Defining Your Questions: Why, What and Who

This section will show you how to:

♦ Define the question your monitoring program will answer.

♦ Identify your monitoring purpose.

♦ Identify who your primary data users will be.

♦ "Reality check" from the start.

A successful monitoring effort requires detailed consideration of the why, what, who, where, when and how of your monitoring. In this Section, you will be answering the "why," "what" and "who" questions. In *Section 5* you will address the "where," "when" and "how" questions. It is critical to thoroughly answer in detail many aspects of these questions to assure that your program is on track and proceeding toward answering the initial question that spurred your monitoring program.

Why are you monitoring?

You may have an idea of why you want to monitor. Perhaps you want to discover:

♦ What lives in a wetland near you.

♦ Whether your stream or lake meets Vermont Water Quality Standards for uses such as fishing, swimming, drinking, aesthetics.

♦ Whether water quality is diminishing or improving.

♦ If swimming in your lake is a health risk.

♦ The impact land use activities are having on the ecological conditions of a lake or river.

♦ If the various strategies to protect and restore ecological integrity and human uses have been effective.

Questions to Answer to Design Your Program

WHY
The "why" of your monitoring program involves a question you have about a certain river, stream, lake or wetland that cannot or has not been answered by any other groups' information or studies.

WHAT
"What" you do with the monitoring results gives your monitoring effort its purpose, because it addresses the use of your results.

WHO
"Who" is going to use the data you generate? To make sure your purpose for monitoring is met, consult in advance with those who will receive the results of your monitoring.

WHERE
"Where" you monitor may seem quite basic (i.e., Lake Eden, or the Winooski River), but will require some careful consideration (choosing one specific location, or a few representative locations). The details of this question will be explored in *Section 5*.
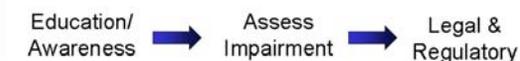
WHEN
Most surface water monitoring will be done from roughly early May through October. You will set specific dates for your program in *Section 5*.

HOW
Specific methods for "how" you monitor may require detailed methodologies depending on the parameters chosen and your data user(s) requirements. You will identify your methods in *Section 5*.

The Continuum of Volunteer Monitoring Data Use

Education/Awareness → Assess Impairment → Legal & Regulatory

Increasing Time - Rigor - Data Quality - Expense $$

Graphic used with permission from River Network

Upper Otter Creek Watershed Council Uses Monitoring to Launch an Education and Outreach Program

The Upper Otter Creek Watershed Council (UOCWC) monitors water quality on numerous tributaries to the Otter Creek. Since 2004, they have received analytical services for their samples through the VTDEC's LaRosa Lab Analytical Services Partnership. Their samples were analyzed for total phosphorus, total nitrogen, turbidity, total suspended solids, *E. coli*, and temperature and the results were compared to Vermont Water Quality Standards.

One of the questions they hoped their monitoring would answer was whether or not the waters were suitable for contact recreation (i.e., swimming). Their results indicated that some areas exhibited poor water quality, occasionally exceeding state and federal standards for contact recreation. Consequently, the Upper Otter Creek Education and Outreach Program was initiated to target urban residents regarding Best Management Practices (BMPs) that landowners might implement to improve the buffering capacity and reduce nonpoint source pollution from their properties.

Another success of their monitoring was volunteers' discovering large beds of Eurasian watermilfoil (*Myriophyllum spicatum*), a non-native aquatic invasive plant, in the main stem of the Otter Creek as well as the Clarendon River.

The UOCWC plans to expand their monitoring program by partnering with Smokey House Center, a nonprofit organization that offers both a Youth Work Program for 14-18 year-olds and an Environmental Field Studies Program for middle and high school students. Through this partnership they will be able to include more monitoring sites and additional tributaries. They will continue to work with residents through their Education and Outreach Program to increase stewardship in the Otter Creek Basin.

♦ For more information on the Upper Otter Creek Watershed Council's water quality monitoring and other activities, visit **www.vacd.org/rutland/uocwc.html**.

What is your purpose?

Think about what you would like to see happen as a result of your monitoring (site cleanup, watershed protection, education). Your "why" question (previously answered) should address a problem or concern, or explore a curiosity. Keeping that question in mind, try to make your monitoring project part of the bigger scientific picture by formulating your plans into a purpose ("what" the data will be used for). Simply stated, the purpose is *how the data user will use the information you collect*. Your purpose may fall into one or more of the following categories:

♦ To promote community education and awareness.

♦ To provide waterbody characterization and assessment (baseline water quality data, changes/trends over time).

♦ To identify actual or potential sources of pollution (point or nonpoint pollution sources).

♦ To gather information to be used for design of pollution prevention and remediation programs.

♦ To evaluate the effectiveness of management decisions and actions.

For example, if you want to find out what lives in a wetland near you, your purpose could be to "promote awareness." If you want to find out if eutrophication is being accelerated in a lake, your purpose may be "to provide data that can be used to characterize and assess" the lake.

Point and Nonpoint Sources of Pollution

Point sources are those that have a known discharge point, such as a pipe, urban stormwater discharge or industrial or municipal wastewater treatment plant that discharges directly into a stream or lake.

Nonpoint source pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, eventually depositing them into lakes, rivers, wetlands and even underground sources of drinking water. These pollutants include excess fertilizers, herbicides and insecticides, oil, grease, sediment from improperly managed construction sites, crop and forest lands and eroding stream banks, salt from roadways, and bacteria and nutrients from livestock and inadequate household waste disposal systems.

Decide why you are going to monitor and what your purpose is. Clearly document them on the *Monitoring Design Worksheet* (pages 5-8) so you can revisit them later on to see if you accomplished what you set out to do.

Who will use the data?

Whatever monitoring project you select, you will be generating some kind of data. That data can range from macroinvertebrates counts in a stream to measurements of chemical concentrations.

To make sure data will be useable for its intended purpose, identify in advance who will use the data you collect and meet with them to discuss your purpose and methods. Potential data users could be:

◆ Monitoring program participants.

◆ Students and teachers.

◆ Watershed and community residents.

◆ Local decision-makers (towns and Regional Planning Commissions).

◆ Landowners and lakeshore residents.

◆ Natural Resource Conservation Districts.

◆ Lake and watershed groups.

◆ Regional, state and federal agencies.

◆ Nonprofit organizations.

Never assume a state agency or other organization will use your data just because you have collected it. It is usually best, especially when monitoring programs are starting out, to collect data for the purpose of meeting your own needs and uses.

Programs have varying data quality requirements

Data quality and rigor that will ensure credibility can vary with the use and the user. You may set up a volunteer monitoring program primarily to educate participants regarding the values of local surface waters. If your primary purpose is education and constituency building, you may

adopt simple, easy-to-use assessment methods and may not need to develop strict quality assurance protocols. If you want the data to be used for research, decision-making, or regulatory programs, your sampling techniques and analyses that produce the data will have to meet strict protocols set by those who will ultimately use the data. This generally requires following a Quality Assurance Project Plan (QAPP). Data quality needs will be specifically addressed in detail in *Section 4*.

A variety of monitoring programs can help build bridges among various governmental agencies, businesses and organizations and create a constituency to protect local waters that promotes personal and community stewardship and cooperation. You might find that interest in and understanding of monitoring and the resources being monitored increases over time, as well as volunteers' scientific study skills.

Learn what it takes to be credible

If you are collecting data to be used by the VTDEC or another regulatory agency, you will

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Using Your Own Data

Volunteers with the Huntington Conservation Commission monitor *E. coli* levels at multiple sites along the Huntington River. They use their results to inform the public when unsafe levels are detected through local postings, email alerts and their own web site.

Their program has been successful in identifying localized areas with high bacteria levels and generating much interest in river water quality. With the results of their monitoring, they were able to identify the need for regulatory stream buffer protection and building/wastewater system setbacks along the Huntington River and brought the issue to Town Meeting.

◆ For more information on the Huntington Conservation Commission and their water quality monitoring program, visit **www.gmavt.net/~aaronw/e-coli/2004_home.htm**.

Photo submitted by the Huntington Conservation Commission

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want to contact them to determine what information they need and if they have predetermined sampling protocols. For example, if you want your data to be used by the Water Quality Division for assessments, you will need to find out what waterbodies they need information on and follow protocols outlined in the *Vermont Surface Water Assessment Methodology*. See *Appendix F* for a list of VTDEC uses of volunteer monitoring data.

⬥ The *Vermont Surface Water Assessment Methodology* is available online at **www.anr.state.vt.us/dec/waterq/planning/ docs/pl_assessmethod.pdf**.

⬥ For more information on the use of volunteer monitoring data for VTDEC assessments, contact the Water Quality Division Planning Section at (802) 241-3770.

VTDEC monitoring programs are also required to develop and follow a Quality Assurance Project Plan (QAPP). A QAPP is a written document that outlines the procedures a monitoring program will use to ensure that the samples volunteers collect and analyze, the data they store and manage, and the reports they write are of high enough quality to meet the desired uses. A QAPP is required for all U.S. EPA funded monitoring programs and state funded programs. The QAPP provides a tool for engaging the data users and defining credible protocols at the beginning of the project. See *Section 4* for more information on developing a QAPP.

Reality check from the start

Incorporating tasks into your monitoring program at the beginning will give you short-term motivation and maintain the long-term vision of your program. Succeeding at small tasks will create confidence in your team, prevent problems and help ensure that the original question asked is on track to be answered. Examples of tasks to accomplish before monitoring starts:

⬥ Recruit and train volunteers.

⬥ Decide how your group will communicate with each other (i.e., email list, phone calls).

⬥ Establish a group meeting schedule/place.

⬥ Decide on the preferred length of the monitoring effort, May-Sept., or June-August, etc.

⬥ Designate a group to write the QAPP, if needed.

At this stage, you have to ask yourself and your group if the amount of volunteer time and resources available can meet your monitoring responsibilities. If you realize that your question is too broad and complex for your volunteer group to answer, now is the time to revise it and rethink the "why", "what", and "who" parts of your monitoring plan.

Now that you have finished reading *Section 2*, return to the Worksheet on pages 5-8 to answer the corresponding questions.

Funding

By doing a little bit of research, you may find numerous opportunities to obtain funding for your volunteer monitoring program or assistance with sample analysis. Some past and ongoing providers of grants and other sources of funding include:

⬥ Local town and health offices.

⬥ Regional Planning Commissions.

⬥ Local hospitals or schools.

⬥ VTDEC grants related to Clean & Clear Action Plan. **www.vermont.gov/cleanandclear/grants.htm**

⬥ VTDEC Water Quality Division. **www.vtwaterquality.org/grants.htm**

⬥ Lake Champlain Basin Program. **www.lcbp.org/grants.htm**

⬥ U.S. EPA. **www.epa.gov/water/funding.html**

⬥ The River Network's *Directory of Funding Sources for Grassroots River and Watershed Conservation Groups in New England and New York, 1999-2000.* **http://rivernetwork.org/emplibrary/libfun_nedirect. pdf**