Evaluating Your Volunteer Water Quality Monitoring Program

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Introduction

This publication briefly explains why you should evaluate your volunteer monitoring program. It provides examples of what to evaluate, and discusses five essential steps for doing evaluation by means of a case study. Additionally, resources noted throughout the document and at the end provide considerably more information about conducting a program evaluation than can be covered here.

Why Evaluate?

There are three primary purposes to evaluation:

1. To **inform** you about the state and effectiveness of your program or initiative

2. To provide information that can be used to evolve, refine or **improve** your efforts, and

3. To collect evidence of progress toward, or achievement of, intended outcomes in order to **communicate the impact of your project**

When you evaluate, you show what you have accomplished, which is important both in terms of accountability and making the case for future funding.

For guidance on how to plan your program with your end goals in mind, see the Extension Volunteer Monitoring Network's Guide for Growing Programs module "Designing Your Monitoring Strategy" http://www. usawaterquality.org/ volunteer/pdf/GuideBook/ Designing Your Strategy IV. Pdf. It can assist you in creating an evaluation plan right from the start.

There is an old African proverb, "The person who aims at nothing will surely hit it." Evaluation offers the structure to more clearly articulate what you are 'aiming at' and whether/how closely you 'hit' your target.

What to Evaluate

There are many different aspects of a program one can evaluate. In terms of <u>program improvement</u>, here are just a few examples of types of guiding questions:

1. Is the program effectively reaching those it intends to serve?
2. What aspects of the training are most engaging? Most disengaging?
3. Is the program run in a way that is cost effective and/ or sustainable?
4. To what degree is the program successful in achieving its goals?

Evaluating Your Volunteer Monitoring Program

In terms of <u>impact</u> we tend to look at desired outcomes and the degree to which they are achieved. There are many different kinds of outcomes. Our efforts may seek to achieve learning, environmental, organizational, financial, policy or other kinds of outcomes. When trying to measure a change, it is important to know what you are starting with. Collecting baseline data is important and should be the first step! Below are some real-life examples generally contributed by the organizations named.

Outcomes Related to Learning

Evaluating changes in awareness, knowledge or understanding

Citizens who attended an *E. coli* monitoring project training in the upper Midwest increased their knowledge of bacteria and surface water monitoring as a result. Ninety-two percent of the 38 participants trained performed better on the post-test than the pre-test. (http://www.usawaterquality.org/volunteer/Outreach/TranslatingScience.pdf)

Evaluating changes in behavior, skill or capacity

Changes in behavior can be measured or described *for volunteer monitors or for others who are affected by volunteer monitoring efforts.*

Conducting Self Knowledge Tests:

A number of programs have participants self-assess their knowledge and/or test them on the content taught. To measure *change* in participant knowledge, participants complete a knowledge test prior to and following training. Alternatively, conduct only a post-test, asking participants to rate their knowledge *now* (following training) and to recall their level of knowledge prior to the training. This is called Retrospective Pre & Post-test or post-then-pre design.

"The University of Wisconsin-Extension's "Quick Tips: Using Retrospective Post-then-Pre Design" and the University of Michigan's "My Environmental Education Evaluation Resources Assistant" (MEERA) are two highly recommended resources that can help you develop effective retrospective pre and post tests. See the resources section on page 8 for links to these resources.

A survey conducted by Extension in eight Southern Region states found, "water quality monitoring volunteers reported decreased use of fertilizers and other chemicals and changes in yard irrigation (to become more environmentally friendly) more often than non-participants," (Borisova et al. 2012).

Monitoring data from the Mill Creek (MI) Volunteer Monitoring Project documented reduced water quality (using benthic macroinvertebrate monitoring) as well as increased erosion and sedimentation at sites in the creek that were dredged as compared to those that had not been dredged. These data were first presented to the local Drainage Board who postponed decisions of whether to continue planned dredging of the stream (see http://www.freshwaterfuture.org/resources/success-stories/Monitoring-Produces-Dramatic-Results.html for full details). Later the results were presented to the state Senate and resulted in the Michigan Department of Environmental Quality imposing fines on the Drainage Board if the problems were not addressed.

A next step to strengthen this evaluation would be to collect more information on the behavior change: what exactly did the Drainage Board have to do differently? How many stream miles were prevented from being dredged as a result of the efforts? That would be an example of evaluating, rather than using, the monitoring data. Assessing the data in this way would help to communicate the program's impact.

Environmental

Annie Gillespie, of the Morro Bay National Estuary Program (CA) reported that volunteers found elevated fecal bacteria in San Luisito Creek in 2006. The program worked with public health officials from San Luis Obispo County to inform streamside and other local residents of the situation and to increase monitoring in hopes of identifying possible sources. This additional monitoring revealed that cattle operations were the most likely source of contamination. Monitoring and communications between landowners, the Morro Bay Estuary Program and public officials have continued since that time. This has resulted in Best Management Practices (BMPs) being implemented to attempt to address the identified problems. Since installation of the BMPs, volunteer monitoring data indicate a statistically significant decrease in fecal coliform bacteria.

Measuring environmental impacts can be one of the most effective ways of demonstrating success. However this can be very challenging to accomplish as both pre- and post -monitoring must be done and the parameter chosen to monitor must be able to reflect changes in conditions. Site location (e.g., in the head-waters or along a 5th order stream) and watershed characteristics will affect this type of evaluation.

Policy

A simple indicator to track impacts on policies is the number of policy changes that have occurred as a result of using monitoring data, for example: Six town boards instituted policies that restrict use of phosphorus lawn fertilizers after volunteer data were presented to them that linked algal blooms in local lakes with high phosphorus levels.

Financial

Measuring financial success of a program directly by determining savings to an organization is a meaningful, effective way to evaluate a program. It can also emphasize the cost-effectiveness of volunteer monitoring. Several well established methods are widely accepted for determining this (see "Valuing Volunteer Time").

Volunteers in the River Prairie Group of the DuPage County, IL, Sierra Club have analyzed approximately 275 grab samples per year for more than 10 years. This represents a savings of at least $6,000 for the local community .

Another way to measure financial outcomes of your program is to estimate the value of your volunteers' time. To do this, survey your volunteers to determine the total number of hours they spent monitoring in a particular time period and multiply by an hourly wage typical of employees who get paid to do such work. For example: the engagement of 500 new volunteer monitors giving an average of 40 hours time in 2011 (at an average "volunteer" wage of $19.92/hour) led to savings of $398,400 for state regulatory and natural resource agencies who would have otherwise paid for monitoring activities or not been able to conduct the monitoring at all.

Valuing Volunteer Time:
Independent Sector maintains a valuable online tool that lists the value of volunteer time in each state:
http://independentsector.org/volunteer_time?s=value%20of%20volunteer%20time

Organizational

Organizational impacts might include such things as changes to a volunteer monitoring program's structure, addition of new staff or volunteers, or development of a task force to look into an issue in more depth, as in the following example.

Surfrider's Blue Water Task Force in Astoria, OR, monitored bacteria levels at Cannon Beach and found that 50% of samples were above health standards for storm water. Sharing their results with the city resulted in the City Council establishing a public works committee to look into the issue.

How to Evaluate

The case study below is used to illustrate five steps for doing evaluation well. The fictitious Xanadu Volunteer Monitoring program, entering its sixth year, decided to conduct an evaluation of their program effectiveness. The goals of the Xanadu program are to improve citizens' understanding of the connection between what we do on the land and how that affects water quality, to build a group of informed citizen advocates for management and protection of natural resources, and to obtain data useful for natural resource management decision making.

Approach: Five simple steps for doing evaluation well

Step One:

Develop a process for engaging your partners and/ or stakeholders in shaping the evaluation process .

Defining what constitutes success is very important as it sets a standard that you can later judge your results by - for example, if you set out to reach 10% of the neighborhood's population were you able to accomplish this goal? If you don't set this criteria ahead of time, then once you have your results, you won't know if you have met your goal or not.

In order to shape the evaluation approach, stakeholders need to fully understand the program and any existing data. You may need to spend time reviewing/presenting your program's goals, current activities, and any data collected in the past.

Xanadu Case Study - Step One - engage partners to shape the evaluation approach

The program coordinator held a meeting with key volunteers and other intended users of evaluation findings (in this case a funder, a local leader/ resident, a policymaker, and a representative from a collaborating agency). They discussed and agreed on what constitutes 'success' in terms of their programming Their desired outcomes were to:

- Reach at least 10% of the neighborhood's population and reach a diverse aged audience,
- Build participant stream ecology knowledge,
- Change behaviors of participants (they become more active in natural resource management in their communities),
- Change community members' land use practices based on volunteer monitoring data,
- Have volunteer monitors measure impact of those changes, and
- Improve water quality.

They reviewed all of the outreach and training approaches to be offered by the program for the upcoming year and created a short table that listed and described each. In this process they reviewed the goals of each activity, the intended audience, the delivery schedule and format, and whether there was any evaluative data in existence on similar past efforts (i.e., post training surveys).

For very detailed information on this aspect, see the 2009 Robert Wood Johnson report titled "A Practical Guide for Engaging Stakeholders in Developing Evaluation Questions." (http://www.rwjf.org/content/dam/web-assets/2009/01/a-practical-guide-for-engaging-stakeholders-in-developing-evalua

Step Two:

Frame a few questions that will guide your investigation. These questions should relate to the goals of your efforts, the implementation of your program, and/or the impacts your work is having.

Step Three:

Identify direct and indirect indicators, which you will examine as evidence of progress toward your goals.

Direct Indicators are measures used to directly assess achievement toward intended outcomes (e.g. average amount of *E. coli* in a waterbody; number of participants implementing *E. coli* monitoring in their communities after attending a training workshop).

Indirect Indicators do not directly assess achievement of outcomes, but provide important information on what *may be* a correlation between your efforts and certain outcomes (e.g., more local businesses using salt alternatives in winter; fewer manure spills to local streams reported in spring).

Xanadu Case Study - Step Two - frame evaluation questions

The committee came up with the following specific questions to gauge success:

- Number of people reached through outreach and training programs?
- Ages of those reached?
- Did participants learn new information?
- Did participants apply what they learned? If so, how?
- Did land use practices change in the local community?
- Did monitoring and successive outreach efforts related to one particular waterbody lead to any changes in water quality?

Xanadu Case Study - Step Three - identify indicators

The committee identified the following indicators to measure success of their outreach and training approach:

- Number of residents reached (overall and by age group),
- Percentage of the neighborhood's population reached,
- Percent increase in the number of participants who correctly answer stream ecology questions after training as compared to before,
- Percent of participants who report being engaged in natural resource management activities in their community one year after being trained as compared to before,
- Percentage of attendees at local watershed, neighborhood or town council meetings who are volunteer monitors, and/or percentage of members on a natural resource management board who are volunteer monitors,
- Number of community members who changed their day-to-day land use practices after the outreach campaign *(community members would be surveyed regarding specific practices on which the campaign focused)*
- Ways community members had changed their day-to-day land use practices after the outreach campaign,
- Water quality of local waterbody before and after outreach efforts *(again, this would be based on the specific aspect of water quality (the outreach campaign aimed to improve).*

Step Four:

Develop a plan for collecting data relative to your evaluation questions. The plan should include methods, timeline, data analysis and who will be responsible for completing which tasks.

Numerous excellent resources exist to guide you through this step of the process, thus specifics are not covered in detail in this fact sheet. Also consider enlisting the help of an Extension Evaluation Specialist, another professional evaluator, or a graduate student who has training in survey design.

Xanadu Case Study - Step Four - plan and collect information

With the indicators defined, the committee needed to determine how to measure each to be able to answer their evaluation questions. They determined that they didn't have adequate expertise, so they connected with their local Extension Evaluation Specialist. To determine whether the program resulted in changes to local land use practices (i.e., the number of community members who changed day-to-day land use practices after the outreach campaign) the committee decided that they needed to develop pre-training and follow-up surveys. The Extension Evaluation Specialist helped them craft a pre- and post- training survey, and was responsible for analyzing the data. Together they developed their pre-training survey to address the question "How many community members changed their day-to-day land use practices after the outreach campaign. It included this question: "Which, if any, of the following activities do you currently practice? Check all that apply.

- I leave a buffer of natural vegetation along the edge of the creek on my property.
- I set my mower at its highest setting so grass can better absorb rainfall and minimize stormwater runoff.
- I attend public meetings about water quality or other natural resources decisions in my community.
- I wash my car on the lawn to help minimize runoff to the storm drain.
- I check the weather before fertilizing my lawn to ensure rain is not forecast for the next two days.
- I use non-phosphorus fertilizers or no fertilizer at all on my lawn."

Xanadu Case Study - Step four (continued)

One year after the training, a follow-up survey was distributed to the same group of landowners. It contained the *identical question*. The percent of respondents who indicated that they practiced any of these activities was compared to the pre-training survey results, to determine percent change, as well as individual changes over time. To make this indicator more meaningful, an additional question was included on the follow-up survey asking if anything else happened in the past year that may have influenced their participation in these activities (to confirm that changes were due to the excellent and thorough Xanadu training).

Step five:

Structure time to write a summary report; use your findings to improve the program and/or report to key stakeholders or funders.

Be sure to reference how you initially defined success (step one) when analyzing evaluation results.

Xanadu Case Study - Step five - report your results

After the post test had been administered and evaluated, the coordinator convened a meeting with the stakeholders and the Extension Evaluation Specialist to share results, discuss any changes needed to programming based on the findings and decide how to communicate successes identified. Results were disseminated by posting a summary on the Xanadu website and through a press release to the local news media. The committee realized the importance of evaluating their program and decided to build evaluation into their yearly activities.

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Summary

Evaluation helps ensure that programs are meeting their goals, the needs of their stakeholders, and creating the benefits for which they were created. Evaluation should occur on an on-going basis, and be an integral part of overall program activities. Timelines for collecting evaluation data should align with the schedule of program activities. Many programs engage in evaluation over the course of a one-year cycle; collecting data throughout the year, then analyzing and making use of the data annually.

One of the most important and overlooked steps in evaluation is to collect some baseline data. **It is difficult to know what you've accomplished if you don't know what you are starting with.** By incorporating evaluation into your program development, you provide the opportunity to gather baseline data, as well as allowing the program to better adapt to social and environmental changes, supporting long-term success.

Image from University of Texas

Evaluation Resources :

The University of Wisconsin-Extension maintains a comprehensive website with program development and evaluation resources (http://www.uwex.edu/ces/pdande/), including:

- Planning a Program Evaluation: Worksheet: http://learningstore.uwex.edu/assets/pdfs/G3658-1W.PDF
- Questionnaire Design: Asking Questions with a Purpose: http://learningstore.uwex.edu/assets/pdfs/g3658-2.pdf
- Collecting Evaluation Data: An Overview of Sources and Methods: http://learningstore.uwex.edu/assets/pdfs/G3658-4.pdf
- Quick Tips: Using the Retrospective Post-then-Pre Design: http://www.uwex.edu/ces/pdande/resources/pdf/Tipsheet27.pdf
- Collecting Evaluation Data: Surveys: http://learningstore.uwex.edu/assets/pdfs/G3658-10.PDF

The Minnesota Pollution Control Agency has a section titled "Evaluating Monitoring Program Performance" in their 2003 Volunteer Surface Water Monitoring Guide: http://www.pca.state.mn.us/index.php/view-document.html?gid=6861

My Environmental Education Evaluation Resource Assistant (MEERA) is a highly recommended online "evaluation consultant" created to assist you with your evaluation needs. One of its many features is that it moves you through the evaluation process step-by-step, with tips and pitfalls to avoid: http://meera.snre.umich.edu/

The Program Evaluation and Measurement site designed by David C. Crawford of Ohio State University Extension is a very comprehensive and useful resource. There is a section on "Introduction to Program Evaluation": http://hostedweb.cfaes.ohio-state.edu/brick/suved2.htm

Evaluation Resources (continued):

NOAA Coastal Services Center offers training on social science tools critical for program success including program design and evaluation: http://www.csc.noaa.gov/socialscience/.

- Introduction to Survey Design and Delivery provides easy-to-understand information about survey design, delivery and analysis: http://www.csc.noaa.gov/surveydesign/tools_survey.pdf.

- Designing Evaluation for Education Projects: http://wateroutreach.uwex.edu/use/documents/NOAAEvalmanualFINAL.pdf.

- Steps to Effective Program Design & Evaluation (Presented to UNHCE Staff) - a portion of the notebook which provides a concise overview of the steps from Needs Assessment to Evaluation, including writing SMART objectives: http://extension.unh.edu/intranet/UNHCEPDE/NOAAinst.pdf.

The Research Methods Knowledge Base is an online tool to guide you through the research design process. It includes a section on evaluation that offers an overview of how to set evaluation goals and what strategies you might wish to employ: http://www.socialresearchmethods.net/kb/intreval.php.

Florida Atlantic University has numerous links about program evaluation listed at: http://www.fau.edu/~rcnyhan/images/program.html.

2009 Robert Wood Johnson Foundation report titled "A Practical Guide for Engaging Stakeholders in Developing Evaluation Questions": http://www.rwjf.org/files/research/49951.stakeholders.final.1.pdf.

The Evaluators' Institute: http://tei.gwu.edu/.

American Evaluation Association: http://www.eval.org/ - Check out their "Find an evaluator" tab!

Borisova, T., Adams, D., Flores-Lagunes, A., Smolen, M., McFarland, M., & Boellstorff, D. (2012). Participation in volunteer-driven programs and their effects on homeowners' landscaping practices? *Journal of Extension (JOE)* June 2012 . 50(3): http://www.joe.org/joe/2012june/rb4.php

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