



Stream Report

1. Introduction

The Nemadji Watershed is located just south of Carlton, MN. The waters flow from the headwaters located in Northern Pine County and Central Carlton County, MN to Lake Superior in Superior, WI. The watershed covers 473 square miles with 276 square miles in Minnesota, with 353 miles of stream and 35 lakes on the Minnesota side.

The **Nemadji One Watershed One Plan** (1W1P) is a planning partnership between Carlton SWCD, Carlton County, Pine SWCD, and Pine County, with a goal of **prioritizing** opportunities to protect the watershed's valuable resources along with **targeting** projects to help solve water quality problems. The result will be a **measurable** improvement in water quality and protection of this important resource for future generations.

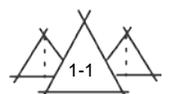
The general 1W1P process is outlined in Figure 1. For the first step, which is to gather and prioritize opportunities/issues in the watershed, four topic meetings that bring together watershed and topic experts are being held. The meeting topics include 1) forestry, 2) wetlands & lakes, 3) streams and 4) agriculture. This report summarizes the results from the **Stream** topic meeting held October 23rd, 2019.



Figure 1. The 1W1P process is displayed above. The topical meetings are the first steps within the process (circled in gray).

The 1W1P process is driven by local units of government, guided by an Advisory Committee made up of local stakeholders and state agencies. The decision-making body for the plan is a Policy Committee made up of elected officials from each County and SWCD.

In order to gather as diverse a group as possible, topic experts were also invited to help gather and prioritize issues. In addition to the Nemadji 1W1P Advisory Committee, topic experts from the Carlton County Transportation Department, MN Department of Transportation, Townships, DNR Fisheries, and the Carlton County Land Department participated in the **Stream** meeting.



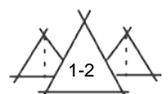
2. Nemadji Watershed Streams

The Nemadji Watershed is made up of a complex network of streams that flow north to Lake Superior. Of these streams, approximately 350 miles are designated trout streams that provide valuable cold-water habitat. However, six streams are listed as impaired because they did not meet MPCA's standards for fish and/or macroinvertebrate diversity. In addition, nine streams are listed as impaired for Total Suspended Solids (TSS). In fact, the Nemadji watershed contributes more sediment to Lake Superior than all the other North Shore streams combined. Most of this sediment comes from near channel and not overland erosion which is exacerbated by the steep slopes and clay soils that make up a large part of the watershed. This leads to a flashy system, presenting challenges for the stream/road interface. Stream crossings in the watershed have led to issues with erosion, connectivity/aquatic organism passage and infrastructure vulnerability.

STREAM



Figure 2. The upper reaches of the Net River in the Nemadji State Forest



In order to help us understand what issues/opportunities surround streams in the Nemadji Watershed, issues listed in previous plans, reports, agency comment letters and public input were gathered and compiled into common themes, becoming the basis of creating the priority stream issues for the Nemadji 1W1P (see References for sources).

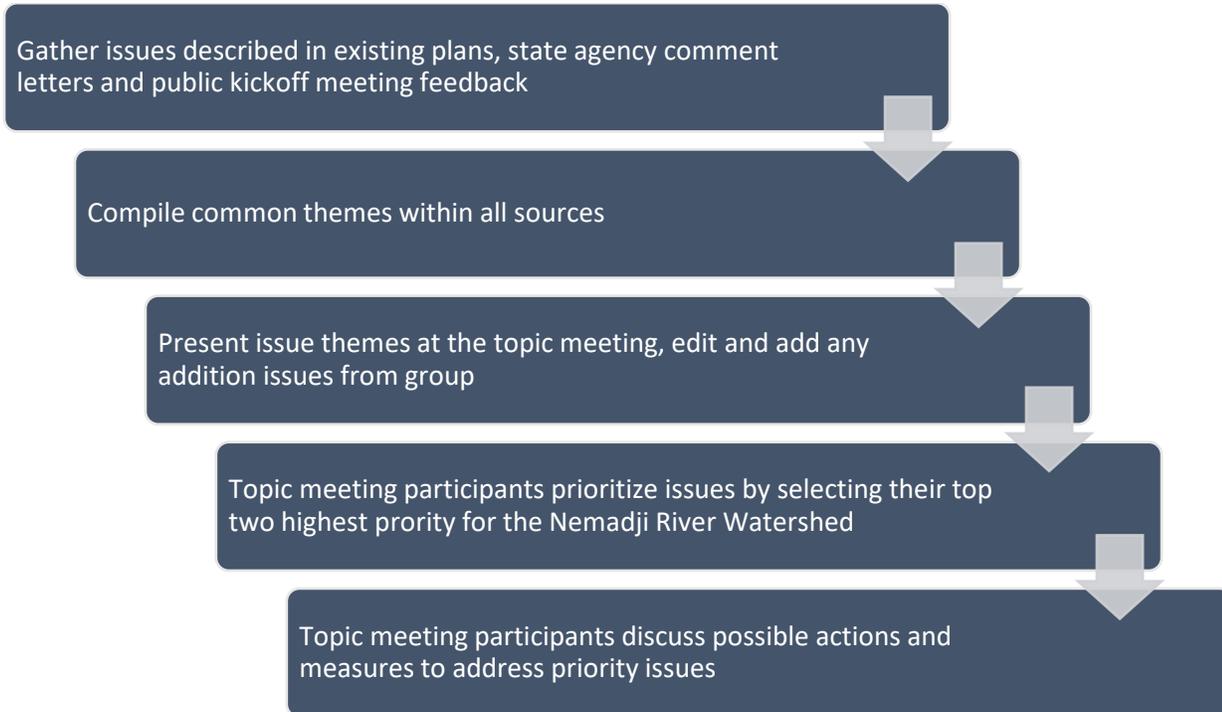


Figure 5. Issue statement development process.

A diverse group of stream experts plus the Nemadji 1W1P Advisory Committee gathered to provide input on the compiled issues list. The group agreed on a final list of 6 issue statements (Table 1) and were also provided the opportunity to add additional issues.

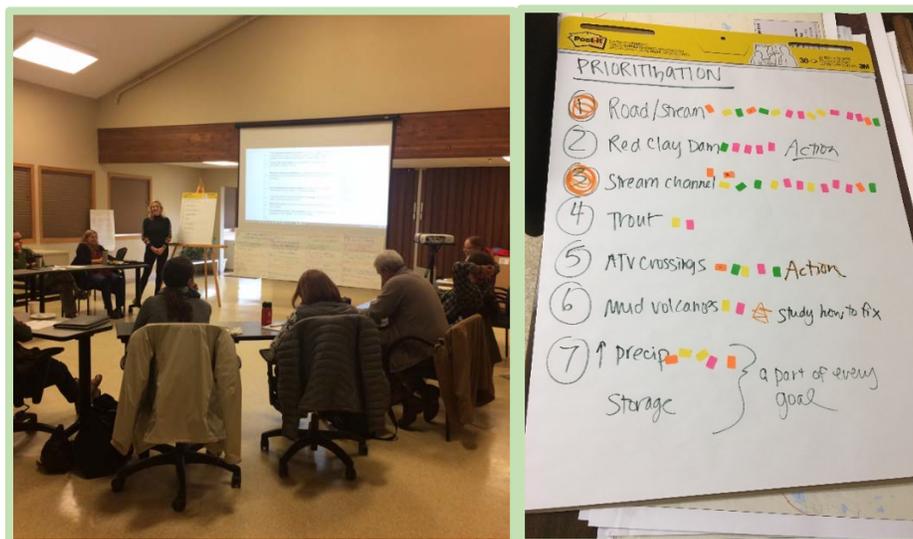


Figure 6. Photos from the Stream Meeting held October 23rd, 2019.

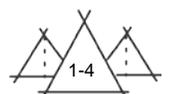


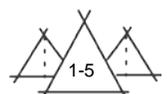
Table 1. Stream issue statements as revised at the Stream topic meeting.

#	Issues Statement	References
1	The road and stream interface (Culverts, bridges, ditches, road maintenance) can contribute to stream instability, sediment impairments, habitat fragmentation, public safety and commerce.	Carlton County Water Plan, Pine County Water Plan, WRAPS, TMDL, Public kickoff, MPCA, BWSR, DNR
2	Failing red clay dams can contribute to stream erosion and are barriers to aquatic habitat.	Carlton County Water Plan, WRAPS, TMDL, MPCA, DNR
3	Stream channel instability and high peak flows contribute to sediment and biological impairments in the watershed. (increase storage) (reconnect floodplain)	Carlton County Water Plan, Pine County Water Plan, WRAPS, TMDL, Public Kickoff, Erosion and Sedimentation in the Nemadji River Basin, USDA - NRCS Rapid Watershed Assessment Beartrap-Nemadji
4	Groundwater-fed trout streams are at risk of increased temperature and turbidity. (increase storage, reconnect floodplain)	Pine County Water Plan, WRAPS, Erosion and Sedimentation in the Nemadji River Basin
5	Uncontrolled/unmanaged stream crossings (such as ATV and other uses) can cause erosion.	WRAPS, Public Kick-off, Erosion and Sedimentation in the Nemadji River Basin
6	Mud volcanoes contribute to sediment impairments on Deer and Mud creeks.	WRAPS, Carlton County Water Plan
7	Increasing trends in precipitation impact infrastructure, water quality and fish habitat. (increase storage)	Stream Topic Meeting, Public kickoff

Each participant ranked their top three issues for streams, and the two top priorities overall were:

- The **road and stream interface** (Culverts, bridges, ditches, road maintenance) can contribute to stream instability, sediment impairments, habitat fragmentation, public safety and commerce.
- **Stream channel instability** and high peak flows contribute to sediment and biological impairments in the watershed. (increase storage) (reconnect floodplain)

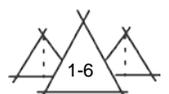
The group brainstormed a list of possible actions to address the priority issues along with ways success might be measured. A water quality category was added to capture additional management actions the group discussed.



Actions/Measures

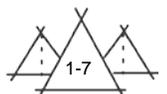
The Road and Stream Interface

- Reconnect streams
 - ✦ *Metric: Miles of streams reconnected*
- Upsize or upgrade culverts for Aquatic Organism passage
 - ✦ *Metrics: Number of culverts replaced*
- Provide education to road maintenance staff
 - ✦ *Metrics: Number of staff reached; number of trainings provided*
- Chip seal gravel roads in priority areas
 - ✦ *Metrics: Feet of roads treated; number of streams protected*
- Coordinate with road authorities to see where project benefits could be stacked
 - ✦ *Metrics: Biannual meeting held*
- Track benefits to watershed projects using a database which includes cost of both projects and consequences of not completing projects, such as road closures
 - ✦ *Metrics: Watershed specific ArcMap application created and maintained*



Stream Channel Instability

- Learn and collaborate with college geology department
 - ✦ *Metric: Number of meetings held*
- Collaborate between entities on construction projects and restrictions
 - ✦ *Metric: Number of meetings held*
- Encourage “do the right thing” without always paying for it by providing technical assistance
 - ✦ *Metric: Number of outreach campaigns, site visits*
- Complete culvert inventory on township and private culverts
 - ✦ *Metric: Culvert inventory completed and maintained*
- Increase storage
 - ✦ *Metric: Acre/feet increase in storage incorporating climate change predictions*
- Restore Streams
 - ✦ *Metrics: Feet of streams restored*
- Restore floodplain connectivity
 - ✦ *Metrics: Feet of floodplain restored*
- Learn where streams are instable
 - ✦ *Metrics: Number of streams evaluated*
- Increased communication between stream practitioners within the watershed
 - ✦ *Metrics: Biannual meeting held; ArcMap application created for partners to enter completed projects*



References

WRAPS. [2017. Watershed Restoration and Protection Strategy, Minnesota Pollution Control Agency](#)

MPCA. [2019. Letter outlining Minnesota Pollution Control Agency priorities for the Nemadji One Watershed One Plan.](#)

DNR. [2019. Letter outlining Minnesota Department of Natural Resources priorities for the Nemadji One Watershed One Plan.](#)

BWSR. [2019. Letter outlining Board of Water and Soil Resources priorities for the Nemadji One Watershed One Plan.](#)

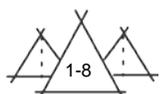
Natural Resource Conservation Service & United States Forest Service. [Erosion and Sedimentation on the Nemadji River Basin](#)

Natural Resource Conservation Service. [USDA – NRCS Rapid Watershed Assessment Beartrap-Nemadji](#)

Carlton County. [Carlton County Water Plan.](#)

Pine County. [Pine County Water Plan.](#)

Wisconsin Wetlands Association. [Exploring the relationship between wetlands and flood hazards in the Lake Superior Basin](#)



Issues/Opportunities List Generated During the Brainstorming Activity at the Stream Meeting

- Large percentage of the watershed is public land, especially where there are steep slopes and in Pine County
- Focus on road crossings and effects on streams
 - Funding sources limited for updating infrastructure
 - Impact of closed roads on access
- Road surface / Resilience to floods
- Ditch design – slow the flow gutters
- Educate road graters to not leave berms and use packing wheels
- Private and recreational roads/access maintenance
- Opportunity for collaboration between state and county for working with private lands
 - Provide technical assistance
- Increase storage capacity on the landscape and reconnect floodplain
- Red clay dams – aging and lessons learned
- Resilience to climate change – design with this in mind
- Trout habitat connectivity
 - How much and where
- Roads and accessibility for economic reasons
- Rain and cold temps has effect on run off and storage
- Learn and collaborate with college geology department
 - Understand clay on bedrock
- Collaboration between entities on construction projects and restrictions
- Encourage “do the right thing” without always paying for it
 - Provide technical assistance
- Data – MN DOT Resiliency study?
- Culvert inventory on private and townships roads
- Work with trout restrictions – expand work dates?
- East-West roads are more of an issue for flooding
- Grating on forest road properly
 - Proper maintenance
- Road closures affect the public and public services
- Proper sizing of culverts and height
- Larger rain events increasing?
- Opportunity to design with future precipitation changes in mind

