The Study Design – The Game Plan Behind Successful Monitoring Strategies and Effective Data Use

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INTIMIDATION

Monitoring Questions (Study Design Process)

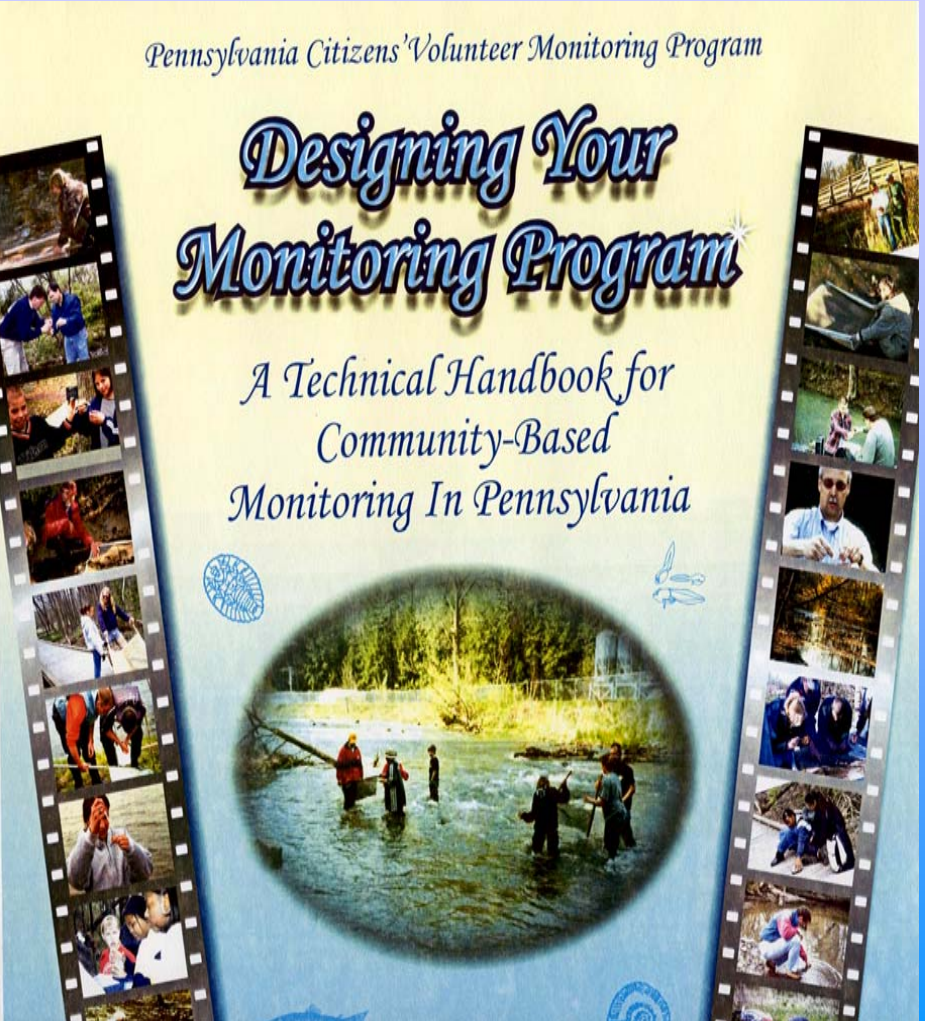
<u>Why</u> am I monitoring?

<u>Who</u> is going to use the data?

<u>What</u> should I monitor and <u>where</u>?

<u>How</u> should I monitor and <u>when</u>?

Technical Handbook



- Offers monitoring choices
- Standardizes the study design process, not the monitoring
- Suggests monitoring approaches
- Clarifies DEP use of data

Why Study Designs are Important

Gives logical series of choices

Provides clear game plan

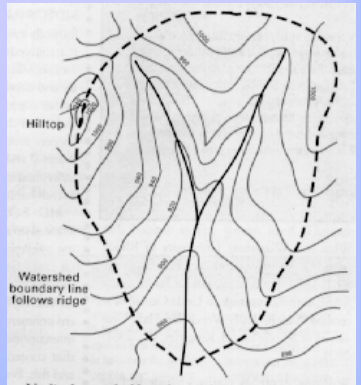
Lends credibility to data and actions

Increases data user confidence

Required for grants

Step 1: What Is Known About the Watershed?

Watershed area/tributaries



Idealized watershed boundary. Adapted from Method for the Comparative Evaluation of Nontidal Wetlands in New Hampshire.

Geology and land use

Existing monitoring reports/data

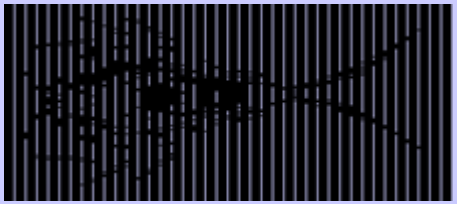
Issues, threats,concerns

Step 2: Why Are You Monitoring/Data User

Match monitoring purpose to data user:

- Education and awareness
- Stream bank stabilization project effectiveness
- Information for the municipality
- Agency use - 305(b) Report

Step 3: What Will You Monitor?



Biological – macroinvertebrates, fish, plants, bacteria

Physical - temperature, water clarity, flow

Chemical - dissolved oxygen, pH, nutrients

Habitat – vegetation, bottom composition

Step 3: What Will You Monitor?

Practical considerations:

- **Human and financial resources**
- **Difficulty to monitor**
- **Will it help to understand ecosystem**
- **Understood by the target audience**

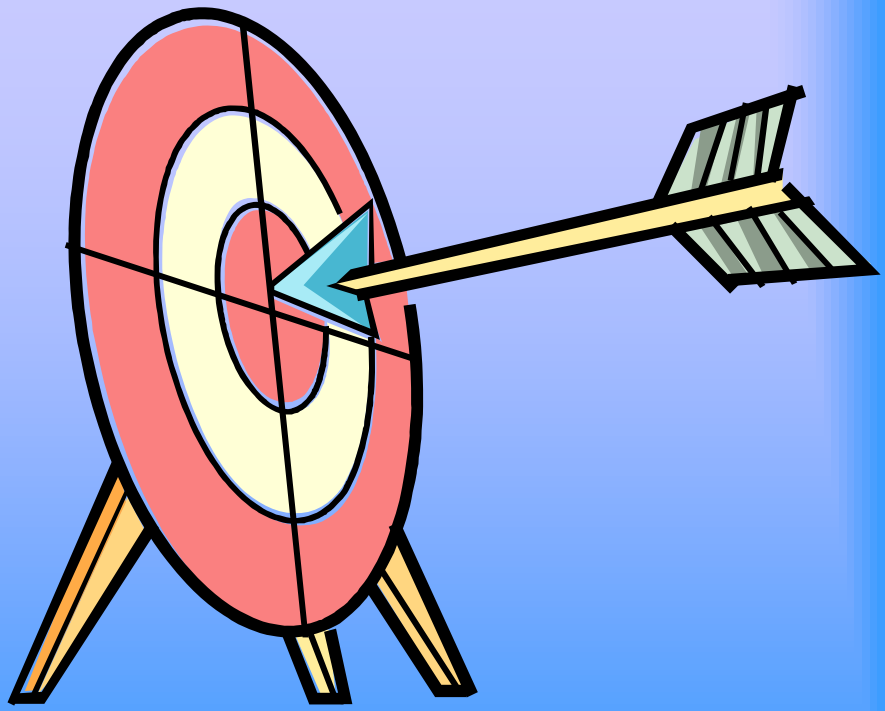
Step 4: What Are Your Data Quality Objectives?

Accuracy

Precision

Representativeness

Completeness



Step 5: How Will You Monitor?

Sampling and analysis methods?

Equipment?

Choose methods that meet data quality objectives.

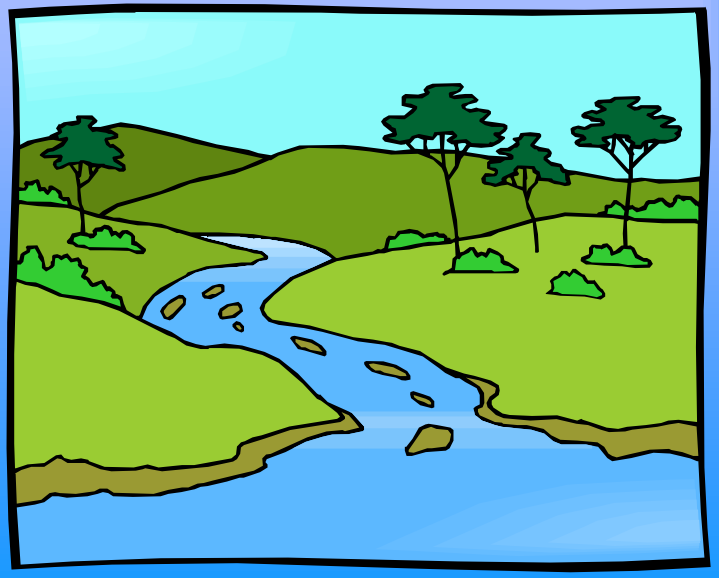
Step 6: Where Will You Monitor?

Point sources

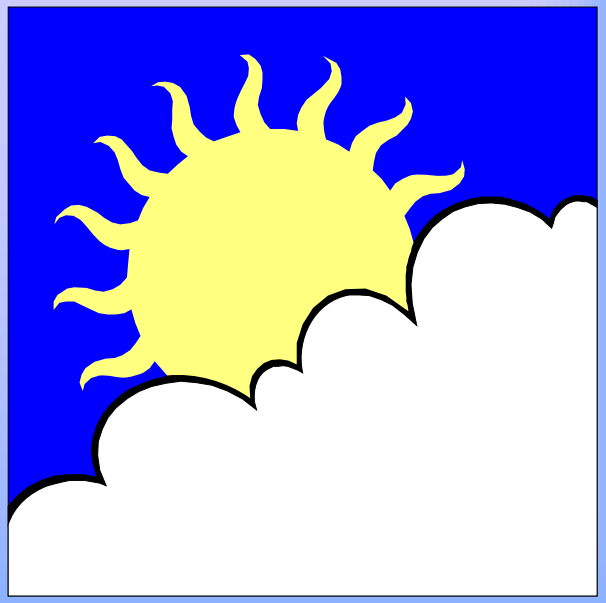
Non-point sources

Near mouth

Headwaters



Step 7: When Will You Monitor?



Time of year

Time of day

Special weather conditions: storm events, drought

Step 8: What Are Your Quality Assurance Measures?

Organization and planning

Sampling and analysis

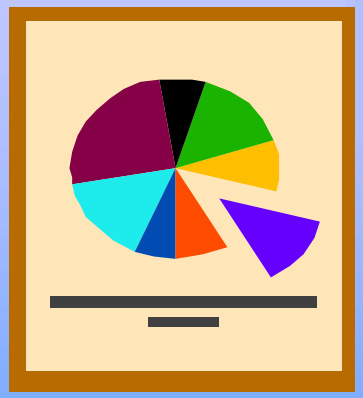
Data management

Documentation

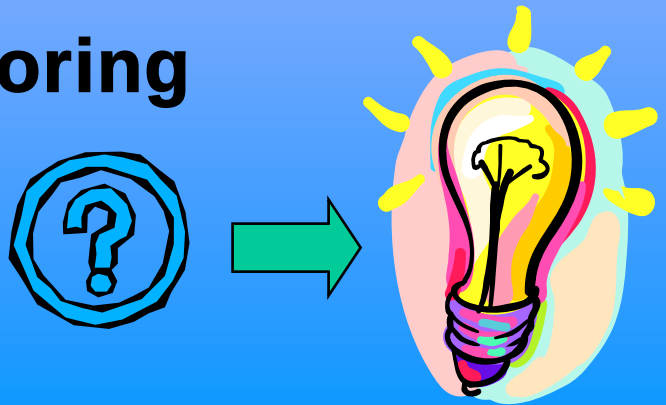
Step 9: How Will You Manage, Analyze and Report the Data?

Data interpretation-

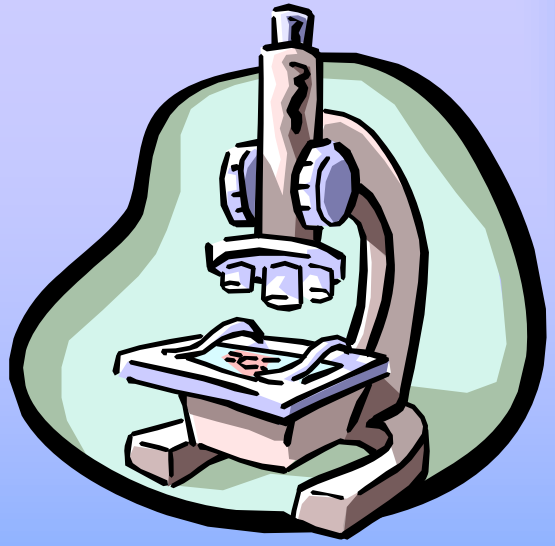
- Converts raw data into useful information



- Gives answers to monitoring questions



Step 10: What Are the Tasks, and Who Will Do Them?



Purchase equipment

Find a lab

Develop a study design

Monitor

Step 10: What Are the Tasks, and Who Will Do Them?

Recruit / train volunteers

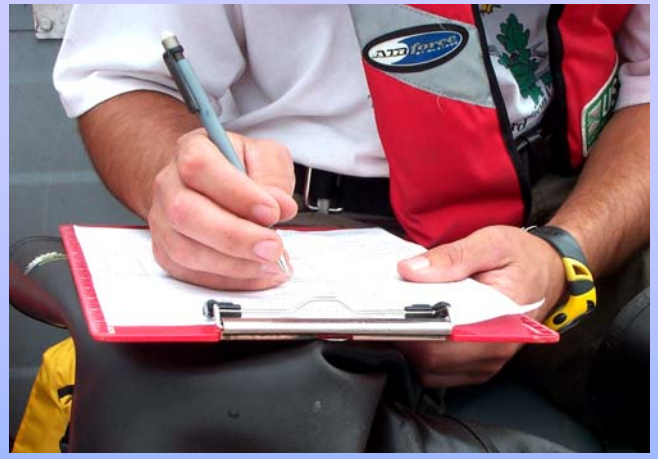
Perform quality assurance

Analyze results

Report results

Summary of Study Design Process

10 Step Process:



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Study Designs Leading to Data Use

Capital Region Senior Environment Corps – first EPA-approved study design for volunteers in Pennsylvania

Baseline data to Conservation District for assessing agricultural BMP's

Provide data for York Region Water Resources Protection Plan

Involve school students in stream monitoring

Study Designs Leading to Data Use

"By distributing our study design to the watershed organizations, the conservation district, other conservation organizations, they were made aware of our mission, and when they had an occasion to use our information they approached us."

Indiana Senior Environment Corps

Study Designs Leading to Data Use

Indiana County Senior Environment Corps:

Blacklick Creek - watershed assessment

Blackleggs Creek – grant/AMD treatment system

Little Mahoning Creek – grant/assessment

Study Design Use

Volunteer lake monitoring study design guides lake monitors who want to know:

- **Is lake good or bad**
- **Is lake swimmable**
- **Is fishery healthy**
- **What's going on in the lake**

LIMITATIONS

UNTIL YOU SPREAD YOUR WINGS,
YOU'LL HAVE NO IDEA HOW FAR YOU CAN WALK.

Volunteers – An Untapped Resource