2003 Report to the Legislature:

Encouraging Citizen Monitoring of Water Quality

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Minnesota Pollution Control Agency

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Introduction

Volunteer citizen monitoring is a critical component of understanding and evaluating Minnesota water resources and educating Minnesotans about water quality issues. Volunteer monitoring ranges in complexity from occasional observations and testing using simple field kits to detailed monitoring programs. The purpose of the monitoring also varies, from education and awareness to informing regulatory decisions

A survey completed by the Rivers Council of Minnesota during the summer of 2002 identified 46 Minnesota groups that organize or rely on citizen monitors. These groups work with approximately 4,000 volunteers in the following basins: Des Moines River, Lake Superior, Lower Mississippi, Minnesota River, Missouri, Rainy River, Red River, St. Croix River, and Upper Mississippi River. The Rivers Council is also aware of at least 14 other groups that involve citizen monitors, although they do not know the number of citizens involved. It is important to note that these figures are based on a citizen monitoring survey and inventory, and do not reflect a complete list of all groups and citizen monitors throughout Minnesota. The actual number of citizens involved in monitoring is likely much greater than the 4,000 identified through the survey.

Citizens have taken an active role in monitoring Minnesota's water resources since the 1970s. In recent years, citizen monitoring has gained attention as the state has struggled with the task of adequately monitoring and assessing Minnesota's water resources given the limited staff and funding available for monitoring.

One outcome of this increased attention was the passage of a citizen monitoring law by the 2002 Legislature (Minnesota Statutes § 115.06, subd. 4). This law directed the Minnesota Pollution Control Agency (MPCA) to encourage citizen monitoring of the ambient water quality of public waters and, by January 15 of each odd-numbered year, to report on its progress on the following activities under the section:

- Provide technical assistance to citizen and local group water quality monitoring efforts.
- Integrate citizen monitoring data into water quality assessments and agency programs, provided that the data meets agency quality assurance and quality control protocols.
- Seek public and private funds to:
    - Collaboratively develop clear guidelines for water quality monitoring procedures and data management practices;
    - Distribute the guidelines to citizens, local governments, and other interested parties;
    - Improve and expand agency water-quality monitoring activities; and
    - Continue to improve electronic and web access to water quality data and information.

This report summarizes the MPCA's efforts to assist citizen and local group monitoring, and its progress on the above activities since the enactment of the citizen monitoring law on July 1, 2002.

Technical Assistance to Citizen and Local Group Monitoring Efforts

The MPCA assists a variety of citizen and local group monitoring efforts. These efforts range from staff serving as technical advisors for local efforts to coordinating MPCA-sponsored citizen monitoring programs and projects. The following paragraphs summarize the types of technical

assistance the MPCA has provided to volunteer monitoring groups and individuals over the past six months.

MPCA Volunteer Monitoring Programs and Projects

The MPCA directly coordinates a citizen monitoring program for lakes (the Citizen Lake Monitoring Program, or CLMP), and a parallel effort for streams (the Citizen Stream Monitoring Program, or CSMP). Both provide training, equipment, communication, data management, interpretation, and reporting for citizen volunteers. Both CLMP and CSMP are statewide efforts designed to involve citizens in water quality monitoring at a basic level that is complementary to other water quality monitoring activities.

Minnesota's CLMP program is the largest and oldest volunteer lake-monitoring program in the country. CLMP volunteers collect water transparency data using a circular, white metal plate attached to a calibrated rope, called a Secchi disk. About once a week during late-spring to early-fall, volunteers boat to a designated spot on their lakes to collect transparency readings and make observations about the lake's appearance and recreational suitability. In the fall, volunteers send their data sheets to the MPCA to be compiled and included in the state water-quality database. The MPCA had 1,224 volunteers enrolled in the program in 2002.

In 2001, the MPCA began a pilot project to expand the CLMP monitoring effort beyond Secchi disk transparency. Participants in the "CLMP-Plus" project collect water samples and send them to a lab for chemical analysis, in addition to making transparency measurements. All equipment and analytical costs for the samples are provided and paid by the MPCA. Volunteers from ten lakes participated in this effort in 2002.

The CSMP program was established in 1998 and has been growing rapidly ever since. Currently, approximately 500 Minnesotans are enrolled in this program. About once a week during the summer, volunteers in the CSMP program visit an established spot on a nearby stream and measure transparency (water clarity) using a transparency tube. Volunteers also record stream stage, rainfall amounts, and make observations about the stream's appearance and recreational suitability. In 1999, the MPCA provided a CSMP monitoring kit to each of the county water planners in the state in an effort to support their work and promote volunteer monitoring efforts.

In addition to coordinating the above citizen-monitoring activities, the MPCA works directly with volunteers in two other arenas. The Lake Assessment Program (LAP) is a cooperative study of a lake involving MPCA staff and local citizens, such as a lake association or municipality. LAP studies serve to characterize a lake's condition and provide some basic information regarding the interaction of the lake and its watershed. Following the study, a detailed report is written by the MPCA that provides valuable information for the local group, the MPCA, and others interested in protecting or improving the quality of lake. Approximately 12 to 15 lakes are evaluated each year (on average); more than 100 lakes have participated since this effort began. In 2002, the MPCA had resources for only one LAP study.

The final example of an MPCA program that involves citizen monitors is the Clean Water Partnership (CWP) Program, through which the MPCA provides financial and technical assistance to local units of government for watershed investigation and restoration or protection work. To stretch financial resources and engage the local community, local CWP project managers often

enlist the help of citizen volunteers to track lake levels or river stages, and to conduct various types of monitoring. Citizens are often encouraged to participate in existing volunteer monitoring efforts, such as the CSMP or a county monitoring effort. (In the same way, citizens become involved in Total Maximum Daily Load studies, which are critical components of the MPCA's work to identify and restore impaired waters.) MPCA staff in St. Paul and the regional offices provide assistance in areas such as monitoring plan design, recruiting volunteers, and data interpretation.

Assistance to Local Units of Government

MPCA staff watch for opportunities to support local planning efforts with CSMP and CLMP, and to support the efforts of local government by providing technical assistance as needed. Staff often receive calls from local resource managers looking for assistance in setting up a monitoring effort or applying the data collected by volunteers.

In some cases, an MPCA staff person works directly with a county to establish a local monitoring effort. For example, staff in the MPCA's Rochester office worked with Dodge County and other counties to establish countywide volunteer efforts with participants enrolled in CSMP. County staff provide additional direction, encouragement and data interpretation to the citizen volunteers.

MPCA staff have also worked with counties and other local units of government on developing volunteer biological monitoring. Beginning in 1996, MPCA wetlands staff worked collaboratively first with Scott County and the Minnesota Audubon Council, and later with Dakota County to establish a volunteer monitoring effort for wetlands, now known as the Wetland Health Evaluation Project (WHEP). The MPCA staff developed the monitoring protocol and an Index of Biotic Integrity (IBI) that is applicable to wetlands in the central part of Minnesota. An IBI relies on multiple attributes of the wetland community, called "metrics", to evaluate the complex biological system. Since 1996, WHEP has expanded to other metro counties. Each year, MPCA wetlands staff assist in training volunteers, and also assist the counties and other local partners with data interpretation at the end of each monitoring season.

Some basin or watershed scale organizations prefer to do the design and implementation of their own citizen monitoring component, but still rely on MPCA staff to help with training or advice. For example, MPCA staff have spoken at basin summit events, provided volunteer monitoring information to local governments, and provided advice and technical assistance to local monitoring efforts throughout Minnesota.

Another example of this type of assistance is the Coalition of Lake Association (COLA) monitoring that is spearheaded by the MPCA's Detroit Lakes office. In this case, a group of lake associations (generally within a county) organize a collective monitoring effort and identify a local government partner, such as a watershed district or soil and water conservation district, that is willing to cost-share for lab analyses and monitoring equipment. The MPCA provides a training day for all the volunteers to demonstrate sampling techniques and water sample handling. The volunteers then monitor their local lakes during the summer, making Secchi disk measurements and collecting samples for chemical analysis. Some of these county efforts, which provide critical information for local resource managers, have continued for seven years.

Assistance to Citizen Groups and Individuals

For many years, MPCA staff has provided technical advice on request to local River Watch and other organizational efforts. All MPCA offices currently provide a range of assistance, from preparing documents to hands-on training, to a variety of groups. The time investment depends on the staff resources available; expectations and needs exceed the time available. The following are just two of many possible examples of this work.

- *Metro-Area Volunteer Stream Monitoring Partnership (VSMP).* In recent years, MPCA staff have joined other state, county, and regional agency and environmental advocacy groups on the steering committee of the VSMP, currently active in the metro area. The VSMP acts as a resource center to support local monitoring programs with elements of training, protocol development, data management, reporting, equipment and supplies. MPCA staff have provided significant support to this organization via assisting with training sessions for local coordinators, identifying aquatic insects to verify and support school-based volunteer efforts, and assisting in volunteer monitoring protocol development.
- *Healthy Lakes Program.* This Central Minnesota Initiative Foundation program receives MPCA Brainerd staff assistance with the evolving monitoring component. In a different county each year, the program accepts applications from lake association volunteers, who then participate in a continuum of development from leadership training to lake management planning.

In addition to assisting volunteer groups, the MPCA is frequently contacted by individual citizens interested in volunteer monitoring. Often MPCA staff can direct the citizen to an existing monitoring effort either at the state or local level. However, occasionally the question the citizen is interested in answering requires a new monitoring initiative. When resources are available (and a local sponsor is not), the MPCA helps the individual design and implement the monitoring effort. For example, MPCA staff from the Duluth office recently helped a citizen living in the St. Louis River watershed, who was concerned about potentially high bacteria levels in the river, design and implement a short-term bacteria monitoring effort.

The above examples illustrate just a few of the many ways that the MPCA has supported the monitoring efforts of citizens and local groups. As indicated by the new CLMP-Plus pilot, the MPCA is continually looking for opportunities to expand its support of citizen monitoring efforts. This is due to the MPCA's commitment to supporting volunteers, and to the importance of citizen-collected data to the MPCA's and others' analyses and assessments of the quality of Minnesota's water resources.

Integrating Citizen Monitoring Data into Water Quality Assessments and Agency Programs

The MPCA is committed to the use of citizen-collected data whenever the data meet applicable quality assurance and quality control protocols. Agency staff makes use of citizen-collected data in a number of ways, depending on the quality and extent of the data and the purpose for which it was collected. These range from trend analysis, to comparisons across regions of the state, to determination of use-support and policy development. Citizen monitoring data is also an important tool the MPCA uses to help determine where to direct its limited monitoring resources.

Data from volunteer and other monitoring efforts that meet quality assurance protocols and are submitted to the MPCA in the necessary format are entered into the agency's water quality database, which is part of a nation-wide water quality database overseen by the U.S. Environmental Protection Agency. These data are then accessible to (and used by) MPCA staff for use-support assessments, as a component of impairment determinations, trend analysis, and other applications. The MPCA routinely receives requests from local governments, consultants, other state agencies, etc. for retrieval of data from the database. When a data request is received by the MPCA, the citizen-collected data are included when the request is filled.

The MPCA has recognized the critical importance of citizen monitoring in its three-pronged assessment strategy identified in the 2003 Legislative report on the Impaired Waters Program. The MPCA's overall strategy for increasing the number of lakes and stream miles that have been assessed relies on a combination of MPCA-conducted monitoring, remote sensing technologies, and volunteer monitoring. Each of these three components is critical to building sufficient understanding of Minnesota's surface water resources.

The MPCA component of this monitoring strategy is focused on the MPCA visiting each monitoring site at least once every 10 years and collecting enough samples during the year to meet the federal requirement of "current" data necessary for assessments. This more intensive monitoring would be supplemented with remote sensing overviews (satellite imagery that is used to identify water clarity) every five years, which would allow the MPCA to determine if some lake or stream characteristics have changed significantly since the last detailed assessment. Finally, a critically important component of this monitoring strategy is to strive for annual volunteer monitoring at each monitoring site. The volunteer monitoring would fill in gaps in the monitoring frequency and alert the community and the MPCA of any changes that occur between assessments, while the MPCA's detailed monitoring would help to validate and support the volunteer monitoring effort. Even relatively simple volunteer efforts such as transparency tube measurements would provide a valuable indication of any year-to-year changes at the site.

The following paragraphs provide more specific examples of how the MPCA uses citizen monitoring data from the various monitoring efforts underway in Minnesota. Recent efforts by the MPCA to expand the inclusion of volunteer data in the water quality database are also discussed.

Data Collected through MPCA Programs and Projects

One example of how the MPCA uses citizen data comes from the CLMP. Transparency data from the program are used to supplement the MPCA's own lake monitoring efforts in determining the trophic (or nutrient enrichment) status of lakes. These data are used to track trends over time, to determine whether a particular lake meets its designated uses (such as support of aquatic life), and to compare lakes across regions of the state. In many cases, transparency readings collected by CLMP volunteers are the only data available for a lake.

CSMP data are also used by the agency on a regular basis. While not currently part of the MPCA use-support assessment protocols, the data is used to indicate where problems may be occurring, and therefore is an important tool for targeting the agency's (and other groups') limited monitoring resources. For example, the Chippewa River Watershed Project in the Minnesota River Basin is using data collected through their volunteer stream-monitoring network to identify problem areas

in the watershed. Transparency readings taken from upstream to downstream in many smaller sub-watersheds pointed to key problem areas across the larger watershed. This information is being used to focus further monitoring efforts and begin implementing management practices on the land. In the future, it is expected that CSMP data will be used for use-support assessments, as well. As with lakes, in many instances data collected by volunteers are the only water-quality information available for streams and rivers.

Another example of MPCA use of citizen-collected data is found in the agency's Lake Assessment work. Here MPCA staff team up with citizens from a lake association or other organization to investigate the condition of a particular lake. A prerequisite is that the lake has a significant record of citizen monitoring through the CLMP or other effort. The citizen monitoring data is used to supplement and help interpret the data the MPCA collects during an intensive summer-long study.

Citizen data is not only used to identify and track problems. It is also used to help solve problems and protect water resources. An example of this is the Clean Water Partnership (CWP) Program, in which the MPCA provides financial and technical assistance to local units of government for watershed investigation and restoration or protection work. To stretch financial resources and engage the local community, local CWP project managers often enlist the help of citizen volunteers. The data generated by the citizens becomes a critical component of the overall project effort, both in identifying specific problems to address and determining if the solutions that are implemented fix the problem or threat.

Data from Other (Non-MPCA) Programs and Projects

In addition to making use of the data generated through MPCA-coordinated volunteer monitoring projects, the agency regularly uses data collected via the volunteer efforts coordinated by other state agencies, local government, schools and citizen groups. For example, the Metropolitan Council supports a network of volunteers on 127 lakes in the seven-county metropolitan area through their Citizen-Assisted Lake Monitoring Program (CAMP). Data collected by CAMP volunteers meet established quality assurance and quality control protocols, and are currently being entered into the MPCA's water-quality database and used for use-support assessments and impairment determinations.

Efforts to Expand the Use of Citizen Data

While the MPCA does make use of citizen data, there are opportunities for improving both the awareness of existing efforts and the use of the data generated. Toward that end, the MPCA recently issued a statewide "Call for Data" in the hopes of identifying data from local government, educational institutions and citizen monitoring efforts that it was previously unaware of. The intent is to identify sources of data, prioritize those sources, and then devote resources (either MPCA staff time or contracted services) towards assisting the organizations in providing the data in a format that will allow its inclusion into the state's water quality database.

The MPCA has also made progress clarifying the quality assurance and quality control protocols associated with particular uses of volunteer monitoring data. In April 2002, the MPCA completed a guidance document identifying the data requirements for determining use-support assessments and waterbody impairments (see *Guidance Manual for Assessing the Quality of Minnesota*

Surface Waters: For the Determination of Impairment, MPCA, April 2002). This guidance manual identifies the data requirements for use-support and impairment determinations, which applies to whatever data sources the MPCA uses, including citizen data.

In addition, the MPCA is in the process of collaboratively developing a volunteer monitoring guidance manual to help volunteers to: identify the purpose(s) for which monitoring will be conducted, select appropriate tests/protocols based on the purpose, and determine how to store and use the data they generate. More about the guidance manual can be found in the following section on funding efforts.

Other Uses of Citizen Data

It is important to point out that the MPCA is not the only entity that uses citizen data. The data citizens generate provide invaluable information to other state agencies, as well. Local governments also rely on citizen data to identify potential problems, help target limited resources, and help make resource management decisions. Scientists at the University of Minnesota and other educational institutions also make use of long-term citizen monitoring data, such as Secchi disk transparency, in their research efforts. Other groups, such as lake associations, use the data to track the health of a particular waterbody and develop water resource management plans.

Finally, and perhaps most importantly, the activities of citizen monitors help to raise overall community awareness about the health of (and threats to) water resources. Through monitoring activities, individuals gain a better understanding and appreciation for the workings of the ecological system. This awareness helps them understand how their (and their community's) actions impact the environment, and what steps can be taken to minimize those impacts. This understanding, which can be shared with others in the community, in turn helps citizens participate in and influence resource management decisions made at the local and state level. In this way, the activity of citizen monitoring – and the greater understanding it creates – can be just as important as the data that is generated.

Funding Efforts

The 2002 citizen monitoring legislation directed the MPCA to seek private and public funds to develop and distribute a monitoring guidance, improve agency water quality monitoring, and continue to improve web and electronic access to data and information. Several ongoing and new efforts have allowed the MPCA to make considerable progress towards these goals, as discussed below.

Water Quality Monitoring Guidance

The dialogue that occurred around volunteer monitoring during the 2002 Legislative Session clearly illustrated the need for a monitoring guidance manual. The citizen monitoring legislation reflected this need by directing the MPCA to encourage citizen monitoring in part by seeking funds to collaboratively develop clear guidelines for water quality monitoring procedures and data management practices.

The MPCA initially included the manual development as part of a proposal to the Legislative Commission on Minnesota Resources (LCMR) in the spring of 2002. However, the MPCA also recognized the urgency of the need and was able to accelerate the manual development by securing EPA approval to use some federal funding for the manual development. Following this approval, the MPCA began the manual development process in late summer 2002.

The development of a first iteration of the guidance manual will take place over the next year, with a targeted completion date of spring 2003 to allow for production and distribution of the manual by June 30, 2003. The manual will be developed through a collaborative effort of a variety of stakeholders, including the MPCA, volunteer monitoring groups, business interests (including agriculture), sister agencies, and environmental advocacy groups. The intent of this new manual is to help volunteers to: identify the purpose(s) for which monitoring will be conducted, select appropriate tests/protocols based on the purpose, and determine how to store and use the data they generate. Ultimately, this will help ensure that volunteer monitoring data is useable for the intended purpose and that volunteers are supported in their critically important efforts.

The MPCA has contracted with a facilitation and technical writing team (Diane Lynch of Lynch Associates, Betty McMahon of Z Communications and Paul Nelson of Sustainable Watershed Strategies) to design and facilitate a stakeholder process for developing the manual. Staff at the MPCA and other monitoring groups will provide technical input to the manual development. Meetings will also be convened with interested stakeholders, who will provide input into the content of the manual, review draft products, and ensure that the final manual is acceptable to a variety of interests and meets the needs of volunteers. The MPCA will host an initial meeting in December 2002 to convene the stakeholder process. Following that initial meeting, a series of meetings will be held with stakeholders to create the guidance, and the guidance manual will be drafted. The overall goal is to develop a manual that is accepted and recognized by a diversity of stakeholders. The final format of the guidance manual could include both written and on-line or CD/ROM documentation, depending on the available budget at that point.

Distribution of Guidance

One component of the monitoring guidance development is a determination of the preferred formats for delivery of the information. The MPCA, with stakeholder input and assistance from the technical writing contractor, will explore various formats for the completed manual, including printed, on-line or CD/ROM documentation. The completed manual will be distributed to citizens, local governments and other interested parties. The MPCA has secured permission to use federal funds for the production of the manual, following manual completion in the spring of 2003.

In addition to distributing the manual, the MPCA will provide it to the Rivers Council of Minnesota and the Minnesota Lakes Association for their use in training volunteer monitors, which is a component of the surface water monitoring project recommended for funding by the 2002 LCMR. In fact, one of the motivating factors for securing non-LCMR funding to develop the manual was to allow for the completion of the manual prior to the release of LCMR funds on July 1, 2003, to ensure that the manual is available to assist in the training effort.

Improving and Accelerating MPCA Water Quality Monitoring Activities

The MPCA has recently undertaken or proposed several initiatives designed to improve and expand water quality monitoring activities. Each of these is discussed separately below.

2002 LCMR Proposal

In March 2002 the MPCA submitted the proposal "Accelerating and Enhancing Water Quality Monitoring – Rivers and Streams" for LCMR funding. The desired outcome of the proposal was to significantly increase the data available about Minnesota's surface water and provide much-needed information for individual, local and statewide decision-making and resource management. The MPCA proposed to accomplish this by devoting $3.9 million over the 2003-2004 biennium towards additional lake and stream monitoring.

Through the acceleration of existing efforts and the use of emerging technologies, this initiative would have:

- Allowed the MPCA to complete the development of indices of biological integrity (IBIs), which are critical to the assessment of stream biological health, by 2005.
- Filled significant gaps in stream flow measurements by establishing or enhancing flow stations in all of the state's major watersheds.
- Significantly increased the MPCA's ability to conduct cost-effective initial assessments of thousands of Minnesota streams and further target monitoring activities, through the use of satellite remote-sensing technologies.
- Allowed the MPCA to complete statewide initial lake assessments through remote sensing, and complete detailed lake assessment on an additional 100 lakes each year.

The Minnesota Environmental Partnership, a consortium of several environmental organizations including the Rivers Council of Minnesota (RCM) and the Minnesota Lakes Association (MLA), submitted a companion proposal to the LCMR, which the MPCA collaborated on. That proposal focused an effort to coordinate, equip and train citizens and non-government organizations for water monitoring, at a cost of $2 million for the 2003-2004 biennium. The Minnesota Lakes Association also submitted a separate proposal to expand its Healthy Lakes and Rivers initiative statewide.

During the LCMR evaluation and hearing process, the three proposals were combined, and the funding reduced to $1 million per biennium shared between the MPCA, the RCM and the MLA. The MPCA was directed to act as overall project manager. Following the LCMR decision the MPCA, RCM and MLA met to determine how to revise their proposals based on the reduced funding. Of the $1 million, the MPCA will receive $595,000. Due to the reduction in funding, the MPCA altered its expected outcomes for the project as follows:

- Moved back the completion date for the IBIs from 2005 to 2007.
- Deleted the stream flow and concentration monitoring element.
- Removed the additional 100 detailed lake assessments each year.

2002 Internal Monitoring Evaluation

From fall 2001 through June 2002, the MPCA also conducted a detailed evaluation of its monitoring activities. This evaluation identified several recommendations that could improve the effectiveness of the MPCA's monitoring efforts. Some of these recommendations would require

additional funding to implement, but several do not require resources other than the staff time necessary to put the idea into practice. Since June 2002, the MPCA has been actively considering and implementing many of the recommendations. The continued implementation of the recommendations will improve the operation of the MPCA's monitoring activities, ultimately leading to increased monitoring of Minnesota's resources.

Improving Electronic and Web Access to Water Quality Data and Assessments

A critical component of assisting volunteer monitors in their work, and ultimately protecting Minnesota's water resources, involves providing access to existing water quality data and assessments. In order for Minnesotans to play an active role in protecting and improving their environment, monitoring data must be easily and readily accessible. Although the MPCA and other organizations collect large quantities of environmental data, historically much of it has been difficult to access.

In 2001 the Minnesota Legislature authorized the MPCA's Environmental Data Access Initiative to address those deficiencies in the availability of surface water quality data from MPCA and others. It also specified that more environmental monitoring take place in the Upper Mississippi River Basin, home to the headwaters of the Mississippi River.

The goal of the Environmental Data Access project is to create an interactive, web-based system for retrieving environmental data and assessments. The databases that support the system will be compatible with Geographic Information Systems (GIS) so that monitoring data can be displayed geographically. It is critical that this system be easy to use so that those accessing it can readily find, view and retrieve environmental data and information. The MPCA anticipates having a first-iteration of the web-based system accessible on its web site by June 30, 2003.

The system will include station information and associated data for lake and stream monitoring stations (including data collected by the MPCA, other state and local agencies, and volunteers as that data is made available and loaded into the system), USGS flow stations, and permitted facility discharges. It will also include information about the use-support (or assessment) status of all lakes and streams that have been assessed to date by the MPCA. The system is being constructed with future expansion in mind. Eventually it will include all types of environmental data for the entire state.

Summary

As indicated above, a number of efforts are underway to provide further support for the critically important efforts of citizen monitors. The MPCA has also recognized this importance of volunteer monitoring as one of three components of its impaired waters assessment strategy, which relies on a combination of MPCA-conducted monitoring, remote sensing technologies, and volunteer monitoring. The MPCA expects that further advances will be made in the support of citizen monitoring efforts and the use of citizen-generated data as projects such as those described above, and those initiated by other organizations, are implemented and completed.