



Intro to Stream Monitoring

Students investigating and conserving their streams

Presentation 1

Water Ways: Stream Ecology and Monitoring

Rebecca Wolf
Watershed Coordinator | Interstate Commission on the Potomac River Basin
301-274-8110 | bwolf@icprb.org | potomacriver.org



Interstate Commission on the Potomac River Basin – Water Ways: Stream Ecology and Monitoring

https://www.potomacriver.org/water_ways

This show presentation is intended to introduce students to reasons for stream monitoring and the different ways that streams are monitored. It is meant to be interactive. Students could do follow-up research to answer the planning questions on slide 8, so that they can take part in setting up the stream monitoring program.

My appreciation goes to Dan Boward and the Maryland Biological Stream Survey and Dan Boward for inspiring my love for stream ecology, as well as the quality education and resources he and his colleagues have provided me and the public through their personal efforts and on-line resources. *R. Wolf*

With 15,000
miles of
freshwater
streams in
Maryland...



- There is a stream within 15 minutes of every household.
- One of these great resources could be near your school.



How many of you have streams running through your school grounds or have access to one within walking distance of your school? Do any of them resemble these streams?

From the State of Maryland's monitoring efforts we now know that there are **more than 15,000 miles** of freshwater streams in Maryland, which means that almost all Marylanders live within 15 minutes of a freshwater stream. Ultimately, each of these streams feeds into the Chesapeake Bay. (Some of these streams are intermittent; the estimate for streams with year-round flow is over 10,000 miles.)

Top photo: Maryland Department of Natural Resources,
Middle Photo: Jim Palmer, ICPRB,
Bottom: MD DNR

Sadly...

- 46% Maryland's Streams are in Poor Condition.
- Only 12% are in Good Condition.



► Questions for engaging students:

- Have any of the students seen streams in their neighborhoods or near schools that look more like this?
- What are some clues about the water quality of these streams?
- Would any of us want to wade in them? How likely is it that a variety aquatic life lives in these streams?

From the physical clues of erosion, trash, the color of the water, we could hypothesize that the streams polluted, but it takes a scientific & systematic approach to really understand the status of these ecosystems. This involves monitoring a stream using established field methods and keeping records of findings.

Background info: Surveys completed in 1997 by the Maryland Biological Stream Survey, Maryland Department of Natural Resources have revealed that 46% of our stream miles are in poor condition. Only 12% are in Good Condition. The rest are "Fair." See MDNR's Stream Health site for background publications and interactive stream health maps.

What can be done?

*One of the first steps
in conserving a stream
is learning about its
ecosystem and the
factors affecting it.*

Students can do this by
monitoring. This means
regularly making scientific
observations of a stream near
your school or community.



Photo: ICPRB yearly stream sampling in Pennsylvania.



A question that could be asked is why is this statement true. Also, one could point out that citizens play a vital role in collecting stream data throughout the Chesapeake Bay region and the United States.

What characteristics of a stream are monitored?

- Vegetation and wildlife in the **riparian** area (next to the stream)
- Habitats in the stream
- Fish and benthic macro-invertebrates (insect larvae, mussels, clams).
- Chemical properties of the water.



All of these factors affect the quality of the stream ecosystem for aquatic life, human recreation and fishing, and as a source for drinking water.

Other ICPRB Stream Ecology presentations cover these aspects of monitoring in greater detail.

Citizen Scientists:

Your class could do all of some of these surveys.



Assessing physical and chemical stream characteristics.

Biological monitoring:
collecting benthic
macroinvertebrates.



Uses for Your Findings

Your data will show you the condition of your stream. You could:

- Discover issues that might negatively affect it.
- Determine if changes on your campus could improve it.
- Report abrupt changes in water quality to appropriate agencies.



Setting Up Your Stream Studies

To plan stream research, think about these questions:

How frequently should we monitor?

- Would different types of monitoring (chemical, physical, and biological) be done with the same frequency (the same number of times/year)?
- What can we learn from monitoring once?
- What can we learn from monitoring more than once a year?
- How could it be helpful to monitor yearly?
- What else do I need to know to answer these questions?

Are certain times of year better for some of the stream studies?

Are there any unusual challenges to collecting samples at our stream site? If so, what are possible solutions?



Teachers might want to return to this slide after the students have learned more about monitoring. This also could be used after monitoring, so that students could make a plan for future monitoring. In planning a monitoring program, students will also need to plan on how to store and/or share the data. There are many options available for uploading their findings on maps, including those hosted by Fieldscope and the Izaak Walton League of America.

Vocabulary:

- **Benthic macroinvertebrates:** organisms without backbones that are visible to the eye (less than 2 inches long), and live on the bottoms and underwater surfaces of lakes, rivers, and streams.
- **Monitoring:** regularly making observations with field methods and instruments and recording those observations.
- **Riparian:** relating to or situated on the banks of a river.

