Stream Water Quality Testing

Water quality in streams can be assessed in several ways. Macroinvertebrate sampling is an inexpensive option that can be done in cooperation with students or stream-watch groups. (Photo: Woodway Country Club, CT)

Have you ever wondered about the health and water quality of the streams and rivers that run through your property or your community? Are these aquatic ecosystems being adversely affected by pollution from upstream neighbors? Are *your* activities affecting water quality for your neighbors downstream? Answering these questions is easier than you may think, and lies just below the water's surface.

Evaluating the relative health of a stream is easy and inexpensive. You don't need to be a chemical genius or have a Ph.D. in aquatic ecology to monitor stream water quality. All you need are some knee-high boots, an aquarium net, a dish pan, and a magnifying glass. For nearly 20 years aquatic ecologists have been monitoring streams using indicator organisms: small aquatic animals that tell whether stream water quality is high or low.
The moving water of streams can wash away and dilute some pollutants, making them difficult to find with a chemical test. *Aquatic macroinvertebrates* (visible animals without backbones), however, are sensitive to water quality over time. The presence of certain groups of these organisms can tell you a lot about the quality of a stream over several months.

The key to using these indicator organisms is being able to identify the aquatic insects described on the next page, and understanding their relative tolerances to poor water quality. Like canaries in a mine, these little-known stream dwellers can tell you about the health of their underwater kingdom. Look for these and other stream organisms under submerged rocks and logs, especially in places where the water is moving quickly. Once you have tested stream waters, contact your state conservation agency if you think your stream or river is polluted.

Aquatic insect larvae and other macroinvertebrates are large enough to see and identify. They are collected, grouped, and counted during a stream monitoring session.

Monitoring streams and ponds is a good way to detect the movement of nutrients and chemicals into water sources. Information from monitoring provides a good feedback mechanism for land managers who can see whether environmental management practices are working and then correct problems as needed.

Indicators of Good Water Quality

Several groups or *orders* of aquatic insects are sensitive to many types of pollution, including low oxygen levels. These aquatic insects need healthy water quality to survive, and they can be useful as indicators of good water quality. If you find these immature insects in your stream, chances are high that your water quality is good.

Stoneflies (Order *Plecoptera):*

Trout fisherman have long known that the presence of stoneflies in a stream can mean that good fishing is to be had. Identified by their *two tails* and pair of *two tiny hooks at the end of each leg, the presence of even a* few stonefly nymphs suggests that stream water quality is good.

Mayflies (Order *Ephemeroptera):*

Like the stoneflies, mayflies are also indicators of good water quality and are often the most numerous aquatic insects found in healthy streams. Mayflies are identified by their *three tails* and *single hook at the end of each leg.*

Caddisfly (Order *Tricoptera):*

Caddisfly nymphs build an encasement of small stones, sticks, or other debris around their small bodies. These walking debris-piles make sorting caddisfly nymphs out of a stream sample relatively easy. While a few species of caddisfly are tolerant to certain pollution, their presence in your stream will usually indicate good water quality, especially when found in the company of stonefly and mayfly nymphs.

Indicators of Poor Water Quality

Several other Orders of aquatic insects are indifferent to or tolerant of stream water pollution. In many cases these indicate poor water quality, especially if they are the only macroinvertebrates found. Indicators of polluted water include:

Midges (Order *Diptera):*

The larvae of midgeflies *resemble small worms* and are the most common aquatic flies. Many species of midgeflies are tolerant to pollution and can be found in poor quality water. Red midgeflies, also known as *bloodworms* may be abundant in areas being polluted by sewage waste water.

Aquatic Worms (Order *Oligochaeta):*

Aquatic worms resemble their familiar terrestrial counterparts and burrow through stream sediments. Aquatic worms can do very well in areas of severe pollution and low oxygen and are, therefore, valuable pollution indicators.

Photos in this article were taken from NYS Department of Environmental Conservation's website, Stream Biomonitoring Unit section at http://www.dec.state.ny.us/website/dow/stream/. This website provides a description of the Unit's work and many additional photos. If you would like more detailed instructions for testing your stream, please contact us. There may be local conservation groups or high school classes that would be eager to help you as well. Contact us so we can direct you to appropriate resources.