Nonpoint Source Pollution Management Program

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Biological Indicators

What are they?

Specifically they are aquatic plants and animals that are susceptible to specific types and levels of pollutants. Many organisms require a specific range of physical and chemical parameters to flourish in surface waters.

Why test for them?

Fish, algae, and benthic macroinvertebrates are sometimes used when determining the biological integrity of surface waters. Benthic (bottom dwelling) macroinvertebrates, primarily immature insects, are useful organisms because: 1) many are sensitive to physical and chemical changes in their habitat; 2) many live in the water over a year; 3) they cannot easily ñescapeò pollution; and, 4) they are easily collected in many streams and rivers. The presence or absence of these ñindicatorò species can reveal the overall health of the water body. Biosurveys or bioassays use the collection and classification of aquatic organisms and changes in their populations as indicators of environmental change.

Typically, unpolluted waters will contain a greater diversity of organisms than polluted water. Polluted water will support larger numbers of tolerant organisms and have less diversity.

What affects aquatic organisms?

Factors that affect the aquatic community will vary greatly as you travel from the source of a river to its mouth. The most significant factors are; water temperature, volume, velocity and instream habitat. Instream habitat includes stream bottom composition (substrates), aquatic vegetation, woody debris, as well as food quantity and quality.

Suspended solids are a common form of pollution. These solids can settle on eggs and suffocate them. Suspended solids can also raise the water temperature. Other types of pollution will eliminate the most sensitive organisms, reducing diversity in the community and, in turn, cause an increase in pollution tolerant organisms. Pollution intolerant species include; mayflies, stoneflies, rock bass, smallmouth bass and several dace species. Examples of tolerant species are leeches, midge larva, bullheads, and carp.

How can we help strengthen the community?

Closely monitoring the riparian area and watershed associated with a river or stream for erosion, sources of pollution, and changes in the diversity and population of aquatic organisms are the most important tools.

For more information about the Nonpoint Source Pollution Management Program contact:
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