"Water Watch" Programs: Stream Water Quality Monitoring

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WATER — a priceless resource! Its quantity and quality are watched over by more organizations than ever before, ranging from local citizen groups to national and Federal government programs. "Water Watch," "Save Our Streams," and "Stream Quality Monitoring" are just a few titles used by various organizations for their water monitoring programs.

It is estimated that 45 of the 50 states have water protection programs of one kind or another, with more than 1,000 "water watching" subgroups involved. A large majority of these groups are comprised of concerned citizens who are taking the initiative to monitor their communities' lakes, streams, and rivers. Many are trained by state or independent environmental groups on what to look for and how to analyze water quality.

Citizen participation is considered vital to save America's surface waters. Federal and state agencies are only able to monitor a small portion of the nation's surface water, leaving a large percentage unprotected. Although some groups do more elaborate testing, including chemical testing, most citizen monitoring programs do simple biological monitoring tests. A golf course committed to addressing the water issues of the 1990s should be committed to water quality protection. Being aware of community monitoring programs and taking an active role in monitoring on-site water resources are good ways to start understanding water quality and setting priorities for its protection.

Biological Monitoring

Biological monitoring involves trapping, identifying, and recording stream organisms to determine water quality. It provides evidence of pollution problems that chemical sampling often misses.

The technical name associated with biological monitoring is "macroinvertebrate bioassessment." The term macroinvertebrate refers to living organisms lacking a backbone and large enough to be visible to the naked eye. These organisms provide an excellent source for stream quality assessment work because, by nature, they are restricted to the immediate habitat and cannot escape water quality changes. In freshwater streams, this group includes insects, crustaceans (crayfish), mollusks (clams and mussels), gastropods (snails), oligochaetes (worms), and others.

Macroinvertebrates live in sand and mud, or attached to submerged rocks, logs, sticks, and vegetation. Stream flow provides a steady supply of necessary organic material on which the organisms feed. When the water becomes polluted, macroinvertebrate populations are adversely affected and require considerable time to recover. In a monitoring program, the overall health of the water is assessed by determining the number and variety of organisms present. In general, a greater quantity and diversity of organisms indicates better water quality.

Water is a priceless resource to be protected. Biological monitoring of stream water quality involves periodically trapping and identifying stream organisms.
Monitoring Methods for Streams

A variety of sampling techniques and equipment are utilized by water monitoring groups. Analysis often involves measuring dissolved oxygen, pH, and identification of stream organisms. Monitoring stream organisms (macroinvertebrates) involves collecting the organisms in a fine mesh seine from a small riffle area on the stream bottom. The macroinvertebrates are identified, counted, and returned to the stream, or taken to a classroom for detailed identification.

Water Quality Assessment

Interpretation of stream quality data involves analyzing the diversity and type of organisms found in the sample. Macroinvertebrates are dependent on one another, so loss of one species impacts others. Additionally, the organisms found in the macroinvertebrate group have different tolerances for low oxygen levels or toxic substances associated with pollution. Therefore, the presence or absence of certain organisms can be related to the water quality. One simple guideline for stream assessment, using the rock scraping survey method provided by the New Jersey Water Watch Program, is as follows:

<table>
<thead>
<tr>
<th>Stream Quality Rating</th>
<th>Organisms Present</th>
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<tbody>
<tr>
<td>Good</td>
<td>Stoneflies, mayflies, and caddisflies</td>
</tr>
<tr>
<td>Fair</td>
<td>Caddisflies only</td>
</tr>
<tr>
<td>Poor</td>
<td>Tubiflex worms and red-colored midget larvae dominate sample</td>
</tr>
</tbody>
</table>

Results are most accurate in April, May, or June. Later in the summer, fewer stoneflies will be observed.

There are more elaborate assessment procedures used to identify and rate organisms; however, the premise is the same. Recording the aquatic life found in the stream and applying knowledge of each species’ sensitivity to pollution provide techniques to rate water quality.

Summary

Citizen monitoring programs are rapidly growing throughout the nation. Efforts are underway to establish a national group or organize the volunteer groups and to standardize testing procedures. Biological monitoring is not difficult to master. Middle school and high school students are participating nationwide. Data from numerous citizen groups have, in many areas, gained considerable credibility and are used in government database programs and by national water quality organizations such as the Izaak Walton League.

Important indicators of pollution entering a stream can be identified by a simple stream monitoring program. Participation in stream monitoring provides a unique opportunity to increase educational awareness. It makes sense to be aware of your golf course stream’s current water quality and to conduct your own “water watch” or get help from a local citizen monitoring group.

Whom to Contact?

Most states have a Division of Water Resources, as part of the Department of Natural Resources or Department of Environmental Protection, that can direct you to local water watch groups in your area.

The USGA-sponsored Audubon Cooperative Sanctuary Program for Golf Courses also has a water watch program in which you can participate. For more information, contact the Audubon Society of New York (phone 518-767-9051).

The New Jersey Water Watch Program works with high school students on educational programs about water quality testing procedures.