

**An Evaluation of
Citizen Volunteer Water Quality Monitoring
In Minnesota**

Final Report

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Preface

Minnesota's streams, lakes, and wetlands should support healthy aquatic life and be safe for swimming, fishing, and (for some waters) drinking. Waters that support these values should be protected and waters that don't should be restored. Knowing whether they do, in fact, support these values and uses is critical to determining how they should be managed. Decisions that affect these waters should be guided by relevant, reliable, and current information as to the condition of these waters and the likely impacts of these decisions on them.

This sentiment is echoed in the recent Environmental Quality Board (EQB) report Minnesota Water Priorities 2003-2005. The report states that achieving the principles of sound water program requires a state effort that:

- Is transparent and easily understood
- Integrates and coordinates federal, state, and local interests
- Makes links to land use
- Collects sufficient data and interprets it for ready use by decision-makers and citizens
- Involves and empowers local governments and citizens
- Addresses current problems and prevents the emergence of new ones
- Acts in a unified, economical manner

Yet, approximately 95% of Minnesota's streams and 88% of its lakes have *not* been assessed as to their condition and whether they support healthy aquatic communities and human uses¹. Two reports on water protection programs at the Minnesota Pollution Control Agency (MPCA) released in January 2002 by Minnesota's Legislative Auditor concluded that Minnesota:

- has "one of the most inadequate ambient monitoring programs in the nation" (citing a 1995 Governor's Blue Ribbon Panel);
- is "off to a slower start than most other states" (according to federal officials) in efforts to identify acceptable levels of pollution (Total Maximum Daily Loads, or TMDLs) in water bodies.

Inadequate investment in assessing lake and stream health prevents state agencies, local governments and citizens from finding problems and evaluating solutions. Local, state and federal resources are expended on structures and practices to improve water quality without fully knowing how well those actions work. Perhaps most importantly, citizens and visitors of Minnesota are kept uninformed about the waterways they rely on for recreation, drinking water and sustenance.

From another perspective, however, the state should be praised for its honesty about the inadequate monitoring coverage of the state's waters. Other states report higher percentages of waters assessed by making dubious assumptions about what constitutes "assessed waters." Is a single sample collected on a 100-mile reach of the Mississippi River "assessed?"

There are likely hundreds of citizen volunteer groups and schools in Minnesota monitoring rivers, streams, lakes and wetlands. There are likely thousands of people involved in collecting information on

¹ "Minnesota Watermarks," produced in September 2000 by Minnesota Planning's Environmental Quality Board.

the condition of the state's waters. Given the lack of information cited above, one would think that these data would be in great demand to supplement MPCA's efforts to determine compliance with the state water quality standards. What about local land use planning decisions? These incremental, relatively small-scale decisions, taken together, may have profound impacts on Minnesota's waters.

There may be consensus that volunteer monitoring is a good thing because it gets people out in the field experiencing Minnesota's waters. There may even be agreement that these programs produce useful information. But, is this information actually being used to make decisions or spur actions that will make Minnesota's waters healthier?

The McKnight Foundation has funded many of these volunteer monitoring efforts over the past decade. The foundation wants to know if this funding has produced information that is being used to make decisions. The Rivers Council of Minnesota (RCM) and the Minnesota Lakes Association (MLA) have many connections to volunteer monitoring and provide organizational and technical support. So the McKnight Foundation asked us to take a hard look at this question. This report is the result of that evaluation.

It should be noted that this evaluation included an in-depth survey of a sampling of river and lake monitoring groups throughout the state, and interviews with MPCA staff. This produced a large volume of information to summarize, analyze, and distill into a set of conclusions and recommendations. Some of these are critical of the volunteer monitoring groups themselves, the MPCA, and the various support organizations. We hope the conclusions and recommendations outlined in this report are taken in the spirit they are intended – to maximize scarce resources available towards building a sound water program in Minnesota. Time and resources simply did not permit including a six-month process to build consensus around the recommendations and the actions to follow. We recognize some of the recommendations will be challenging to implement, and we look forward to working with all partners report as a starting point for change.

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I. Executive Summary

This report evaluates citizen volunteer monitoring in Minnesota, and has been prepared by the Rivers Council of Minnesota (RCM), Minnesota Lakes Association (MLA), and River Network (RN) for the McKnight Foundation.

Introduction and Objectives

The evaluation was done at the request, and with the support of, the McKnight Foundation. Given the high level of volunteer monitoring activity, and having provided funding support for numerous citizen volunteer monitoring programs over the past decade or so, the foundation wanted to know if this was making a difference. So did we.

This report is intended to provide the basis for a more strategic and coordinated approach to citizen volunteer monitoring in Minnesota. The main objectives are to:

1. Explore if, how and by whom citizen volunteer monitoring data is used to guide surface water resource management decisions and actions in Minnesota.
2. Identify the barriers and opportunities to using citizen volunteer monitoring data to guide decisions and/or take action at various levels.
3. Use this information to recommend how to make citizen monitoring more effective in Minnesota.

A. How the Evaluation Was Done

The evaluation was done in 3 parts: 1) in-depth surveys of river and lake groups that provide and use data, 2) interviews with agency staff that use data, and 3) an analysis of the results to develop conclusions and recommendations. To apply their roles to data use, the survey participants first identified themselves as one or more of the following:

- **Data Providers** are the individuals and groups that gather data with the intent to pass it onto a decision-maker (data user).
- **Data Users** are the individuals or organizations that incorporate data into their decision-making processes.
- **Service Providers** are the individuals or groups that provide resources and various kinds of training or support to citizen volunteer monitoring programs

We surveyed 41 river and lake groups using a standard set of questions. These survey questions addressed the first two objectives listed above to:

1. **Get a handle on data use:** From raw numbers on field and lab sheets to decisions and actions, there are many, many small steps. We wanted to know from the groups that gathered the data, and those that used it, what happened to it. So, we asked them to explain the path their data followed.
2. **Identify the barriers and opportunities:** We also asked data providers and data users where data got “stuck” in the data pathway (the barriers).

The results of the surveys and interviews were analyzed both quantitatively and qualitatively to compare issues/threats, intended data users/use, and actual data use. The comparisons helped us identify common experiences with both barriers and successes, from which we drew our conclusions, and recommendations.

B. Highlights of Survey Results

Overview of Groups Surveyed

- Of the 41 groups surveyed, 20 were primarily river-focused and 21 lake-focused, though some groups did both.
- Many (23) identify themselves as both data providers and data users
- 18 are nongovernmental organizations
- 23 Local and quasi-local government organizations

1. Finding: Top 3 Intended Data Users

Data users are individuals, agencies, or organizations that incorporate data into their decision-making processes. The top 3 are:

- The Minnesota Pollution Control Agency
- Local Organizations (most often local and quasi-local governments)
- Themselves (their own group)

2. Finding: Monitoring Groups Produce Outcomes

In this report, outcomes are a change in the world – either in people or in their waters:

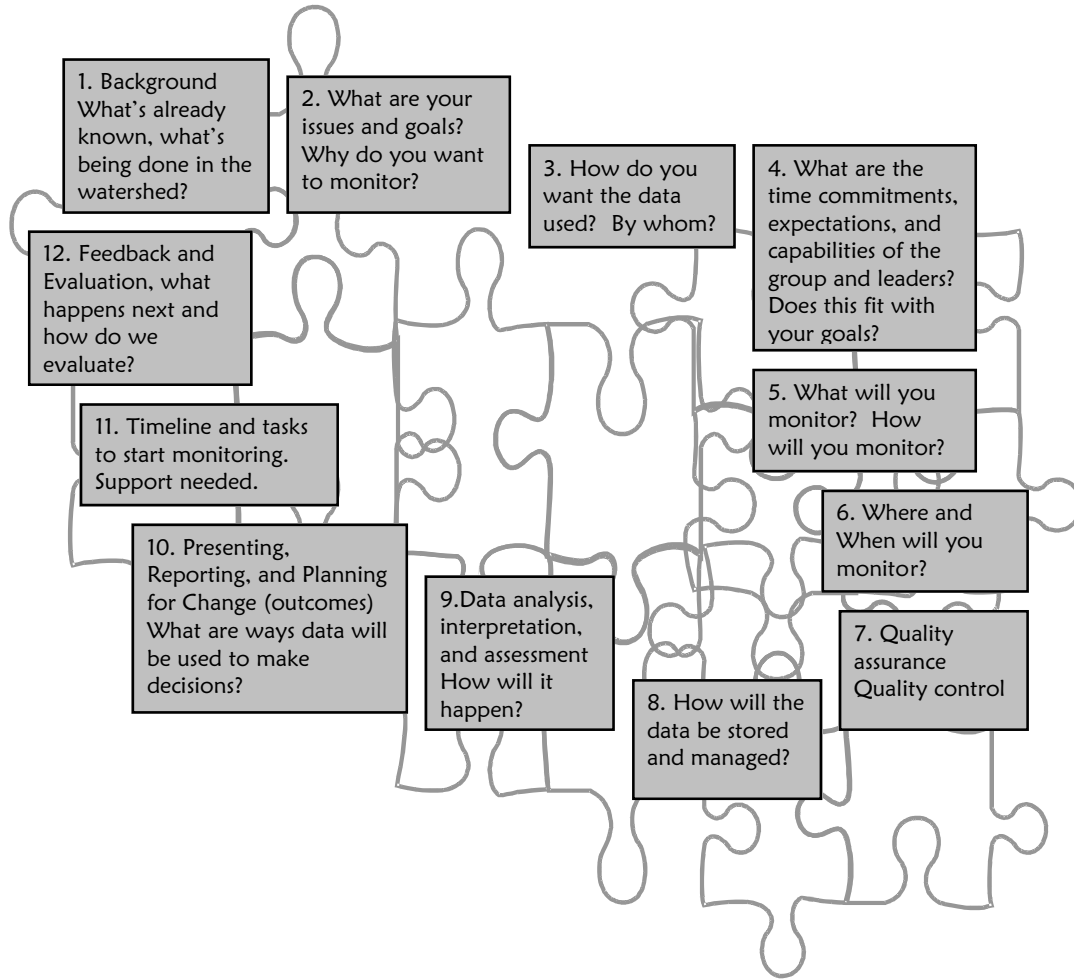
1. **Increase understanding of water body conditions:** This involves people learning about their waters and how they work.
2. **Changes in attitudes:** This involves people forming a different opinion or view of their waters based on learning and understanding.
3. **Changes in behavior:** These are decisions or actions taken voluntarily or through regulation, to protect and restore waters.
4. **Changes in the condition of the water body** (due restoration or protection): This involves measuring actual change (expected result of restoration) or continued high quality (expected result of protection).

We were able to find examples of all 4 types of monitoring program outcomes:

3. Finding: Many Groups Don't Have Monitoring Plans

About half of the groups surveyed did not have a monitoring plan that specified intended uses and users of their data and how they were going to gather these data. Monitoring plans are written documents that answer strategic questions designed to focus monitoring programs. Figure 1 shows the various steps in the process.

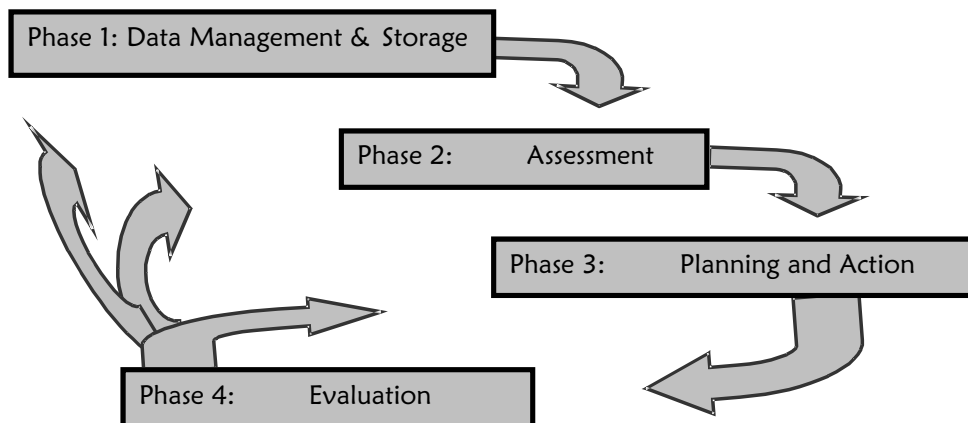
Figure 1: The Basics of a Monitoring Plan



4. Finding: Data Follows Pathways

Key to understanding data use in Minnesota is the concept of “Data Pathways.” This is the path that data moves through from collection to use. Figure 2 shows the phases:

Figure 2: Generic Data Pathway



Phase 1: Data Management and Storage - This phase involves compiling, entering, validating, and storing the data.

Phase 2: Assessment – This phase involves summarizing and analyzing the data to determine patterns and comparing the monitoring data to known benchmarks (such as reference conditions or state water quality standards) to see if the water body(s) are healthy.

Phase 3: Planning and Action – This phase involves reporting and presenting the data to the intended users, developing protection and/or restoration plans, and carrying out the actions in the plan.

Phase 4: Evaluation – This phase involves comparing intended and actual uses of the data with the outcomes they produced to see if the actions worked.

We used this data pathway concept as a way to identify barriers to the use of the data. A more detailed descriptions of the steps is in Chapter 3, section D.

5. Finding: Barriers to Using Volunteer Monitoring Data

When outcomes do not happen, it is because of **barriers** at different places along the data pathway, or within the system (organizational/technical support). Citizen volunteer monitoring data isn't being as effectively used as it could be for a variety of reasons, including:

- Overall Citizen Volunteer Monitoring “System” Barriers (such as lack of funds, trainings, or knowledge of support programs).
- Monitoring Program Barriers (such as lack of design plan or unclear goals).
- Data Collection Barriers (such as lack of consistent sampling protocols).
- Data Pathway Barriers (such as lack of communication between data providers and users).
- Data User Barriers (with data users at both the state and local levels).

6. Findings: Successes Using Volunteer Monitoring Data

Participants were asked what they consider the most important ingredient for program success. Their responses were (in order of number of responses)

- Strong leadership
- Funding
- Keeping volunteers informed and motivated
- Clear monitoring objectives

Following a review of the outcomes “stories” included in chapter 5, we added a few more:

- Partnerships with data users and other providers
- Data collection with a definite purpose and use
- Help to interpret the data
- Data users are local

C. General Conclusions and Recommendations

General Conclusions

1) **Minnesotans really care about their lakes and streams and are willing to put in a lot of time and effort to monitor and protect them. (recommendation 3)**

- Citizen volunteer monitoring programs involve committed, enthusiastic people.
- Successful citizen volunteer monitoring requires healthy organizations and a network of people/organizations that provide support, training, and coordination.

2) **Like the lakes, streams and watersheds of Minnesota, citizen volunteer monitoring programs are complex and unique from place to place. (recommendation 1)**

- The variety of programs reflects the reality of different types of water bodies, scales, and issues, in different parts of the state. It also reflects the varying political, socio-economic, and cultural differences of different regions of the state.
- Given this variety, a “one-type fits-all” standardized monitoring program for all groups will likely not produce useful data everywhere.
- Effective monitoring programs are that best reflect the various issues at stake, needs for and uses of data, variety of aquatic ecosystems, and capabilities of groups.

3) **Citizen volunteer groups’ data are frequently not used by their intended users. (recommendations: 1,2)**

This is due to:

- The inherent difficulty in measuring long-term changes in complex ecosystems.

- Lack of monitoring plans that document their basic monitoring approach
- Lack of communication between the groups and the data users
- Lack of clarity on the part of data users as to their data requirements.
- Groups find it difficult to move beyond data collection to the next steps.

4) **Citizen volunteer programs that are successful in having their data used by their intended users have a few common key ingredients. (recommendations 2, 3)**

These include:

- Strong leadership
- Partnerships with clearly identified local data users
- Informed, involved, and motivated volunteers

5) **The pathways from raw data to its use to attain healthy waters are complex and need to be clarified. (recommendation: 2)**

- The Minnesota Pollution Control Agency's 305b Water Quality Assessment data pathway is the best-documented but not clear and user friendly. (The "Guidance Manual for Assessing the Quality of Minnesota's Surface Waters," can be found at www.MPCA.state.mn.us/publications/manuals/tmdl-guidancemanual.pdf).
- The MPCA is producing a guidance manual for volunteer monitors to make state and local assessments more user-friendly and creating a data entry/retrieval website for better access to the STORET database.
- The regional and local watershed planning pathways are very complex and need better development.

6) **Volunteer monitoring has been an effective tool in producing "learning-based" outcomes and even restoration and protection actions. It has been less effective to date in measuring the resulting positive changes in the condition of water bodies. (recommendations:1, 2)**

- Outcomes defined as changes in learning, attitude, behavior, and improvements in water quality conditions are all important. See page 17 for a description of outcomes.
- Water quality-based outcomes and results are long-term, not always defined, difficult to document, and do not always adequately represent the impacts of a program.
- In general, many citizen volunteer groups haven't been around long enough to measure the outcomes of restoration efforts.
- Volunteer lake monitoring programs are more developed than stream monitoring programs, due to the fact they have been around longer, are generally easier to measure, and are more recognized for their recreational uses.
- Currently, there is no systematic statewide effort designed to track and document outcomes of citizen volunteer efforts.

7) Support services for citizen volunteer monitoring groups are not consistently available and, where they are available, groups are not taking full advantage of them. (recommendation: 3)

- Technical assistance services are critical to help groups with basic monitoring trainings, skills building, and through all parts of the data pathway.
- Services that equally important are those that nurture and sustain organizations and help them learn from each other. These services include organizational development, networking opportunities, and coordination of services between organizations.
- In particular, producing a monitoring plan is a difficult process for many citizen volunteer groups.
- These services are best provided through a network of service providers.

8) Given the reality of reduced public and private funds, fewer dollars will be available to support volunteer monitoring. A new funding approach is needed. (recommendation: 4)

- Information generated by citizen volunteer monitoring programs may be the only information available in some watersheds. Given the already inadequate assessment coverage (fewer than 5% of streams and 12% of lakes assessed), it is critical that citizen volunteer monitoring contributes information and should continue to be funded.
- Given scarce resources, it is important that funding be allocated strategically to enable services to be provided in the most cost-effective ways.

General Recommendations

1) Every citizen volunteer monitoring group (including CLMP and CSMP) should prepare a monitoring plan that is designed to provide information useful to achieve its specific outcomes.

These plans should specify:

- Intended uses and users of the data, along with their data requirements
- Monitoring activities (indicators, sites, frequency, etc.) that will meet those requirements
- How the data will be managed, summarized, and assessed
- Quality assurance measures

2) Clear and user-friendly guidance should be produced by data users and state service providers that identify different monitoring program options and their associated data requirements.

This guidance should include:

- The data and data quality requirements of state and local data users.
- A standardized monitoring design process.
- A few standardized monitoring plans geared to different data uses and users, water body types, purposes, etc. These should include recommended indicators. Acceptable

sampling/analysis methods, procedures for demonstrating the comparability of alternative methods, and guidance for site selection and frequency, data reporting formats, etc.

- Meta data needed: basic information about the data set - e.g. program name, who collected and analyzed, the samples, site location info, etc.

3) RCM and MLA should continue to build and coordinate a statewide service network that provides technical, organizational, and networking services.

In order for successful development of a coordinated network to happen, there needs to be players providing guidance, advice, training, networking, consultation, and coordination in a variety of content areas:

Organizational Development Topics

Fundraising
Program and strategic planning
Leadership development
Volunteer recruitment, etc.

Technical Topics

Monitoring Plans
Monitoring Techniques
Data Interpretation
Quality Assurance
Data to Action

Other services include advocating for citizen volunteer groups and conducting needs assessments.

This support network should exist at state, regional, and local levels and include all of the players involved, such as: an overall coordinator, citizen volunteer groups, non-profit and for profit service providers, data users, agency service providers, and funders. Not all services and funding need go through the network. Existing relationships among the pieces would be supplemented, not replaced by, the network.

4) A collaborative process should be convened to design a statewide volunteer citizen monitoring network and develop a supporting funding strategy by potential funders and network participants.

This process should result in a plan that:

- Develops a long-term funding strategy for the network
- Maximizes efficiency of the delivery of services
- Assures the long-term viability and capacity of the monitoring groups.
- Provides support for individual groups to buy services and supplies
- Funds different levels of service providers to provide certain services free of charge,

That approach will have added benefits of providing more consistent training, both quality and content, and enabling a larger number of groups to participate in training sessions, and creating economies of scale.

5) Additional research needs

- The research (generated for this report) should be repeated periodically to benchmark progress, assess needs of service providers and monitoring groups, and address new/different needs involving citizen volunteer programs.
- A more detailed look and evaluation of existing monitoring plans – including what they look like in Minnesota and other states), how they are developed and implemented, and document specific outcomes in the program and how they correlated to the plan.
- A more systematic look at actual versus intended data uses that are defined by citizen volunteer monitoring groups.
- A better understanding of professionally gathered data (especially at local levels) how it relates to citizen volunteer monitoring programs and the data pathway barriers and successes to make these efforts most effective.