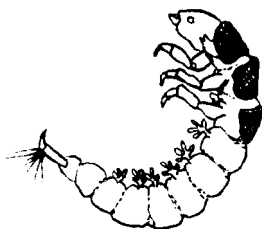


Chapter 1: INTRODUCTION

Across the country, volunteers are monitoring the condition of streams, rivers, lakes, reservoirs, estuaries, coastal waters, wetlands, and wells. The number and variety of these projects is continually on the rise; so, too, is the complexity of the monitoring they conduct and the uses of the data they collect.

Most volunteer monitoring projects evaluate the chemical, physical, or biological condition of waters in a given watershed. They may address different kinds of waters—e.g., streams with associated embayments—and they may conduct several types of monitoring activities. Some projects may address only one type of monitoring in one type of waterbody, e.g., nutrient sampling in estuaries. More comprehensive projects may take basic chemical measurements of conditions such as dissolved oxygen levels, pH, or salinity, evaluate the physical condition of streamside habitat, and evaluate the biological condition of aquatic insects or vegetation.



Not only do volunteer projects monitor many different parameters and types of waters, they are also organized and supported in many different ways. Volunteer monitoring projects may be associated with state, interstate, local, or federal agencies, with environmental organizations or universities, or may be entirely independent. Financial support may come from government grants, partnerships with business, endowments, independent fundraising efforts, corporate donations, membership dues, or a combination of any and all of these sources. Most

volunteer projects are fairly small and have very small budgets--based on EPA's latest *Directory of Volunteer Environmental Monitoring Programs, 4th Edition*, we know that the median program size is 25 volunteers, and the median annual budget is under \$5,000. However, there are also volunteer programs with over 1,000 volunteers and those with annual budgets of more than \$50,000.

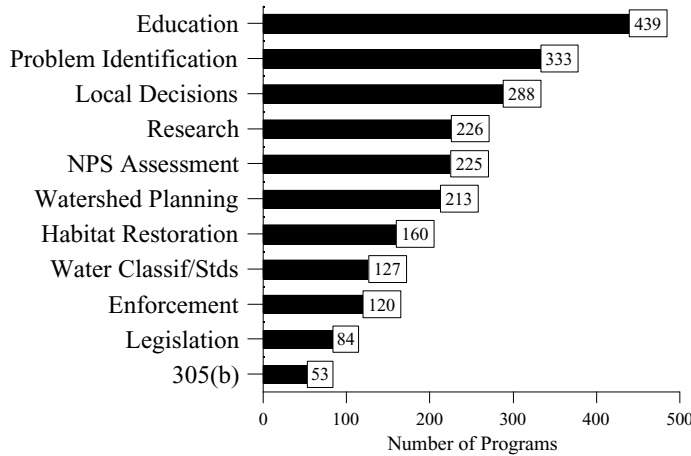


Top 20 Parameters Assessed by Volunteer Monitors

- Water temperature
- pH
- Dissolved Oxygen
- Macroinvertebrates
- Debris clean-up
- Habitat assessments
- Nitrogen
- Phosphorus
- Turbidity
- Coliform bacteria
- Secchi depth
- Aquatic vegetation
- Flow
- Birds/Wildlife
- Fish
- Watershed mapping
- Rainfall
- Photographic surveys
- Salinity
- Sediment assessments

Source: *Directory of Volunteer Environmental Monitoring Programs, 4th Edition*

Volunteer Monitoring Data Uses



Source: *Directory of Volunteer Environmental Monitoring Programs, 4th Edition*

Although the goals and objectives of volunteer projects vary greatly, virtually all volunteers hope to educate themselves and others about water quality problems and thereby promote a sense of stewardship for the environment. Many projects, in fact, establish these as their goals. These projects might be called primarily *education* oriented.

Other projects seek a more active role in the management of local water resources, and therefore

strive to collect data that can be used in making water quality management decisions. Common uses of volunteer data include local planning decisions, such as identifying where to route a highway; local priority setting, such as determining which county lakes require restoration; screening for potential pollution problems, which might then be investigated more thoroughly by water quality agencies; and providing data for state water quality reports, which might then be used for statewide or national priority setting. Projects doing this type of monitoring might be called primarily *data* oriented. Data oriented volunteer projects, in particular, must continuously wrestle with the issue of credibility.

They must prove to skeptics that their volunteers collect good-quality data that is:

Although the goals and objectives of volunteer projects vary greatly, virtually all volunteers hope to educate themselves and others about water quality problems and thereby promote a sense of stewardship for the environment.

- › consistent over time and within projects and group members
- › collected and analyzed using standardized and acceptable techniques
- › comparable to data collected in other assessments using the same methods

These projects must adopt protocols that are straightforward enough for volunteers to master and yet sophisticated enough to generate data of value to resource managers.

This delicate and difficult path cannot be successfully navigated without a quality assurance plan that details a

project's standard operating procedures in the field and lab, outlines project organization, and addresses issues such as training requirements, instrument calibration, and internal checks on how data are collected, analyzed, and reported. Just how detailed such a plan needs to be depends to a large extent on the goals of the volunteer monitoring project.

What Is a Quality Assurance Project Plan?

A Quality Assurance Project Plan, or QAPP, is a written document outlining the procedures a monitoring project will use to ensure the data it collects and analyzes meets project requirements. The U.S. Environmental Protection Agency (EPA) has issued interim guidance that establishes up to 24 distinct elements of a QAPP (see *Appendix C: References*). Together, these elements of a QAPP comprise a project's quality assurance system. As we will discuss below, not all 24 elements need be addressed in every QAPP.

By law, any EPA-funded monitoring project must have an EPA-approved QAPP before it can begin collecting samples. The purpose of this requirement is to ensure that the data collected by monitoring projects are of known and suitable quality and quantity. Typical sources of EPA funding for volunteer monitoring projects include Lake Water Quality Assessment Grants (under Section 314 of the Clean Water Act) or grants under the nonpoint source pollution control program (Section 319 of the Clean Water Act). Quality assurance staff in each of EPA's 10 regional offices are available to review volunteer monitoring QAPPs and have authority to recommend approval or disapproval of QAPPs. In addition, volunteer monitoring coordinators and individual EPA project officers in the EPA Regions may be able to assist projects seeking advice on the preparation of QAPPs. (See Appendix A, Regional Quality Assurance Contacts.)

About This Document

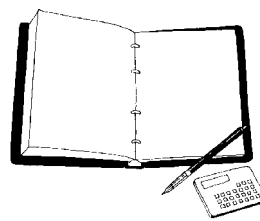
The purpose of this document is to provide volunteer monitoring programs with the information they need to develop a quality

A Quality Assurance Project Plan, or QAPP, is a written document outlining the procedures a monitoring project will use to ensure the data it collects and analyzes meets project requirements.

Why Should You Develop a QAPP?

The QAPP is an invaluable planning and operating tool that should be developed in the early stages of the volunteer monitoring project.

Even if a volunteer monitoring project does not receive any EPA money through grants, the coordinating group should still consider developing a QAPP, especially if it is a data oriented



project and seeks to have its information used by state, federal, or local resource managers.

Few water quality agencies will use volunteer data unless methods of data collection, storage, and analysis can be documented. Clear and concise documentation of procedures also allows newcomers to the project to continue monitoring using the same methods as those who came before them.

This is particularly important to a volunteer project that may see volunteers come and go and that intends to establish a baseline of water quality information that can be compared over time.

The purpose of this document is to provide volunteer monitoring programs with the information they need to develop a quality assurance project plan.

assurance project plan. It does not suggest specific field, laboratory, or analytical techniques or procedures, and is not a "how to" manual. It is organized as follows:

Executive Summary introduces the reader to the steps involved in developing a QAPP, fundamental QA/QC concepts, and the basic elements of a QAPP.

Chapter 1: Introduction provides background on volunteer monitoring, discusses the purposes of QAPPs, and outlines the structure of this document.

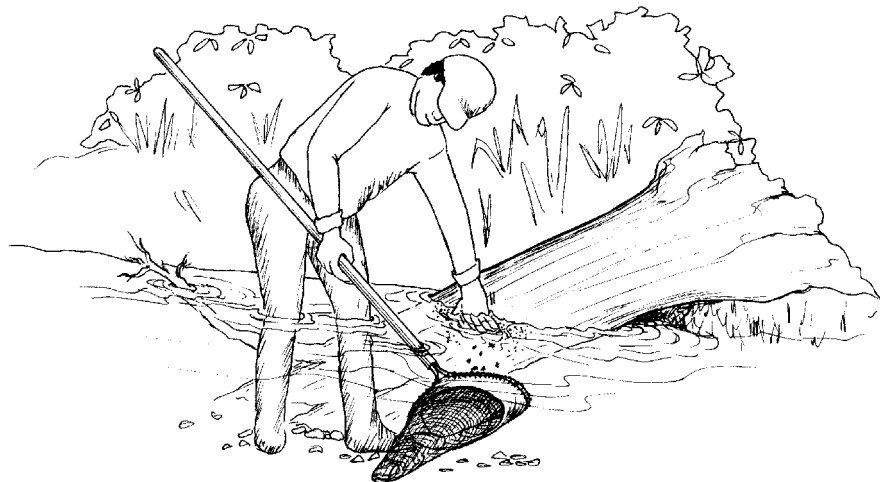
Chapter 2: Developing a QAPP outlines the steps a volunteer monitoring project should take as it moves toward developing a quality assurance system, documenting its procedures in a QAPP, seeking approval of its QAPP, and updating the QAPP over time.

Chapter 3: QA/QC: Basic Concepts introduces basic quality assurance/quality control (QA/QC) concepts and definitions that are needed in developing a quality assurance system and a QAPP. Examples from a fictional project--the *Volunteer Creek Monitoring Project*--are used to illustrate these concepts.

Chapter 4: Elements of a QAPP presents the basic elements of a volunteer monitoring quality assurance project plan (QAPP), again with examples from the QAPP of the fictional *Volunteer Creek Monitoring Project*.

Appendix A: Glossary defines various terms and concepts associated with quality assurance and control.

Appendix B: EPA Regional Contacts is a list of people within EPA who can assist, and offer guidance to, volunteer monitoring programs. Each of the 10



EPA regions has a volunteer monitoring coordinator as well as QA staff. This appendix also shows which states and U.S. territories are within each of the 10 regions.

Appendix C: References is a list of documents and articles relevant to volunteer monitoring and quality assurance issues. All EPA volunteer monitoring documents are available by contacting the National Volunteer Monitoring Coordinator at USEPA. The address is given in the appendix.

Appendix D: Abbreviated QAPP Form is an example of the layout and structure of a quality assurance project plan. Some programs may wish to adapt this form to fit their plan.



This document is not intended as a stand-alone reference document. Volunteer monitoring programs are strongly urged to consult the references listed in Appendix C for further information on quality assurance/quality control and the Quality Assurance Project Plan process.

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