



Intro to Stream Monitoring Introducción al seguimiento de los cursos de agua

Students investigating and conserving their streams
para estudiantes que realizan tareas de investigación y conservación de sus cursos de agua

Presentation 1
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Water Ways: Stream Ecology and Monitoring
Water Ways: La ecología y el seguimiento de los cursos de agua

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Interstate Commission on the Potomac River Basin – Water Ways: Stream Ecology and Monitoring
https://www.potomacriver.org/water_ways

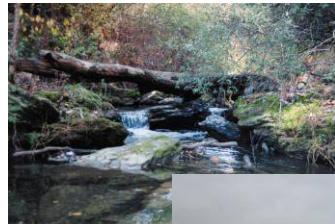
This show presentation is intended to introduce students to reasons for stream monitoring and the different ways that streams are monitored. It is meant to be interactive.

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...
Con m s de 15,000 millas de cursos de agua dulce en Maryland...**

- There is a stream within 15 minutes of every household.

Hay uno a 15 minutos de cada hogar.



- One of these great resources could be near your school.

Uno de estos incre les recursos podr a estar cerca de tu escuela.



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... Desafortunadamente...

- 46% Maryland's Streams are in Poor Condition.
El 46 % de los cursos de agua en Maryland se encuentran en malas condiciones.
- Only 12% are in Good Condition.
Solo el 12 % se encuentra en buen estado.



- ▶ 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? ¿Qué se puede hacer?

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

Uno de los primeros pasos para conservar un curso de agua es aprender acerca de su ecosistema y los factores que lo afectan.

Students can do this by *monitoring* — regularly making scientific observations of — streams near your school or community.

Los estudiantes pueden hacer esto mediante un *seguimiento* (observaciones científicas periódicas) de los cursos de agua en los alrededores de su escuela o comunidad.



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?

De qué características de un curso de agua se hace un seguimiento?

- Vegetation and wildlife in the **riparian** area (next to the stream).
De la vegetación y la vida silvestre en la zona **ribera** (junto al curso de agua).
- Habitats in the stream.
Del hábitat en el curso de agua.
- Fish and benthic macro-invertebrates (insect larvae, mussels, clams).
De los peces y macroinvertebrados bentónicos (larvas de insectos, mejillones, almejas).
- Chemical properties of the water.
De las propiedades químicas del agua.



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 Ciudadanos científicos

Your class could do all of some of these surveys.

Tu clase podrá hacer algunos de estos estudios.



Physical and chemical stream characteristics.

Características físicas y químicas del curso de agua.

Collecting benthic macroinvertebrates.

Recolección de macroinvertebrados bentónicos .



Uses for Your Findings Usos de sus hallazgos

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

Los datos te indicarán el estado de tu curso de agua. Podrás:

- discover issues that might negatively affect it.
descubrir elementos que podrían perjudicarlo.
- determine if changes on the school grounds could improve the stream.
determinar si hacer cambios en el predio escolar podrían mejorar el curso de agua.
- report abrupt changes in water quality to appropriate agencies.
informar cambios bruscos en la calidad del agua a las agencias correspondientes.



Setting Up Your Stream Studies

Cómo organizar los estudios de tu curso de agua

Discuss these questions to plan your stream research:

Comenta estas preguntas para planificar la investigación de tu curso de agua:

- How frequently should we monitor?
■ Con qué frecuencia deberíamos hacer el seguimiento?
 - Would different types of monitoring (chemical, physical, and biological) be done with the same frequency (the same number of times/year)?
■ Deberíamos hacer los distintos tipos de seguimiento (químicos, físicos y biológicos) con la misma frecuencia (la misma cantidad de veces al año)?
 - What can we learn from monitoring once?
■ ¿Qué podemos saber con un solo seguimiento?
 - What can we learn from monitoring more than once a year?
■ ¿Qué podemos saber con más de un seguimiento al año?
 - How could it be helpful to monitor yearly?
■ ¿Qué utilidad tendría hacer un seguimiento anual?
 - What else do I need to know to answer these questions?
■ ¿Qué más necesito saber para responder estas preguntas?
- Are certain times of year better for some of the stream studies?
■ Existen ciertos períodos del año más propicios para hacer algunos de los estudios del curso de agua?
- Are there any unusual challenges to collecting samples at our stream site? If so, what are possible solutions?
■ Existe alguna dificultad fuera de lo común para recolectar muestras en nuestro curso de agua? Si la hay, ¿cuáles son las posibles soluciones?



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 Izaac Walton League of America.

Vocabulary Vocabulario

- **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.
Macroinvertebrados bentónicos : organismos invertebrados visibles a simple vista (inferiores a 2 pulgadas de largo) que habitan en el fondo y en los sustratos sumergidos de lagos, ríos y arroyos.
- **Monitoring:** regularly making observations with field methods and instruments and recording those observations.
Seguimiento: hacer observaciones de forma periódica con instrumentos y métodos de campo y llevar un registro de esas observaciones.
- **Riparian:** relating to or situated on the banks of a river.
Ribereño (a): relativo a las orillas de un río o situado en ellas.

