Protection and prioritization

Tools available to help prioritize waters for protection efforts.

Why protection?

As of 2017, an estimated 60% of Minnesota surface waters are meeting water quality standards or fulfilling their beneficial uses. However, the majority of the focus of state and local organizations charged with oversight of water quality issues is on restoration of waters that do not currently meet clean water standards. A much smaller focus is placed on maintaining the high quality waters that we still have. This perspective can be costly, as restoration of waters that do not meet standards typically requires much more time, money, and effort than taking the steps to preserve existing ecosystems – a process that nature has used to protect water quality for thousands of years. The same practices that protect water quality will also benefit wildlife, groundwater, air quality, soils, and numerous other aspects of our Minnesota environment.

With this understanding in mind, the Minnesota Pollution Control Agency collaborated with the Minnesota Department of Natural Resources (DNR), the Minnesota Board of Soil and Water Resources, the Minnesota Department of Health, and the Minnesota Department of Agriculture to develop guidance for incorporating protection strategies into Watershed Restoration and Protection Strategy reports, local water plans and/or One Watershed One Plan documents. The guidance provides more detail on a five step process:

1. Summarize current water quality data
2. Apply risk assessment metrics to generate water quality targets and/or goals
3. Prioritize water resources using the output of risk assessment approaches
4. Collaborative review, analysis and identification of protection targets, priorities, and best practices
5. Collaborative recommendation of protection strategies

The following is a process summary for both streams and lakes. Please refer to the more detailed guidance documents for specific discussions of the process.

Stream protection and prioritization

The Stream protection and prioritization tool is designed to generate a prioritized list of streams. The list is based on the results of water quality assessments, the level of risk posed from near shore areas, the level of risk posed from the contributing watershed, as well as the level of protection already in place in the watershed. The tool utilizes state-wide coverages; therefore, additional local information must be weighed including factors such as forest management practices, potential development trends and mining impacts.

The process is limited to streams that have water quality assessments that include fish and/or macroinvertebrates (bugs) and the streams must be meeting water quality standards – i.e., they are considered to be fully supporting of aquatic life**.** The first step considers how close these communities are to being impaired or degraded.

Natural Condition

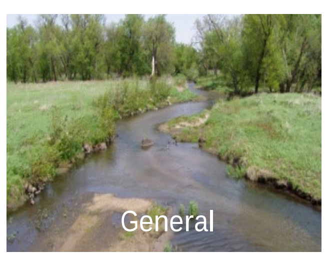
Degraded Condition

The second step looks at near shore (riparian) risks to healthy stream communities. In developing the tool, we considered the presence of steep slopes, percent altered streams, percent wetland loss, road density, population density, population change, feedlots, septic system density, and a variety of land use categories (percent agriculture, percent row crop, percent impervious surface, percent undeveloped). Our analysis indicates that road density and disturbed land use (cultivated and urban uses) can best predict impacts or changes in stream biological health. These same risks are then also evaluated for the larger, upstream watershed.

The third step looks at how well protected the near shore areas and upstream watershed already are. To complete this step, analysis of lands in public ownership or with public easements is conducted.

Risk Factors	Impairment Risk Level	Rank
Road Density - Riparian % Disturbed Land – Riparian	Low road density Low % disturbed Low Risk → High Risk	**RIPARIAN RISK** (low) 3 2 1 (high)
Road Density – Watershed % Disturbed Land – Watershed	Low road density Low % disturbed Low Risk → High Risk	+ **WATERSHED RISK** 3 2 1
Protective Factors		+
Current Protection – Riparian Current Protection –Watershed	High % current riparian protection High % current watershed protection Low Risk → High Risk	**CURRENT PROTECTION** 3 2 1
IBI Threshold Proximity Factor		×
Number of communities close to IBI Impairment threshold	Neither Community One Both Low Risk → High Risk	**IBI THRESHOLD PROXIMITY** 3 2 1
PROTECTION PRIORITY	**Priority Level**	=
High Risk = High Priority Rank Low Risk = Low Priority Rank	**Lower Priority** → **Higher Priority**	**PROTECTION PRIORITY RANK** (lower priority) C B A (higher priority) (low rank) 27 14 3 (high rank)

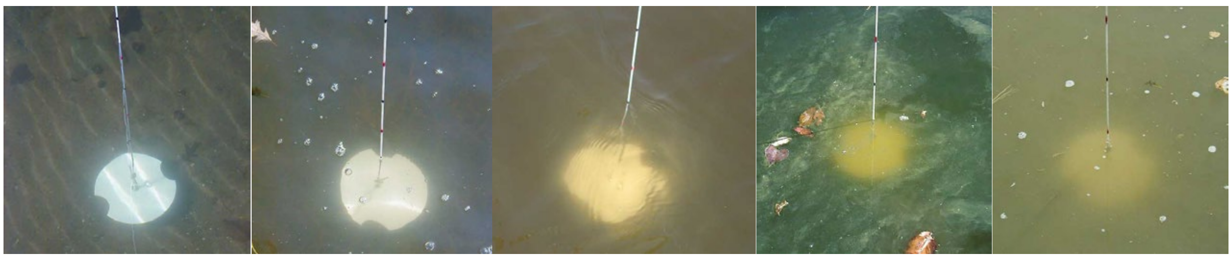
A prioritized list of streams is then generated for the entire watershed. The list may then be further prioritizing by splitting out, or separately considering, modified streams (ditches), general use streams (good biology and habitat), and exceptional streams (best biological communities and habitat).



Lake protection and prioritization

Like the Stream tool, the Lake protection and prioritization tool generates a prioritized list. The analysis is based on water quality assessment results, the amount of clarity lost if phosphorus is added, the amount of land use disturbance, lake size, as well as what is known about current trends in water quality. The tool utilizes state-wide coverages; therefore, additional local information including local priorities, values and land use information such as forest management practices, potential development activities and/or mining impacts need to be considered.

The process is limited to lakes that have completed water quality assessments and that are currently meeting water quality standards – i.e., they are considered fully supporting for aquatic life. The first step considers how much lake clarity would be lost with an increase of 100 pounds of phosphorus to the lake. This is also known as the lake's phosphorus sensitivity.



The second step considers the significance of this sensitivity – i.e., the likelihood that this increase in phosphorus would occur. Factors considered include the percentage of disturbed land use (cultivated and urban uses), the amount of surface area of the lake, the current phosphorus concentration and loading to the lake, and the proximity of the lake to the impairment threshold. Any information on declining trends in water quality are also considered.

The third step for lakes results in a prioritized list of lakes, each with a load reduction goal. The goal is calculated as a 5% reduction in predicted phosphorus loading (pounds/year) for any given lake. The goal is not regulatory; it is intended to give local groups a value to aim for, in lieu of just maintaining current phosphorus levels. This provides a way to measure progress over time for a given lake; estimated load reductions in phosphorus can be tracked as new practices are implemented.

How to use the tools

Tables, maps, and spatial data (via the Watershed Health Assessment Framework) are created for use in prioritization activities. The lakes and streams are ranked and prioritized. For lakes, the top 25^{th} percentile is the high (A) priority, 50 to 75^{th} percentile is medium (B) priority, and the bottom half of the lakes are the lower (C) priority. For streams, the data is split into thirds; the top third are high (A) priority, the next third medium (B) priority, and the final third are low (C) priority.

It is important to note that these prioritization tools are considered a starting point. Additional factors in steps 4 and 5 should be considered when evaluating the provided lists and ultimately more decisions will be made at the local water management planning levels**.** For example, what local or regional priorities impact the list? Are areas under development pressure? Is there land use conversion planned? Perhaps a particular area has mining, logging, or other practices that are not found statewide, and local maps will provide better information. And finally, are there opportunities to "stack environmental benefits" by choosing lake or stream protection strategies that achieve multiple objectives such as habitat preservation or open space protection (in addition to water quality protection).

Local knowledge of surface water resources is key to utilizing any prioritization tool. For example, knowing what lakes or streams have active associations that are engaged in water quality improvement can add weight to other data. Local governments may have information as to what lands are most at risk for development, or what areas may be at risk due to non-compliant septic systems, land use violations, or filled or degraded wetlands.

Below is a partial list of data sets that could be considered when prioritizing surface waters.

Land use/Land cover (Natural Resources Conservation Service)

Groundwater depth (DNR)

Land ownership private vs. public

Impervious surface coverage

National Wetland Inventory wetlands

Flow direction

Index of Biological Integrity scores (fish and invertebrates)

State permitted sites (NPDES-CSW, MS4, IS)

Petroleum cleanup sites

Restorable wetlands

Imagery

Invasive species observations

Cumulative forest change

Public water supplies

Census blocks

Tribal lands

DNR native plant communities

Trout streams

Wild rice locations

Lakes of biological significance (DNR)

In addition to these available datasets, local knowledge can be of use for identifying the following considerations:

- Potential implementation partners
- Problem areas (eroding bluffs, shorelines, degraded areas)
- Future development plans
- Illicit discharge locations
- Local values
- Historic activities
- Social capital and leadership for project implementations

By encouraging stakeholders to choose relevant existing datasets and contribute local knowledge of resources to the prioritization process, ownership of the process is enhanced and prioritization becomes more targeted and measurable, thus increasing the likelihood that implementation will occur on a sustained basis.