Lake Superior Basin Natural Flood Management Initiatives

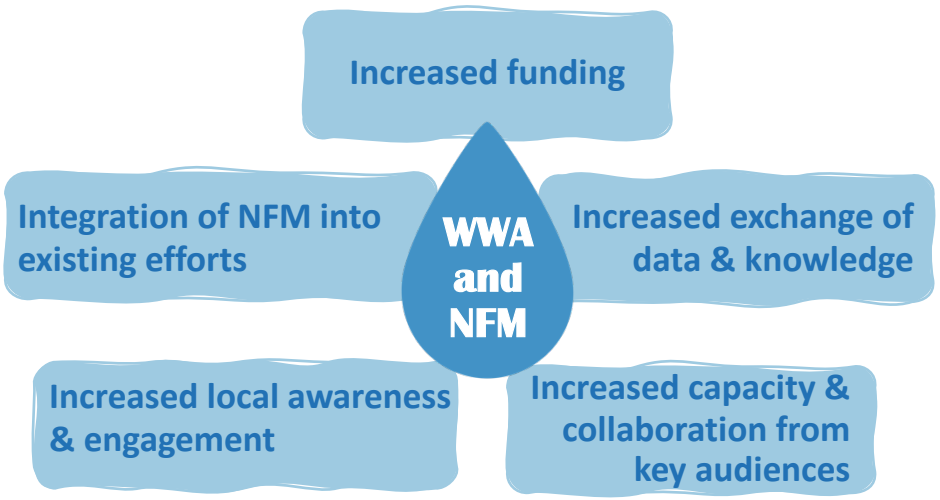
Exploring Impacts through Ripple Effects Mapping

Introduction

In 2016, a powerful rainstorm swept through Wisconsin's Lake Superior Basin, delivering 9 to 12 inches of rainfall in just under a day. In the end, the storm claimed two lives and caused 35 million dollars in damages, devastating many communities, rivers, bridges, farms and homes. For some, the effects of the 2016 storms presented an overwhelming challenge**, but the Wisconsin Wetlands Association (WWA) used the flood to make the case for protecting vulnerable infrastructure through Natural Flood Management (NFM)**.

By exploring the relationship between wetlands and flood damages in northern Wisconsin, WWA has shown that wetland loss and degradation can affect the landscape's ability to slow and capture water--particularly from extreme storms. Now, with the help of **Wisconsin Coastal Management Program's (WCMP) 309-funding and other funders**, WWA has built partnerships to further explore NFM while finding ways to increase awareness, share solutions, and demonstrate results to community members, collaborators, and policymakers in Wisconsin.

This report reflects findings from an evaluation of impacts and outcomes from WWA's NFM work between 2016 and 2021, with emphasis on support provided by WCMP for activities related to Wisconsin's Coastal Zone Enhancement Strategy.



In May of 2021, a **Ripple Effects Mapping (REM) activity was conducted with 31 participants from various partner organizations engaged in a pilot NFM project** in the Marengo River Watershed (MRW). Facilitated by the University of Wisconsin Extension Natural Resources Institute's Evaluation Unit, participants were led through a series of small and large group discussions to **identify the impacts of WWA's NFM work on their own programs and activities**. As shown in the figure to the left, and further detailed in this report, the REM session identified five categories of impacts. This session also explored possibilities for new projects and priorities moving forward and captured participants' thoughts on the value of coordinated NFM to increase flood resiliency across the Lake Superior Basin and beyond.

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Timeline of Key Activities in the Marengo River Watershed Pilot

Define Problem / Explore Opportunities

-WWA developed and released flood hazards case study.
-Established Marengo River Watershed (MRW) as pilot area for collaborative assessment and action.

Articulate Problem

-Scoped FEMA proposal to study degraded hydrology and restoration opportunities in MRW.
-Formed Natural Flood Management (NFM) technical team.
-Reinvigorated Lake Superior Collaborative with shared goals and increased capacity.

Assess Vulnerabilities

-Launched FEMA-funded NFM assessment in MRW.
-Developed integrated protocols for assessing infrastructure and hydrologic conditions.
-Integrated local road crew, resource manager and water resources knowledge into NFM assessment.

Demonstrate NFM Strategies

-Legislature invested in NFM demonstration projects (2019 WI Act 157)*.
-Hosted design charrette to collaboratively develop NFM design concepts and demo plan.
-Secured more capacity for design and engineering of projects identified in NFM demo plan.

Evaluate Projects / Accelerate Restoration

- 31 partners document NFM Initiative ripple effects.
- NOAA invests in Hydrologic & Hydraulics modeling and engineering for MRW.
-Legislation creates hydrologic restoration general permit (2021 WI Act 77)*.

*Note: WWA policy staff engaged in efforts to secure passage of legislation cited here; however, no state or federal funding was used to support those lobbying activities.

Natural Flood Management Investments: 2016 to 2021

WI Coastal Management Program Investments: $150,898

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Leveraged: $1,409,538

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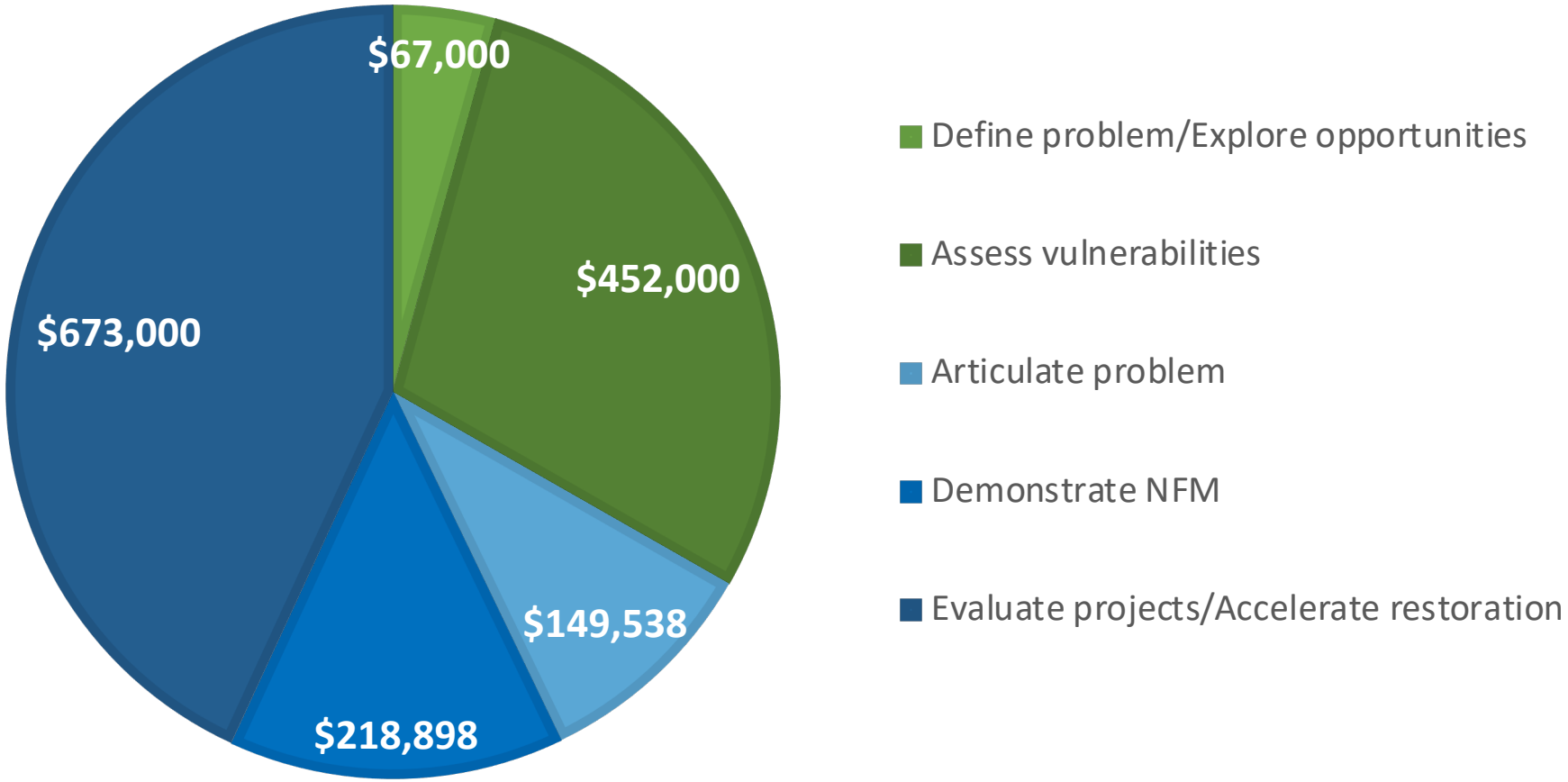
Total Investments: $1,560,436



Natural Flood Management Investment Details: 2016 to 2021

Define Problem / Explore Opportunities

2016: $67,000 from Wisconsin Coastal Management Program (WCMP) to WWA, to develop and promote the case study *Exploring the Relationship between Wetlands and Flood Hazards in the Lake Superior Basin.*

Articulate Problem

2019: $24,538 from the Catalyst Fund to WWA to hire a 1-year coordinator for the Lake Superior Collaborative and to finalize and begin implementation of the LSC Action Plan. UW-Extension provides $25K match and agrees to host position long-term.

2020: $50,000 from The Brico Fund to WWA to develop a NFM climate adaptation menu and help Ashland County integrate NFM strategies into its Land & Water Management Plan.

2021: $50,000 from The Brico Fund to WWA for Project Management of NFM initiative and related state policy work.

Assess Vulnerabilities

2019: $200,000 Pre-Disaster Mitigation Grant from the Federal Emergency Management Agency to Ashland County to assess fluvial erosion hazards and NFM priorities in the Marengo River Watershed (MRW). Project partners supply ~$117K of match.

2020: $85,000 Good Neighbor Authority award from WI DNR to MSA Professional Services for a watershed road-stream crossing inventory in the MRW.

2021: $50,000 Surface Water Restoration grant from DNR to Ashland County for Marengo River streamflow gaging station.

Demonstrate NFM

2019: $68,898 from WCMP to WWA for outreach and facilitation to accelerate NFM in the Lake Superior Basin. This included a Design Charrette that created the NFM Demonstration Plan.

2019: $150,000 From the State of Wisconsin to Ashland County to design and build 2-3 wetland flood risk reduction demonstration projects (2019 Wisconsin Act 157).

Evaluate Projects / Accelerate Restoration

2021: $15,000 from WCMP to WWA and UW-Extension for Ripple Effects Mapping evaluation of Section 309-funded NFM projects.

2021: $120,000 from U.S. Army Corps of Engineers' Section 154 Funds to Ashland County for design and engineering of projects identified in the NFM Demonstration Plan. Ashland County provides $30K in match.

2021: $508,000 from NOAA Great Lake Restoration Initiative to Assoc. of State Floodplain Managers and WWA for hydrologic and hydraulics modeling of NFM practices in the MRW.

Impacts Identified through Ripple Effects Mapping

1 Increased local awareness and engagement

NFM work has increased community awareness about how degraded hydrology increases flood hazards, and about opportunities to restore wetlands and floodplains to reduce risks.

Key outcomes included:

- More communities considering NFM practices to protect vulnerable transportation infrastructure
- Increased collaboration and partnerships focused on multi-objective restoration work
- Increased exploration of new disaster-recovery policies and procedures that facilitate NFM projects

> "I think these projects are just getting better. And we're being able to build more partnerships, we're actually able to physically do more work. The right people are in the right places to be able to implement some of these strategies that we want to do. And I just see that increasing…."

-- Stacy D. Dehne P.E. ,
DATCP Conservation Engineer

2 Integration of Natural Flood Management into existing efforts

This work helped incorporate NFM strategies into existing restoration and climate adaptation projects and plans in the Lake Superior Basin.

Key outcomes included:

- Wetland and floodplain conditions were integrated into risk assessments, culvert inventories, flow monitoring, fish passage and erosion control efforts
- Incorporated NFM and climate adaptation strategies into local hazard mitigation and land and water management plans
- Launched explorations with federal, state, and non-profit organizations about emerging hydrologic restoration techniques and ways to incentivize NFM-related work

> "...there's a lot of energy around trying to understand what's happening and use new approaches rather than just returning to the same replacing as it was, whether it's a culvert or a road."

--Dorothy Tank,
Ashland County Emergency Mgmt. Director

3 Increased exchange of data and knowledge

NFM work has increased the exchange of data and technical knowledge between agencies and organizations working in the Lake Superior Basin.

Key outcomes included:

- Created an interdisciplinary NFM team that increased knowledge, collaboration, and the technical assistance available to counties, towns, and tribes
- Expanded and tested risk assessment methods to evaluate erosion hazards and hydrologic restoration opportunities near vulnerable infrastructure
- Strengthened interest in NFM by promoting assessment and restoration approaches to resource managers through conferences, webinars, and field trips

> "That [NFM charette] field time helped us crowdsource different ideas ... having that interdisciplinary group together…give[s] us a place to not only field validate data, but also to…flip the process a little bit and just learn from the demonstration, the types of techniques, and then using that as a mechanism to help improve the assessment data ...that we can incorporate into modeling or other decision support tools."

-- Kyle Magyera,
Local Government Outreach Specialist
WWA

4 Increased capacity and collaboration from key audiences

NFM work has increased awareness, collaboration and participation from policymakers and natural resource managers.

Key outcomes included:

- Established a shared interagency vision for applying NFM assessment methods and restoration practices
- Received bipartisan legislative support for NFM demonstration projects (2019 WI Act 157) and policy reforms that reduce barriers to hydrologic restoration (2021 WI Act 77)
- Explored policies and procedures that can help local communities utilize NFM during hazard mitigation and disaster recovery

> "I've been doing this job for 20 years, and it doesn't always feel as though the practices that we're putting on the landscape are necessarily recognized or understood, with people outside of who you're actually working with, or the group that you work within. So, I really feel confident or encouraged that this has become much more vibrant from people just recognizing the need."

-- Stacy D. Dehne P.E. ,
DATCP Conservation Engineer

5 Increased funding

These efforts have increased the amount of funding available for additional NFM-related work. New investments by federal, state, and local agencies and private foundations have enabled the outcomes listed below.

Key outcomes included:

- A case study of the relationship between wetlands and flood hazards
- A pilot project to assess vulnerabilities and NFM restoration opportunities on a watershed scale
- Established a catchment-scale NFM demonstration plan
- Increased capacity for the design, engineering, and construction of recommended demonstration projects

> "...we're finding more sources of funding and we're being allowed to utilize it more flexibly than we have in the past."

-- Sara Hudson,
City of Ashland Parks and
Recreation Director

Partner Organizations

Funders

Wisconsin Coastal Management Program

FEMA

The Brico Fund

NFM Technical Team

Lake Superior Collaborative

Wisconsin Dept. of Natural Resources

Wisconsin Emergency Management

Department of Agriculture, Trade & Consumer Protection • Wisconsin •

United States Environmental Protection Agency

Trout Unlimited

USGS science for a changing world

Ashland County

Forest Service U.S. Department of Agriculture

NIACS Northern Institute of Applied Climate Science

Extension University of Wisconsin-Madison

National Oceanic and Atmospheric Administration NOAA U.S. Department of Commerce

inter·fluve

Mary Griggs Burke Center for Freshwater Innovation Northland College

USDA United States Department of Agriculture Natural Resources Conservation Service

WICDI

Saint Mary's University of Minnesota GeoSpatial Services

Northwest Regional Planning Commission NWRPC keeping your future as our focus

Partner Organizations

Additional Ripple Effects Mapping Participants

- Mashkiziibi (Bad River) Natural Resources Department