



**Ecological and Water Resources Division
1568 Highway 2
Two Harbors, MN 55616**

October 12, 2018

Margaret Allen
Coastal Management Fellowship Program
NOAA Office for Coastal Management
2234 South Hobson Avenue
Charleston, SC 29405-2413

Dear Ms. Allen,

It is my pleasure to share with you Minnesota's proposal for the 2019 Coastal Management Fellowship opportunity. We have a great project, perfect for someone with strong GIS and inter-personal communication skills. We would greatly benefit from the work of an eager, flexible fellow with a strong work ethic. And we have a lot to offer a fellow too – top-notch people, exceptional colleagues and a beautiful setting.

Please let me know if you have any questions about our proposal. Otherwise, we hope to hear a favorable response in November, and be welcoming a fellow here in August.

Sincerely,

A handwritten signature in blue ink that reads 'Amber A. Westerbur'. The signature is written in a cursive style.

Amber Westerbur
Coastal Program Manager

CC:

Mike Peloquin, EWR – Regional Manager

Equal Opportunity Employer



2019 Coastal Management Fellowship Proposal

Minnesota's Lake Superior Coastal Program

October 12, 2018

Title

Data, Tools and Resources to Address Minnesota's Coastal Erosion

Contact

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Background & Introduction

Minnesota's rugged North Shore seems immovable. But closer inspection of the nearly 190 mile stretch of shoreline running from Duluth to the Canadian border indicates quite the contrary. It is eroding. Clay banks are failing when wet or severely undercut. Bedrock ledges are succumbing to the forces of freezing/ thawing and wave action.

How much erosion is happening is unclear. In 1994, University of Minnesota researchers measured erosion rates for the 1930s – 1975 and 1975 – 1988/89 time periods. There was substantial variation across the area. On average, rates ranged from 0.16 to 4.5 feet per year.¹ That was the first and last published study.

Given today's conditions and the changes in climate, erosion is likely to worsen. Lake Superior lake levels are above their long-term average by almost seven inches.² Higher lake levels leads to more erosion. Minnesota's climate is also getting warmer and wetter.³ Increased rain and snow means more surface water and groundwater flow which can compromise slope stability and produce water-induced landslides. In addition, climatologists project the area will see continued heavy rains and more frequent, intense storms.² The combination of waves and water can be devastating. In 2012, Duluth experienced historic flooding after receiving more than 10 inches of rain in a 24 hour period, causing hundreds of millions of dollars of damage to roads, bridges, and infrastructure. Waves during an October 2017 storm ravaged public and private property along the entire Lake Superior shoreline.⁴ And it happened again in April 2018.⁵

Out in front of the issue are the Lake, Cook and South St. Louis Soil and Water Conservation Districts (SWCDs). These four districts and the others like them across the state provide critical conservation services to public and

¹ Minnesota Sea Grant Research Bulletin 44. Erosion Hazard of Minnesota's Lake Superior Shoreline. Accessed on October 10, 2018 from <https://conservancy.umn.edu/handle/11299/189149>.

² Army Corps of Engineers Weekly Great Lakes Water Level Update, October 5, 2018. Accessed on October 10, 2018 from <https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/Great-Lakes-Water-Levels/Water-Level-Forecast/Weekly-Great-Lakes-Water-Levels/>.

³ Minnesota Department of Natural Resources, Climate Changes in Minnesota. Accessed on October 10, 2018 from https://www.dnr.state.mn.us/climate/climate_change_info/climate-changes-minnesota.html.

⁴ Duluth News Tribune, November 7, 2017. "Storm damage tops \$3 million, county backs disaster declaration". Accessed on October 10, 2018 from <http://www.duluthnewstribune.com/news/4355741-storm-damage-tops-3-million-county-backs-disaster-declaration>.

⁵ Duluth News Tribute, April 25, 2018. "St. Louis County approves disaster declaration for April storm". Accessed on October 10, 2018 from <http://www.duluthnewstribune.com/news/weather/4436880-st-louis-county-approves-disaster-declaration-april-storm>.

private landowners. In the past, the Board of Soil and Water Resources (BWSR) had a Coastal Engineer on staff, who was available to the SWCDs. Today, that is not the case. As a result, the SWCDs lack expertise on coastal erosion, which limits what they can share with property owners related to the issue⁶. Lack of expertise is not stopping landowners from requesting help. Calls come in after every large event and the SWCDs expect that trend to continue; landowners want to protect their assets.

In the end, both the SWCDs and landowners would benefit greatly from knowing more about Lake Superior erosion and its risks, as well as the alternatives, opportunities and/or solutions for addressing it.

Goals & Objectives

The overarching goal of the project is to provide data, tools and resources to area practitioners and landowners tackling Lake Superior erosion. Specifically,

- Develop a community of practice to explore, develop and share knowledge on coastal erosion;
- Update the area's coastal erosion hazards data and maps; and
- Provide information on coastal erosion to SWCD staff, landowners and other regional professionals.

Objectives for the two-year project include:

- Host at least seven community of practice meetings for SWCD and county staff, planning and zoning officials and other interested individuals; the meetings will provide at least 14 hours of training and time for building members' understanding and expertise on Lake Superior erosion.
- Analyze the shore and bluff recession rates along the North Shore, from Duluth to the Canadian border, using current aerial imagery, LiDAR and local data; synthesize results in a publicly available GIS format; and train users.
- Identify active erosion problem areas by type (e.g., bluff slumping, toe erosion, sliding) between Duluth and the Canadian border and structures at risk of loss using current aerial and coastal imagery, LiDAR, and field visits; publish the GIS data in a publicly available location; and train users.
- Create and publish a guide and a series of short fact sheets about living on Lake Superior providing landowners, realtors and planning and zoning departments with up-to-date and state-specific information on coastal erosion hazards; conduct initial outreach with target audiences.
- Update or develop at least one resource for SWCD staff that helps them better respond to landowner requests for coastal assistance.

⁶ Personal communication with Erin Loeffler, Board Conservationist for BWSR.

Milestones & Outcomes

The project has three short-term outcomes; all three will enhance learning and understanding.

Outcomes, Tasks and Milestones	Yr1 Q1	Yr1 Q2	Yr1 Q3	Yr1 Q4	Yr2 Q1	Yr2 Q2	Yr2 Q3	Yr2 Q4
Practitioners expand and exchange knowledge on Minnesota’s Lake Superior erosion issues.								
1. Organize community of practice participants	x							
2. Facilitate community of practice meetings and trainings		x	x	x	x	x	x	x
3. Evaluate community of practice effectiveness				x				x
Community decision makers and practitioners have data and tools to better understand North Shore erosion risks.								
1. Compile data resources and determine applicability and usability	x	x						
2. Analyze data to determine shore and bluff recession rates		x	x	x				
3. Update existing GIS data for shore and bluff recession rates			x	x	x	x		
4. Create GIS-based map of erosion problem areas and vulnerable structures for Minnesota’s North Shore					x	x	x	x
5. Solicit feedback from community of practice on products			x			x		
6. Share products and offer training through community of practice					x	x	x	x
Practitioners and landowners improve their understanding of the Lake Superior erosion problem, alternatives, opportunities and/or solutions.								
1. Update existing coastal landowner inventory form	x	x						
2. Develop a guide for coastal living on Lake Superior and coastal property owner fact sheets		x	x	x	x	x		
3. Solicit feedback from community of practice on products		x	x		x		x	
4. Conduct initial outreach and training		x	x	x			x	x

Notes: Year 1 covers August 2019 – July 2020; year 2 covers August 2020 – July 2021. Each year is broken out into three month quarters (August – October = Q1; November – January = Q2; February – April = Q3; and May – July = Q4).

Project Description

The project includes three main components:

1. Develop a Community of Practice

We will harness the power of a community of practice in this project. A community of practice is a group of people who share a concern, problem or deep interest in a topic – in this case Lake Superior coastal erosion – who learn better as they interact. They provide a setting where people can identify solutions to common problems, evaluate approaches and determine best practices.⁷

Efforts to modernize the area's existing erosion hazard map has brought together people with a sincere interest in not only Lake Superior erosion, but problem solving and knowledge sharing. The current group includes individuals from three local SWCDs; Minnesota Department of Natural Resources (MNDNR); BWSR; FEMA; North Shore Management Board (NSMB); the University of Minnesota- Duluth; and several local county departments. They will be the start to the community of practice. NOAA's Office for Coastal Management; Minnesota Sea Grant; the US Fish & Wildlife Service; Grand Portage Band of Lake Superior Chippewa; city and town planning and zoning officials with the NSMB; and local engineering firms will be invited to participate. Once assembled, the group will meet quarterly to share ideas, network and learn. The community of practice will be the first to review and test the project's tools and products. It will also provide a forum for training on management options and product use. The fellow will provide some process support, facilitation and logistic and evaluation assistance to the group, but leadership and direction decisions rest with the group.

2. Update Coastal Erosion Data and Maps

Updating the area's coastal erosion data and maps is an essential element to the project. The current (15 year old) coastal hazard map is not in a useable form for decision making, prioritizing work, or public use.

With advances in technology, we can do better. Lake and Cook SWCDs, with funding from BWSR and the support of more than eight different organizations are currently taking the first steps to put the existing map and related data into a useable form. The proposed project would build on those efforts, further filling gaps. Most notably, the fellow, with assistance from the Coastal Program's technical specialist and the community of practice, will analyze the shore and bluff recession rates along approximately 190 miles of shoreline using current aerial imagery, LiDAR and local data. The fellow would also identify active erosion problem areas by type (e.g., bluff slumping, toe erosion, sliding) and structures at risk of loss using current aerial and coastal imagery, LiDAR, and field visits. Personnel will use existing standards and methods, and draw upon the expertise of other coastal programs across the Great Lakes and nation. Once complete, the final data and maps will be publically available.

3. Provide Information on Coastal Erosion

⁷ For more information about communities of practice, visit <http://wenger-trayner.com/introduction-to-communities-of-practice/>.

There is a wealth of information available on coastal erosion on the Great Lakes. However, much of it is not specific to the conditions found on Minnesota’s North Shore, or in a less than useable format. That needs to change.

To that end, the fellow will lead efforts to update and/or create at least three guidance materials in high demand by landowners, SWCD staff and other area professionals. They include:

- ***Coastal Landowner Inventory Form:*** Local SWCDs need a simple, straight forward tool to help them and the landowners they are working with first determine what erosion problems they have and then what kind of erosion protection options they can use.
- ***A Guide for Coastal Living on Lake Superior:*** This print and/or web-based guide will provide detail about buying property and living on Minnesota’s North Shore. Honing in on the “why” – why is your setback this way; why are buffers important; why is this a sensitive area – will be important. The guide will also speak to concrete actions (e.g., best management practices) landowners can take to protect their property and assets.
- ***Coastal Property Owner Fact Sheets:*** Coastal landowners have questions on topics ranging from insurance to steps they can take to protect their property from storm damage. These short topical fact sheets will provide answers to some of the most frequently asked questions and direct individuals to more information.

The fellow will work closely with the community of practice during both the development and initial launch and delivery of these products and tools. He/she will also look to them to identify additional ways to expand the products’ reach (e.g., audience specific meetings, web-based videos and informational inserts).

Fellow Mentoring

The Coastal Program sees many powerful mentorship opportunities for a fellow. Amber Westerbur, Coastal Program manager, will provide day-to-day supervision. Mrs. Westerbur is a considerate leader; she is friendly, unassuming and thorough. She has strong, loyal relationships with many in the area’s coastal management community. As a mentor, she will remain worthy of the fellow’s trust, model positive behavior and successful performance, and offer guidance and advice toward reaching the project’s and other professional goals. Clint Little, Coastal Program technical specialist, will provide guidance on the technical aspects of the project. Mr. Little has been with the program for nearly 20 years, and knows the community, the data and resources like no other. The fellow will learn much by watching him use his unique blend of people and technical skills.

The fellow will be a part of the Coastal Program’s small (5 people), tightly knit team, and included in all day-to-day activities. These may range from assisting with pass-through grant review and selection and meeting with the Governor’s Council on Minnesota’s Lake Superior Coastal Program, to providing technical assistance to local governments and organizations working on an array of coastal issues. He/she will have access to a variety of people and positions within the MNDNR, and there will be opportunities to network at meetings and events.

In addition to working closely with MNDNR staff, the fellow will routinely interact with SWCD and BWSR staff, as well as other professionals throughout the area. Their insight and perspectives are vital to the success of this project, and will make the fellow's two year experience that much more impactful.

Project Partners

This proposed project integrates well with several existing state and local efforts:

- Lake and Cook Counties have begun implementing the new (2016) One Watershed, One Plan for the Lake Superior North watershed. The near shore area of Lake Superior is a Tier 1 priority area. One of the priority projects is a coastal erosion hazard zone mapping update, scheduled to be complete in August 2019 (see Project Description, #2). This proposed project will build on and not duplicate those efforts. Given their active engagement on coastal erosion, workgroup members are excellent candidates for the community of practice.
- The North Shore Management Board (NSMB), a joint powers board that exercises zoning authority along the North Shore, updated the North Shore Management Plan in 2016. As part of the plan update, the NSMB reaffirmed its role in distributing information about erosion hazard areas. The products of this proposed project will help them and the board's municipal members do that more effectively and efficiently.
- FEMA is currently completing a coastal analysis and mapping study of Lake Superior, including an analysis of storm and high water events in the basin as part of the Great Lakes Coastal Flood Study. This proposed project will integrate the Great Lakes Coastal Flood products when appropriate, creating a full suite of products for use by a variety of practitioners.
- Cook and St. Louis County are currently or will be soon updating their all-hazard mitigation plans. Among their priorities are to back-up the existing erosion data, better equip landowners with hazard information and assist them with the permitting process. These priorities align well with the objectives of this project, and the resultant products will be tools they can use immediately.
- The MNDNR is working collaboratively with the US Army Corps of Engineers, the seven other Great Lakes States, NOAA, the Coastal States Organizations and others on advancing the Great Lakes Coastal Resiliency Study. The study will investigate opportunities to improve resilience within both the built and natural environments. The data from this proposed projects, particularly the analysis of shore and bluff recession rates and vulnerable structures, will be highly useful to the larger basin-wide study.

Cost Share Description

The MNDNR will contribute both the in-kind and non-federal fellowship match. The MNDNR's annual coastal zone management grant will cover the costs associated with office space; office supplies; computer; phone/internet service; software; and in- and out-state travel. The MNDNR fully commits to using general funds to cover the \$15,000 in non-federal salary match. The area SWCDs and local governments have expressed sincere interest in providing some of the salary match or providing other resources to the project. We continue

to explore these local partnership opportunities. All additional funds or resources will directly support the project.

Strategic Focus Area

The proposed project meets several of the strategic focus areas.

- *It supports coastal resources managers' exchange of best practices* (Healthy Coastal Ecosystems, bullet #3). The community of practice will provide a means to not only exchange best practices, but knowledge.
- *It fosters user-driven science and assessment on the impacts of coastal hazards* (Resilient Coastal Communities, bullet #1). BWSR and the SWCDs have been heavily involved in the design of this project, and will be involved throughout to make sure it is delivering the erosion tools and products they need and will use.
- *It increases public awareness of coastal hazards and actions that can be taken* (Resilient Coastal Communities, bullet #2). The guide to living on Lake Superior and the fact sheets will be extremely effective tools to increase awareness and prompt action.