - This project will restore 1,000 feet of streambank with 50 to 70-foot high clay banks. The site contributes 606 tons of sediment annually and is being funded by the Clean Water Fund administered by the Minnesota Board of Water & Soil Resources. \$282,000
Skunk Creek Watershed Protection Project (2009) - This project was funded through the Great Lakes Commission and resulted in the completion of four erosion control projects: streambank restoration, waterway restoration, gully restoration and construction of a storm water detention basin outfall structure. \$75,000

Stewart River Watershed Protection Project (on-going since 2012) - This project will restore five severely eroding streambank sites along a 1.5 mile reach of the Stewart River which generate over 446 tons of sediment annually. This project is being funded by the Clean Water Fund administered by the Minnesota Board of Water & Soil Resources. \$105,000

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Kawishiwi Watershed Protection Project (on-going since 2010) - A joint effort between the MN Pollution Control Agency, White Iron Chain of Lakes Association and Lake County to develop a comprehensive water management plan for the Kawishiwi Watershed. The project is funded by the Minnesota Pollution Control Agency. \$399,500

A significant partner in this proposal, South St. Louis SWCD, has recently completed a Clean Water Fund Grant focused on reducing sediment in the Knife River watershed (\$90,000 - 2011). This effort included riparian tree planting on private land, a major bank stabilization project, and a ditch stabilization project with the Highway Department.

Project Work Area

HUC: 040101020305 - Lower Knife River, Minnesota

HUC: 040101020304 - West Branch Knife River, Minnesota

HUC: 040101020303 - Upper Knife River, Minnesota

Total Area: 53504

Agricultural Area: 3144

Forest Area: 45243

Urban Area: 604

Priority Areas:

The Knife River is a State-protected water and is classified as a Designated Trout Stream. It is nationally known as a prime fresh-water steelhead fishery and is managed as a cold-water trout fishery for native species including brook trout. The watershed has a rich history of logging, agriculture, mining, and outdoor recreation. The Knife River is characterized by steep gradients, multiple water-falls and cascades, tea-colored water, and remnant old-growth forest cover types including white pine, Norway pine and white cedar. The receiving water body is Lake Superior, an Outstanding Resource Value water body.

Implementation

Implementation Strategy

Types of BMPs: Stream Bank Stabilization, Tree Planting, Critical Area Stabilization, Cross-Vanes, Ditch Checks, Grade Stabilization Structures, and other Storm Water and Stream Restoration BMPs.

Three Year Timeline

Projects will be prioritized based on sediment loading, access, landowner cooperation and financial participation, project cost, and timing.

Incentives – Variable cost-share rate: 50-100% including all permitting fees, cost-share funds, engineering and construction.

Phase 1 – One high priority project has already been identified via field reviews and as a result of the TMDL study process. This project is ready to be constructed and is listed below. At least one additional high priority site on private land will be shovel-ready prior to grant award (Fall 2012).

Lake County

Steve Pavek/State of Minnesota \$70,000

Phase 2 – Initiate a targeted and strategic search process for additional project sites that meet the criteria identified above (3). The search process will begin with a GIS-based effort (including high definition elevation mapping - LIDAR) to identify high priority project sites that have easy access for equipment and materials. A

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comprehensive field review incorporating bank erosion hazard index (BEHI) and near bank shear stress assessment will also be conducted. Contact will be made with landowners of prospective sites to determine their interest in cooperating on a project. Sites of potential projects will be thoroughly field inspected to assess and verify the potential for completing a successful project. Eligible projects will be ranked in order of priority. Phase 3 - Implementation of Stream Bank Restoration projects. Our goal will be a reduction of approximately 750 tons of sediment per year (21 percent of the sediment load).

Technical Assistance

Primary technical assistance to complete this proposed project will be provided by Lake County SWCD, South St. Louis County SWCD and engineering staff from Area III SWCD Technical Service Area (TSA). The lead Conservation Engineer for this project is a Registered Professional Engineer proficient in an understanding of stream geomorphology and erosion control principles. He will conduct the surveys, assemble the design team, design the projects, develop bid documents, prepare permit documentation, conduct the pre-construction meeting, and provide inspection during construction. Area III TSA is a joint powers collaboration of nine Soil & Water Conservation Districts in northeast Minnesota. The Area III TSA employs a Professional Engineer and three Conservation/Engineering Specialists to provide engineering and technical assistance to member SWCDs. Additional technical assistance will be provided by staff members from Lake County Forestry Department, St. Louis County Land Department, Minnesota Pollution Control Agency, Minnesota Board of Water & Soil Resources, and Minnesota Department of Natural Resources.

Administration of the project will be completed by staff members from the Lake County SWCD. This will include completing the required reports and financial record-keeping.

BMPs

Name: Streambank Restoration

Type: Engineering Practices

Acres: 3

Cost: \$210,000

Description:

Project sites will be fully restored and stabilized with state-of-the-art engineering practices that have been successfully implemented on North Shore streams. The BMPs will include grade control with stream vanes and j-hooks, bank-full benches reinforced with woody debris and coarse sediments, root wads / large woody debris, and critical area stabilization on all disturbed areas at each project site. The critical area stabilization practice will consist of planting native trees and a native seed mix of grasses and forbs. Once the sites are fully restored, the sediment loading to the Knife River will be substantially decreased and thus the sediment discharged to Lake Superior will be reduced. We anticipate a cumulative sediment reduction target of 750 tons annually (soil loss from bank erosion) - addressing 21% of the Knife River impairment for turbidity. Over the anticipated life of the BMPs (25+) years, this will conservatively result in a total soil savings of 18,750 tons.

Start Date: August 2012

End Date: December 2015

Incentive Method: Variable Cost-share Rate

Incentive Rates: 50 - 100 Percent

Total Soil Savings: 18750

Media Campaign

Kickoff:

Lake County SWCD will initiate a press conference/public information meeting/tour with local print and television media coverage to explain the project purpose, anticipated benefits, project partners, and funding sources. Invitees will include Lake and St. Louis County Commissioners, State and Federal elected

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representatives, Great Lakes Commission members, and representatives from Minnesota Board of Water & Soil Resources, Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, Knife River Stewardship Committee, Advocates of the Knife River, and Lake Superior Steelhead Association.

Ongoing:

This project will be featured in the Lake County News Chronicle, North Shore Journal, in public displays at the Lake County Fair, and periodic public tours will be conducted to further public awareness and education. Furthermore, both the Lake County SWCD and South St. Louis SWCD will post information on the project to their websites and the South St. Louis Facebook page. Our goal is to increase the public's understanding that these projects have a measurable impact in improving water quality and reducing erosion while at the same time being a cost-effective practice for property owners to implement.

End:

Lake County SWCD will conclude the project with a media day with tours of project sites for local officials and landowners complete with local press and television coverage.

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