

---

## 1.1 Manual Organization

*Volunteer Stream Monitoring: A Methods Manual* is organized into six chapters. All chapters include references for further reading.

### **Chapter One: Introduction**

The first chapter introduces the manual and outlines its organization.

### **Chapter Two: Elements of a Stream Study**

Chapter 2 introduces the concept of the stream environment and presents information on the leading sources of pollution affecting streams in the United States. It then discusses in some detail 10 questions volunteer program coordinators must answer in designing a stream study, from knowing why monitoring is taking place to determining how the program will ensure the data collected are credible. The chapter includes a highlight on training volunteer monitors. The chapter concludes with safety and equipment considerations.

### **Chapter Three: Watershed Survey Methods**

This chapter describes how to conduct a watershed survey (also known as a watershed inventory or visual survey), which can serve as a useful first step in developing a stream monitoring program. It provides hints on conducting a background investigation of a watershed and outlines steps for visually assessing the stream and its surrounding land uses.

### **Chapter Four: Macroinvertebrates and Habitat**

In this chapter, three increasingly complex methods of monitoring the biology of streams are presented. The first is a simple stream survey that requires little training or preparation; the second is a widely used macroinvertebrate sampling and stream survey approach that yields a basic stream rating while monitors are still at the stream; and the third is a macroinvertebrate sampling and advanced habitat assessment approach that requires professional and laboratory support but can yield data on comparatively subtle stream impacts.

### **Chapter Five: Water Quality and Physical Conditions**

Chapter 5 summarizes techniques for monitoring 10 different constituents of water: dissolved oxygen/biochemical oxygen demand, temperature, pH, turbidity, phosphorus, nitrates, total solids, conductivity, total alkalinity, and fecal bacteria. The chapter begins with a discussion on preparing sampling containers, highlights basic steps for collecting samples, and discusses taking stream flow measurements. This chapter discusses why each parameter is important, outlines sampling and equipment considerations, and provides instructions on sampling techniques.

### **Chapter Six: Managing and Presenting Monitoring Data**

Chapter 6 outlines basic principles of data management, with an emphasis on proper quality assurance/quality control procedures. Spreadsheets, databases, and mapping software are discussed, as are basic approaches to presenting volunteer data to different audiences. These approaches include simple graphs, summary statistics, and maps. Lastly, the chapter briefly discusses ideas for distributing monitoring results to the public.

## Appendices

- Appendix A provides a glossary of terms used in this manual.
- Appendix B lists a number of scientific supply houses where monitoring and analytical equipment can be purchased.
- Appendix C discusses how to determine the latitude and longitude of monitoring locations.

## References and Further Reading

- Ely, E. 1994. A Profile of Volunteer Monitoring. *Volunteer Monitor*. 6(1):4.
- Ely, E. 1994. The Wide World of Monitoring: Beyond Water Quality Testing. *Volunteer Monitor*. 6(1):8.
- Lee, V. 1994. Volunteer Monitoring: A Brief History. *Volunteer Monitor*. 6(1):14.
- USEPA. 1996. *The Volunteer Monitor's Guide To Quality Assurance Project Plans*. EPA 841-B-96-003. September. Office of Wetlands, Oceans, and Watersheds, 4503F, Washington, DC 20460.
- USEPA. 1994. *National Directory of Volunteer Environmental Monitoring Programs*, fourth edition. EPA 841-B-94-001. January. Office of Wetlands, Oceans, and Watersheds, 4503F, Washington, DC 20460.
- USEPA. 1993. *Volunteer Estuary Monitoring: A Methods Manual*, EPA 842-B-93-004, December. Office of Wetlands, Oceans, and Watersheds, 4503F, Washington, DC 20460.
- USEPA. 1991. *Volunteer Lake Monitoring: A Methods Manual*, EPA 440/4-91-002, December. Office of Wetlands, Oceans, and Watersheds, 4503F, Washington, DC 20460.
- USEPA. 1990. *Volunteer Water Monitoring: A Guide for State Managers*, EPA 440/4-90-010, August. Office of Wetlands, Oceans, and Watersheds, 4503F, Washington, DC 20460.