Appendix 6

Pa. Citizens Volunteer Monitoring Program

Study Design Worksheets

January 2000

Cover Page

The cover page of your study design should include the following information:

- The title of your program and name of your group;
- The date the study design was completed; and
- Who wrote the study design, including address and phone number.

Note: Use Chapter 2 of this handbook to guide you in filling out these worksheets.

Step 1: What Is Already Known About Your Watershed?

This step prompts you to explain what you already know about your watershed. This is done by describing your group and its programs, identifying your waters of interest, determining their status under the Pennsylvania Water Quality Standards, listing problems you are aware of, and briefly stating the major issues to hope to address through your monitoring program.

1A Describe Your Group: Briefly describe your organization

What is your group's mission?

What are your group's major programs?

What are your group's goals for your watershed?

Are you a non-profit organization? ☐ Yes ☐ No

When was it founded? _____

# of members (if any): _____

# of paid staff (if any): _____

1B Background on the Watershed: Brief narrative followed by the table (please attach a map):

Table 1B: Background On Waters Of Interest

1) Waters of Interest (list major rivers, tributaries, lakes, ponds, etc)	**2) Watershed/ Drainage Area/ Communities**	**3) *Rivers*: Joins What Larger Waterbody/ *Lakes*: Inlets & Outlets**	**4) Land Use Types** (% in each if known)

Table 1C: Current Status of Your Waters Of Interest

Refer to the following: 1) Pa. Water Quality Standards, Drainage Lists A-Z; 2) Water Quality Assessment Maps; and 3) 1998 303(d) List

1) **Stream and Zones of Interest** (from Drainage List)	2) **Water Uses Protected** (from Drainage List)	3) **Actual Uses & Values** (from your own experience)	4) **Waters Assessed? Y or N** (from maps)	5) **Uses Supported ? Y or N** (from maps)	6) **NPS Pollution? Y or N** (from maps)	7) **Source of Impairment** (from 303d list)	8) **Cause of Impairment** (from 303d list)	9) **Known Problems, Conflicts, or Threats** (from your own experience)	10) **Known Efforts To Address Problems** (from your own experience)

1D State the most pressing water quality issue(s) facing your waters of interest:

Step 2: Why Are You Monitoring?

This step prompts you to clarify your information needs, monitoring questions and purposes, and the use of the information you will produce.

Table 2A Information Needed To Address Issues

1) Issue	2) Information Needed	3) Existing Monitoring Efforts

2B Monitoring Questions (*check those that apply*)

- ☐ Is the water meeting or exceeding state Water Quality Standards?
- ☐ Where are the impaired waters that should be a high priority for restoration? What is causing these impairments?
- ☐ Where are the threatened waters that should be a high priority for protection? What is causing these threats?
- ☐ What are the present ecological conditions and how do they change over time?
- ☐ What is the impact of various types of land and water use activities on ecological conditions and human uses? (e.g. various types of point and nonpoint source pollution).
- ☐ How effective are various strategies (e.g. wastewater treatment, best management practices) in protecting and restoring ecological integrity?
- ☐ Where are the special places with unique ecological, social and economic values that should be protected?
- ☐ Other (state):

2C. Monitoring Purposes (*check one below or state your own*)

- ☐ Community Education and Awareness
- ☐ Baseline Data Collection
- ☐ Community and/or Watershed Level Assessment
- ☐ State and Federal Agency Assessment
- ☐ Other (state):

Table 2D. List the intended uses and users of the information you collect.

User	Uses

Step 3: What Will You Monitor?

This step includes deciding what type of survey you will do, and then selecting specific indicators you will monitor from the relevant "Monitoring Options" tables in Chapter 5.

3A Select a Survey (see Chapter 5)

Check the survey(s) you will carry out.

Survey A. Basic Watershed Inventory and Assessment

☐ A1. Watershed Inventory

☐ A2. Condition and Trend Assessment - Wadeable Waters

☐ A3. Condition and Trend Assessment - Non-Wadeable Waters

☐ A4. Condition and Trend Assessment - Lakes

☐ A5. Point Source Impact Assessment

☐ A6. Nonpoint Source Impact Assessment

☐ A7. Groundwater Basin Assessment

Survey B. Advanced Stream Assessment

☐ B1. Impairment Screening / Biological Assessment

☐ B2. Aquatic Life / Designated Uses Assessment - Wadeable Waters

☐ B3. Aquatic Life / Designated Uses Assessment - Non-Wadeable Waters

☐ B4. Recreational Waters and Water Supply Assessment

☐ B5. Advanced Point Source Pollution Impact Assessment

☐ B6. Advanced Nonpoint Source Pollution Impact Assessment

Survey C. Advanced Lakes Assessment

☐ C1. Screening Assessment

☐ C2. Impairment Determination Assessment

☐ C3. Comprehensive Lakes Watershed Assessment

Survey D. Advanced Stream Trends Assessment

☐ D1. Long Term Monitoring: Wadeable Waters

☐ D2. Long Term Monitoring: Non-Wadeable Waters

☐ **Survey E. Advanced Groundwater Basin Assessment**

Table 3B Select and List Indicators

List survey(s) you will carry out and the indicators for each.

Survey Type	Indicators

Step 4: What Are Your Data Quality Objectives?

Table 4A Data Quality Objectives for Sampling

For each sample type, list the objectives.

Sample Type	Completeness	Representativeness	Comparability

Table 4B Data Quality Objectives for Analysis

For each indicator, list the objectives.

Indicator	Accuracy	Precision	Detection Limit/Measurement Range

Step 5: How Will You Monitor?

This step involves deciding how you will collect and analyze samples.

Table 5A: Sample Collection Methods (see Appendix 2)

Indicator	What will be sampled	Sampling containers or devices/ preservation	Quantity of sample to be collected	Number of samples to be collected per site	Methods Reference

Table 5B: Sample Analysis Methods

Indicator	How Sample Transported to Lab	Maximum Holding Time	Method Reference	Brief Description of Method	Reporting Units

Step 6: Where Will You Monitor?

This step involves deciding where you will collect and analyze samples.

Table 6A: Sampling Site List

Site Number	Brief Description of Location (Pa. Stream Code[1] for Segment)	How and Where the Site Will Be Sampled	Type of Site	Indicators

[1] From the PA Gazetteer of Streams

Table 6B: List where each indicator will be analyzed (field or lab)

Place of Analysis	Indicators Analyzed

Step 7: When Will You Monitor?

Table 7A. Sampling Schedule, Frequency, Times and Weather

Indicator(s)	Sampling and Analysis Dates	Time of Day Sampled	Special Weather Conditions

Step 8: Quality Assurance & Quality Control

Table 8A Quality Control Measures

Indicator(s)	Internal Quality Control Measures	External Quality Control Measures	Percent Quality Control Samples

8B Evaluation of Quality Control Results: *List the statistical tools (if any) you will use to compare your quality control results with your data quality objective for each type of quality control sample.*

Type of Quality Control Sample	Statistical Tool

8C Quality Control Response Actions: *Describe the follow-up investigation actions you will take if you don't meet your data quality objectives or if you find errors or problems in your monitoring.*

8D Training

1) List the types of training sessions to be run for initial field monitors and lab volunteers, and who will do the training.

2) How will new field and lab monitors be trained (after the initial group has been trained), and who will do the training.

8E What manuals will volunteer monitors use?

Step 9: Data Analysis

Table 9A Data Management - Recording Data: *Describe the information that will be recorded on the field and lab sheets.*

Field Sheets	Lab Sheets

9B Data Management: How will field and lab sheets be handled?

9C Data Management - Entering and Validating Data – *Answer the following questions:*

1) What computer application will be used?

2) Who will enter the data?

3) How will results below detection limit and missing values be entered?

4) Who will check the data entry for accuracy?

Table 9D Data Analysis – Summarizing Data *List the statistical summaries you will use to reduce your data set.*

Indicator	Statistical Summary

9E Data Analysis: *How will your data be analyzed?*

1) What reference conditions will you compare your data with?

2) What process will you use to come up with a story based on your data?

9F Data Reporting: *How will you report the data?*

1) Who will you report it to? Who are your audiences?

2) What types of reports will you produce for each audience?

3) What report format will you use for your written report?

Step 10: Project Tasks and Personnel

Table 10A Major Project Tasks and Who Will Carry Them Out

Major Project Tasks	Who Will Carry Out (Position Title)	Paid Position? (Y/N)	Address, Phone #, email

Table 10B Technical Committee

Member Name	Area of Expertise	Address, Phone, email