Guidance for Starting a Volunteer Water Monitoring Program

Contents

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Identifying Goals and Objectives

Before you can begin planning a monitoring program, you need to identify why you want to begin monitoring and identify your program's goals and objectives. A goal is a desired outcome from an effort and can be relatively broad. An objective is more focused than a goal and includes more specific details about things that can be measured.

Some common types of **goals** for volunteer monitoring efforts are related to:

1. fostering stewardship of water resources (could include youth, landowners, or other groups).
2. assessing baseline (current) conditions and/or identifying trends (changes over time).
3. collecting data to inform management decisions.
4. identifying locations for restoration projects.
5. assessing whether restoration efforts are effective at accomplishing the intended effects.

Objectives are more detailed and might be written like the following:

1. To assess baseline nitrate concentrations during the nuisance algae season for the town section of Spring creek where the highest septic density occurs.
2. To determine changes in the distribution of beaver dams and number of brown trout spawning beds in response to riparian and flow enhancement projects on Beaver Creek between Diversion A and the confluence with Spring Creek.
3. To help stream team members understand the connection between instream dissolved oxygen concentrations and the presence of nuisance algae.

Taking the time to determine and articulate your program's goals and objectives will help ensure that your monitoring program efforts will produce outcomes your organization is interested in. The process of setting goals should ideally include representation of stakeholder groups (interested groups) who are affected. When starting a monitoring program, your objectives may not be as detailed as those above, but at least some thought should go into the details of why the data is being collected. Volunteer monitoring programs are most successful when the program is collecting data that they can understand and use themselves to answer the questions posed by the program's participants.

Writing a SAP and SOP

Written documentation for a sampling effort is very important and the person coordinating the sampling effort should ideally be involved in writing or updating these documents before each monitoring season.

A **Sampling and Analysis Plan (SAP)** is a document that describes a data collection effort. It should include the goals and objectives, an overview of the watershed area, a description of who is doing the monitoring, where, when and how. There are a lot of examples of SAPs available for different volunteer monitoring efforts which can be used as a template for writing a new SAP. Talking to people with experience to get recommendations for a high-quality SAP to use as a template for your writing effort can save you a lot of time.

A **Standard Operating Procedure (SOP)** is a document that describes in detail the procedures that are used to collect and/or work with the data. These documents should be organized for use in the field (or elsewhere) by the people collecting or processing the data. SOPs include things like step-by-step instructions on exactly how samples are collected in the field and how they are handled and delivered to

the testing lab. If meters are used, they include details on calibrating and using the meters to ensure accurate readings. SOPs may also include detailed descriptions of how to find sampling locations. Template datasheets are also commonly included in SOP documents.

SOPs should be included as an appendix to a SAP so that when data is assessed later, the user can look at the SAP and SOP and know exactly why and how the data was collected. There are a lot of existing SOP documents, so it is often not necessary to do a lot of new writing for SOPs. It is critical however to ensure that appropriate SOPs are being used and that the SOP matches with how the data is actually being collected and managed.

The MT Department of Environmental Quality has a Sampling and Analysis Plan template for groups to use along with helpful tips and guidance on writing a SAP, available here. A list of SAP and SOP documents that MSUEWQ has assisted with, along with example datasheets, calibration logs etc. are available on the MSUEWQ website here.

Program Components – Assigning Responsibility

The most successful volunteer monitoring programs have a single on-the-ground coordinator who is actively engaged in all aspects of the program. There are however, opportunities to share the responsibilities if local volunteers can be recruited with strengths in the different areas. Technical assistance may be available to assist with many of these components, but successful/sustainable volunteer monitoring programs need to be led and administered at the local level. For each of the following program components, consider who will play the lead role, what local volunteers could provide support in that role and what other technical service providers could help with different roles. Be sure to discuss the role of each participant with them prior to beginning the study to ensure they are clear on their responsibilities.

1. Determine and articulate monitoring objectives
2. Identify methods (SOPs) best suited to address monitoring objectives
3. Procure necessary funding to conduct the monitoring program
4. Procure equipment necessary for monitoring
5. Recruit volunteers
6. Coordinate and conduct coordinator/volunteer training
7. Coordinate volunteers and equipment during the season
8. Collect and manage equipment after the season
9. Compile data and perform quality assurance checks
10. Submit data to relevant databases
11. Analyze data to address objectives
12. Present data to volunteers and/or to the public
13. Evaluate the program and objectives, refine and update the SAP and SOPs for the next season

Volunteer Recruitment & Retention

In addition to the collection of useful data, volunteer monitoring programs commonly help to foster water resource stewardship within communities. The people (students, landowners, or general public) who are likely to want to participate are very different across watersheds and participation also depends on the goals of the program. The motivations of the people that you hope to engage as volunteers

should be considered when setting goals and objectives. In general, volunteers will need to see a benefit to themselves that is in-line with the cost of participation (time, gas money, etc.). Students or young professionals may be motivated by experience. Some landowners may be motivated by a desire to protect or enhance water quality while others may be more motivated by how a project might affect their agricultural operation or other business.

Tips for recruitment and retention:
1. Ensure methods (SOPs) are aligned with volunteer ability and interest level.
2. Ensure that volunteers get adequate training and support to be confident with their data collection efforts.
3. Outline expectations of the volunteers as clearly as possible as early in the recruitment process as possible (e.g. time commitments, specific tasks, duration, etc.).
4. Take the time to be organized with volunteer management (e.g. equipment is conveniently organized in bins, SOPs are printed and included with equipment, volunteers are clear on where they are going and what they are doing when, etc.). This will contribute to volunteers feeling capable and empowered and improve the odds of having volunteers return the following year.
5. Make a point to acknowledge the hard work of your volunteers.
6. Make sure volunteers are able to see the data that they have collected so they see that their efforts are validated. End of season data compilation and interpretation is important to answer the questions that initially prompted monitoring in the first place. In some cases, making data available in real-time through websites is valuable.
7. Reassess goals, objectives, and methods periodically (ideally annually) to ensure that objectives are still relevant and that methods are working as intended.

Training

Once methods are clearly laid out in the SOPs, ensuring that volunteers understand how to conduct the methods is very important. Scheduling a hands-on training before data collection starts for the season requires planning to ensure you have instructors available who know the methods and that timing meshes with volunteer schedules. Annual trainings are important even for returning volunteers, even if methods don't change (which they often do) to ensure the written protocols are followed.

A typical training approach is to start the day inside with a few presentations overviewing things like: the goals of the monitoring, summary of any past results, what the different monitoring methods help us learn, the important of quality assurance (if high quality data is sought), and how the streamside section of the training will be organized. An ideal training location has an inside location for this training and a stream within short walking distance for the hands-on portion.

Streamside hands-on trainings will be most effective if the equipment that the volunteers will be using is used for the training. This allows for familiarity with the equipment that will be used and also allows for troubleshooting small things that are missing, or need repair. Setting up different stations that groups of volunteers rotate through works well, and allows for smaller groups so more people can get their hands on the equipment. The training may be a good opportunity to discuss the sampling schedule with volunteers. Safety should be discussed at the training as well.

People available for training may include: MT DEQ employees, MSU Extension Water Quality personnel, MT Watercourse personnel, local water or conservation district employees, MT DNRC employees, federal agency (USGS, Forest Service, BLM, Bureau of Rec.). The Montana Watershed Coordination Council also often schedules training events in the spring that are open to watershed coordinators and others from across the state.

MSUEWQ in partnership with MTDEQ has monitoring supplies available for loan to organizations for volunteer monitoring trainings or short term for monitoring events. Those interested should contact MSUEWQ at extensionwater@montana.edu or (406) 994-7381 for more information.

Data Analysis and Management

After the data has been collected, it must be compiled, double checked, routed to a long-term storage location, analyzed, and prepared for reports and/or presentations.

The way the data will be analyzed should ideally be laid out in the SAP so that plans for analysis can influence what data is collected. This may be as simple as plotting the data in Excel with parameter concentration on the Y axis and time on the X axis. It may include a comparison of the concentrations to relevant water quality standards. Or it may include more robust statistical calculations, or calculations of pollutant loads (concentration times flow). Plans for data analysis are the connection between the data collected and the answers to the questions posed in the monitoring objectives. Once the analysis is done, it should be shared with the volunteers and ideally with the broader public.

Storage of data in a publicly accessible database is a great way to ensure that it is available long-term. Data collection funded by MTDEQ is required to go into their EQUIS database. Other databases that may be relevant are the MSU VOEIS database and accompanying MSUEWQ Django database, the Montana Bureau of Mines and Geology GWIC database, or databases administered by local water quality districts or other groups. At a minimum, data should be stored in two locations to avoid inadvertent loss. MSUEWQ has more detailed information and videos on data management, field datasheet management, file and folder naming/structure, and data entry/storage, data use, etc. available on our website [here](#).

Program Sustainability

In addition to the Volunteer Recruitment and Retention suggestions above, at the end of monitoring season, take the time to reflect on how the season went. This is the time to think about the aspects that went well and what aspects can be improved on for next year. It's best to do this while the season is fresh in your mind. You may also consider creating a survey for your volunteers to get their perspectives.

Some questions for the program coordinator to consider and possibly volunteers:

1. What worked particularly well this season?
2. What improvements could be made on this season's program?
3. Where data collection efforts too ambitious, too modest, or just right?
4. Could datasheets or SOPs be enhanced for clarity or to avoid missteps?
5. Should sites be added or removed from the sampling effort? If this question is asked of volunteers, it might be phrased more in terms of which streams are of highest priority.
6. Are there parameters or methods that might be added or taken away?

Funding a Volunteer Monitoring Program

Costs for administering a volunteer monitoring program may include: staff time to coordinate the effort, assistance with volunteer travel costs, training costs, equipment costs, lab analysis costs, printing of final reports, etc. Competitive grant funding opportunities may include the following.

- o DEQ Volunteer Monitoring Laboratory Analysis Support Program
    - This program provides financial assistance (through a competitive application process) for laboratory analysis to volunteer monitoring groups with a DEQ approved SAP.
- o DNRC Watershed Management Grant
    - This program provides financial support for watershed related planning and management activities which conserve, develop, manage or preserve the state renewable resources, and/or support the implementation and development of the state water plan.
- o SWCDM Mini grant program
    - Soil and Water Conservation Districts of Montana's program provides funding to support local education and outreach efforts to address nonpoint source water quality issues.

The Montana Watershed Coordination Council's Water Activities work group and the Department of Environmental Quality created a Watershed Funding Opportunities table. This table includes the funding entity, the purpose of funding, who can apply, program contact including website, application due dates, and dollar limits per application. Updates to the table will be made as other state or federal programs are identified.

Resources:

1. MSUEWQ Vol Mon page for SAP & SOP examples, Data Management guidance, Sediment Monitoring considerations, Photo monitoring, BMP monitoring, etc

2. Montana DEQ Volunteer Monitoring SAP Template

3. Supplemental Guidance for Using DEQ's Sampling and Analysis Plan (SAP) Template for Volunteer Water Quality Monitoring Programs

4. MDEQ Guidance for Development of Sampling and Analysis Plans (SAPs)

5. MDEQ Current Standard Operating Procedures

6. Watershed Funding Opportunities

7. Montana Watercourse Volunteer Water Monitoring Guidebook

8. EPA Volunteer Stream Monitoring Manual

9. Webinar: Water Quality Monitoring for Impact and Engagement (1 hour and 24 minutes)