Appendix H:

Examples of local data use

One question that volunteers often ask is how to get local government and other groups to use the data they have generated. Often the stumbling block for use of volunteer monitoring data – or any monitoring data – is the comfort level the data user has with the quality of the data. Section 3 of the Guide includes some considerations for working through data quality questions with your primary data user. In addition, the following examples illustrate how three Minnesota groups worked through data quality issues to facilitate local use of their data.

As you read these examples, keep in mind that there is no one magic formula you can employ to ensure that your data will be used for local decision-making. However, by clearly identifying your monitoring purpose, talking through data quality questions with your primary data users and sharing examples from other parts of the state, you will be well on your way to ensuring yourself and your data users that the data you generate will be useable for the intended purpose.

Morrison County water monitoring built on trust

When Morrison County completed its water plan and began a monitoring program, there was little discussion about data quality. This was because a member of the water planning committee who had experience and was trusted was implementing the monitoring program. Even though there was not much discussion, there is a strong emphasis on data quality and making sure the data users understand the intended purpose of the data. This emphasis on data quality is very important, since trust in the individual doing the work is based on relationships, while continued credibility of the data is a function of the quality control efforts. Through these efforts, trust in the people involved and the data quality is continually reinforced.

Efforts to assure data quality and reinforce trust involved two elements:

1) Using basic quality assurance /quality control (QA/QC) procedures
2) Reporting

Basic QA/QC procedures varied by project but generally included:

1) Split samples analyzed major parameters for comparison with backup laboratories (i.e., certified or university laboratories) at a 5 to 10% frequency
2) Split samples with other neighboring community programs
3) Spiked samples
4) Analysis of known standards
5) Field blanks
6) Duplicate samples

The last two are generally completed on >10% of samples for nitrogen and phosphorus.

Reporting included efforts to define the monitoring purpose, present quality control methods and the sample collection and analytical methods. Reports include a page on the quality control methods used, and a page describing how each parameter was analyzed. In this manner, data users have information they need to make informed decisions about whether the data meets their data quality needs.

Source: Wayne Pikal, Aqua Tech

Big Birch Lake: highlighting public/ private partnerships

The Big Birch Lake project is an example of homeowner initiative and commitment, coupled with extensive benefits received from leveraging public and private partnerships.

Big Birch Lake is located in west central Minnesota. Approximately half of the lake is in Todd County and half in Stearns County. It is made up of two large basins with a

watershed of approximately 9600 acres. It has experienced decreasing water clarity and increased areas of submerged aquatic vegetation since the early 1970s. In response to these problems, in 1985 the Big Birch Lake Association (BBLA), an organization of Big Birch Lake shoreland property owners, began participating in the CLMP (Citizens Lake Monitoring Program).

As part of this program, the CLMP participants were required to take weekly transparency measurement readings and record their perceptions of the physical appearance and recreational suitability of Birch Lake during the summer months. The BBLA monitored three sites in the Upper Basin and four in the Lower Basin. Secchi disk readings indicated a decline in water clarity from 1989-91, so the BBLA petitioned the Sauk River Watershed District (SRWD) for funding to complete an independent diagnostic/feasibility study of the lake. A Phase I Diagnostic Study was initiated in 1993.

Phase I

The purpose of the Phase I Diagnostic Study was:

- to monitor lake conditions during 1993
- to assess the hydrologic and nutrient budgets for the lake
- to identify problems within the lake and watershed contributing to the degradation of the lake
- to identify feasible management options to improve or protect the current lake conditions

Water quality samples were collected from three in-lake sampling locations around Big Birch Lake during summer 1993. A survey was taken of aquatic plants in the lake. The study included flow monitoring of four tributary streams that included water quality analysis, a survey of septic systems around the lake and an assessment of the current land use in the watershed. Barr Engineering, who did the sampling, sampled monthly during the open water season, testing for: total phosphorus, ortho phosphorus, chlorophyll-*a*, pH, temperature, total Kjeldahl nitrogen, nitrates, nitrites and total suspended solids. Barr developed a Quality Assurance Project Plan (QAPP) and provided strong quality control and analysis.

The study, completed in 1994, documented that Big Birch Lake experienced declining transparency. It was determined that the high phosphorus loading from Fish Creek tributary resulted from land use in the watershed, primarily agricultural activities located between Goose Lake and Big Birch Lake. Fish Creek had the highest pollutant discharge and the poorest water quality of inflows to Big Birch Lake. It was also determined that 45% of the nutrients to Fish Creek were coming from a few feedlots.

Phase II

The Sauk River Watershed District then applied for a Phase II Clean Water Partnership grant that was awarded with limited grant money but a large low-interest loan component. As part of Phase II, more than 10 cooperating federal, state and local units of government, citizen organizations and individuals sought to maintain and improve (if possible) water quality by reducing the impacts of non-point source pollution.

To accomplish this, each month the Sauk River Watershed District monitored two sites in the Upper Basin and one site in the Lower Basin and took the samples to a certified lab. For the first two years, a six foot profile and bottom samples were taken. The next year, a hyrdoprobe with a complete profile was completed. For the Phase II project, samples were tested for: chlorophyll-*a,* total phosphorus, ortho phosphorus, total suspended solids, chloride, nitrates, nitrites, total Kjehdahl nitrogen, ammonia, dissolved oxygen, pH and transparency. A QAPP was created.

Data was written in a waterproof field book with indelible ink and the date, temperature and depth of where the sample was taken was included. Samples were sent to a certified lab. The MPCA supplied the total phosphorus standards that were sent to the lab for quality assurance/quality control (QA/QC). Blind samples were sent into the MPCA and periodically, double blinds were included. The monitoring complied with the MPCA's monitoring requirements for 305(b) and 303(d) Assessments.

Phase II Implementation

In order to maintain and improve water quality (the goal of Phase II), strong action was taken to minimize pollution from feedlots and septic systems and minimize shoreline erosion.

A full subwatershed feedlot evaluation was completed in 1994 that included 18 feedlot sites. Four sites were identified as the largest contributors to phosphorus loading to the lake. The SRWD offered the feedlot owners matching

funds that resulted in the owners' action to mitigate the runoff from the feedlots. The study also determined that septic systems contributed approximately 10% of the total phosphorus load and funds were provided that ultimately resulted in 98% environmentally compliant septic systems.

In order to enhance water clarity, the Big Birch Lake Association and the Sauk River Watershed District wanted to install vegetative buffer strips along ditches and along Fish Creek. When CRP funds proved too restrictive for the landowners, the BBLA created an innovative program that resulted in buffering 13.94 acres along the lower reaches of Fish Creek.

Ongoing

The BBLA provided funding to the SRWD for monthly lake sampling and tributary sampling for low flows and rain after the Phase II funds were depleted. The SRWD was awarded a second Phase II (EPA 319) grant in 2001 to continue the monitoring program and to address land use practices in the Bass Creek sub-watershed and shoreland BMPs. There are about 11-15 samples taken per year and results are sent to the MPCA.

Source: Sauk River Watershed District

Red River Basin River Watch: focusing on data quality

The Red River Basin River Watch program is another example of the use and acceptance of volunteer monitoring data. With the support of a Minnesota Board of Water and Soil Resources Challenge Grant, the Red River Basin River Watch (RRBRW) program began in 1995 with the participation of four schools on the Sand Hill River. The program has grown to involve more than 30 schools monitoring 148 sites on 53 rivers, streams, creeks and major drainage ditches throughout northwest Minnesota.

Program began with need for baseline data

The genesis of the RRBRW program is a great example of "need meeting opportunity". In the early 1990s, the Sand Hill Watershed District (SHWD) tried unsuccessfully to undertake a major water project in the watershed. According to Wayne Goeken, River Watch coordinator, a key stumbling block was a lack of baseline data to support the application for necessary permits. This experience alerted the SHWD managers of the importance of baseline monitoring data.

At the time of the unsuccessful water project, Wayne was working as the SHWD's part-time secretary. He heard about the efforts of the Mississippi River Headwaters and saw an opportunity to gather baseline data and raise residents' awareness of water quality issues. The Mississippi River Headwaters Board staff helped him sort through the monitoring purpose and goals, and they also provided initial training. Support from the SHWD managers (who saw the program as a means of obtaining the baseline data they needed for future projects) and the BWSR Challenge Grant provided the other elements needed to create the Red River Basin River Watch program.

The program was developed with two specific goals in mind:

1. To develop a baseline of data using standard scientific methods to generate reliable, quality data that is comparable between sampling organizations and rivers
2. To provide students and citizens with hands-on opportunities that will foster a greater awareness and understanding of their local watersheds and the Red River Basin in general

Considerable thought went into developing the program so it would allow its goals to be met, forethought that was extended into program implementation. As the effort is extended to additional watersheds in the Red River Basin, specific monitoring goals are set. Most often these involve providing baseline data and education/awareness opportunities for the youth of the watershed. Ongoing input is also sought from local resource professionals to help design individual sampling efforts and ensure data quality.

The program

Monitoring sites are selected in consultation with local watershed district and soil and water conservation district managers to represent different reaches of rivers and tributaries. Schools conduct monthly monitoring of three to seven sites, generally from April or May through October or November. Students take a variety of field measurements (including air and water temperature, conductivity, dissolved oxygen, pH, turbidity, river depth and width) and record general observations of vegetation and other conditions in the watershed that could influence water quality. During these monthly

sample runs, water samples are also collected and sent to a certified lab for analysis of total phosphorus, nitrate+nitrite nitrogen and total suspended solids.

Focus on data quality

Assuring data quality is an important part of this effort, as the program receives considerable funding from local watershed districts that want to use the data to understand local conditions and guide their management efforts. According to Goeken, the goal of meeting watershed district data needs is one reason why the River Watch program places a strong emphasis on data quality and the collection of scientifically sound data. This commitment was reflected in the development of a Quality Assurance Project Plan (QAPP) for this effort and its approval by the USEPA Ongoing attention is also paid to ensuring data quality. All participants are trained in proper methods and a strong emphasis is placed on the hands-on participation of professionals along with the student monitors.

Historically, students collected water samples and performed the chemical analyses in the classroom. More recently, the program has moved towards the use of field meters and contract laboratories certified by the Minnesota Department of Health. This shift from student analysis to the use of certified labs was made because of the efficiencies this allows and to improve decision-makers confidence in the data and encourage its use in water quality management efforts.

Data is managed through a combination of centralized coordination and individual school efforts. The Red River Watershed Management Board maintains a master data set of all the results, which are entered into an Excel spreadsheet and returned to the participating schools for review and analysis. This allows the Board to ensure proper entry and also make adjustments necessary for more thorough statistical analysis. The data are also submitted to the MPCA for inclusion in the statewide Water Quality Database. Future plans involve creating an Access database and posting the data on two Red River Basin web sites to allow for wider access. The web sites will include interactive maps of the sampling sites, background information, monitoring data and a report card on site conditions. Some schools also maintain their own web pages that include their data along with photos of the sites and their sampling teams in action.

Local data use

Watershed district officials accept the data because they are aware of the effort that went into assuring sound science and they have confidence that the written Standard Operating Procedures, quality assurance documents and training materials developed for this program are being followed. They have also received assurances from state agencies (such as the MPCA) that the methods being followed represent sound scientific practices and are usable for watershed management decisions. As more samples are analyzed, the resulting data provide a basis of comparison for students and local resource managers, a means of beginning to assess the health of their rivers and contributing watersheds. For example, River Watch monitoring results help provide baseline information useful in assessing flood damage reduction projects being advanced in the region.

As the program evolves and builds on its premise of "sound science and citizen involvement," partnerships are strengthening at the local level. As results of initial baseline watershed monitoring are analyzed, more directed research partnerships are emerging between local resource managers and school districts to better understand specific local conditions. On a much broader scale, efforts are underway to raise awareness of how local conditions are connected to the health of the Red River Basin in total as monitoring and education linkages are being made with North Dakota and Manitoba schools and resource managers.

Source: Wayne Goeken, Red River Basin River Watch