Developing a Stream Monitoring Program
[Insert name of your organization]

Prior to developing a monitoring program it is essential to think through the scientific process and the steps necessary to create a program where the data collected match the monitoring objectives. The choices you make about your monitoring program will be documented in a written monitoring plan. Preparing a monitoring plan is the most important step in organizing your monitoring efforts because:

- It helps you to focus on what you are trying to achieve with your monitoring program,
- It allows you to learn all of the components of stream monitoring before "getting your feet wet",
- It clearly documents your sampling and analysis methods along with your quality assurance procedures,
- It helps you to select the most appropriate monitoring strategies to address the issues that are important to you, your group, and your community, and
- It minimizes the impact of changing members on the continuity of your monitoring activities.

Once you begin monitoring, you should revisit your monitoring plan annually to determine if the data you are collecting are answering the initial questions that prompted monitoring and to determine if your methods are still appropriate.

Before you begin:

1. Identify monitoring champion for your organization.
2. Gather a team to develop your study design (e.g. stakeholders, other data collectors in your watershed, scientific team, etc.).
3. Take stock of your resources (financial, people, equipment) what do you have and what do you need? What is your anticipated budget for monitoring for 0-5 years?
4. Examine your organization's strategic plan or work plan, how will monitoring be incorporated?

Step #1: What are the goals of the organization and community partners?

Before you begin a stream monitoring program, it is important to have organizational buy-in and to insure that monitoring fits in well with the group's mission.

Organizational Mission & Goals	
What are the mission and goals of the organization and community partners?	
Does monitoring advance organization and community partners' missions?	
Organizational mission statement (if applicable):	
Program Areas	
What existing programs does the organization implement?	
Can organization support another program?	

#2: Why do you want to monitor streams in watershed?

It is important to reach a consensus among the group about the purpose of the monitoring program. First, identify questions, which if answered, can provide useful information to stakeholders and decision-makers. Then, determine how monitoring can help answer those questions and achieve your group's goals.

Examples:

- Is the water quality meeting or exceeding state standards?
- How are failing septic systems affecting water quality
- How will proposed development affect water quality?
- Is the Cherry Street hog farm impacting the local swimming hole?

Organizational & Watershed Questions	
What are the goals/purpose of the organization's monitoring program?	
What are the specific questions that can be answered through monitoring?	

How can monitoring help to answer these questions?	

Prior to developing a monitoring plan, it is important that the group understands the key watershed features and background information – what is the story of your watershed? Why is it the way it is today? There are a lot of resources groups can use to develop this background information.

County Watershed Characteristics	
Watersheds	
Size	
Land use	
Geology	
Towns	
Permitted dischargers	
Designated stream uses	
Population	
Special features	
Water quality data	
Historical significance	
Watershed Concerns	
What are the watershed concerns?	
What information is needed to address these concerns?	

Step #3: Data Use

After deciding on your research questions, you need to look ahead and think about how you are going to use your data. This will be vital in determining what type of equipment, protocols, and quality assurance measures you will need to use, since your data use objectives will need to align with your monitoring objectives. It is also important to keep in mind your available resources.

Data Use	
How will you use your data?	
Who will you share your data and/or results with?	
How will you share your data/results?	

Step #4: Monitoring Components

Streams are complex systems of inter-related biological, chemical, and physical characteristics. It is important to choose parameters that will help to answer your monitoring questions.

Examples of watershed indicators:

- Biological – macroinvertebrates, bacteria, fish, plants
- Chemical – dissolved oxygen, nitrate, pH, orthophosphate
- Physical – flow, in-stream cover, land use, riparian habitat, temperature, turbidity

Watershed Indicators	
Biological	
Chemical	
Physical	

Step #5: Monitoring Methods

The sampling and analysis methods you choose must align with how you plan to use your data.

Sampling Methods & Equipment	
Macroinvertebrates	
Water chemistry	
Visual assessment	

Step #6: Monitoring Locations

It is important to think through where you monitor. There are many things to consider, including:

- Safety and accessibility
- Potential water quality impacts
- Reference locations
- Stream designated uses
- Resources – equipment and people

Site	Site Description	Site Location	Site Justification

Step #7: Monitoring Timeframe

Monitoring Timeframe	
When will monitoring begin?	
When will monitoring end?	
How often will you monitor biological parameters?	
How often will you monitor chemical parameters?	
How often will you monitor physical parameters?	
Will you monitor year-round?	

Step #8: Quality Assurance/Quality Control

Practice	Components
Training requirements	
Care and calibration of equipment	
External QA/QC	
Documentation of procedures	

Step #9: Data Management & Communication

It is important to think through not only how you will manage your data (datasheets, Excel spreadsheet, online system, etc.), but also how you will convert the raw data into useful information that sheds light on the answers to your monitoring questions.

Data Management	
Field data	*Data sheets for all monitoring aspects*
Organization data	*Excel? Access?*
Data sharing	*Organizational database, partner database, Water Quality Portal?*
Data use	Look at step 3.

Step #10: Monitoring Program Resources and Tasks

You will need to be practical and consider how human and financial resources will impact your monitoring program.

Available Resources	
Who is doing the monitoring?	*Staff? Volunteers?*
How many monitors will you be able to recruit?	
What start-up funds are available for the program?	
What is your anticipated budget for monitoring time frame (staff, equipment, equipment refills, data management)	

There are many responsibilities and roles that come with maintaining a successful volunteer monitoring program. It is important that responsibilities are shared so that no one becomes overburdened.

Potential Volunteer Monitoring Positions		
Program coordinator	Checks in with monitors, point contact person for organizing trainings	
Volunteer recruiter	Recruits new volunteers	
Equipment manager	Keeps a schedule of reagent expiration dates and orders/distributes supplies	
Fundraiser	Raises money for the stream monitoring program	
Data manager	Collects datasheets, enters data into database, and conducts data analysis	
Outreach coordinator	Communicates results to a larger audience	
Monitor	Monitors the stream	