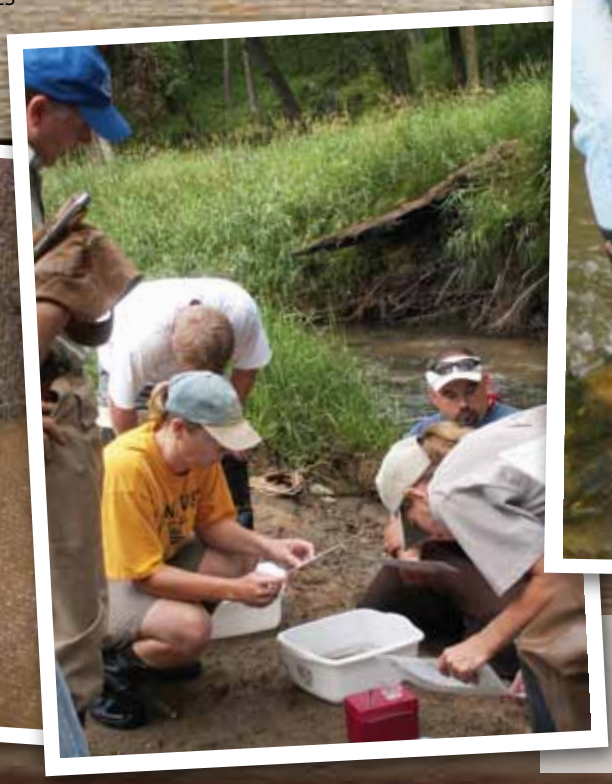
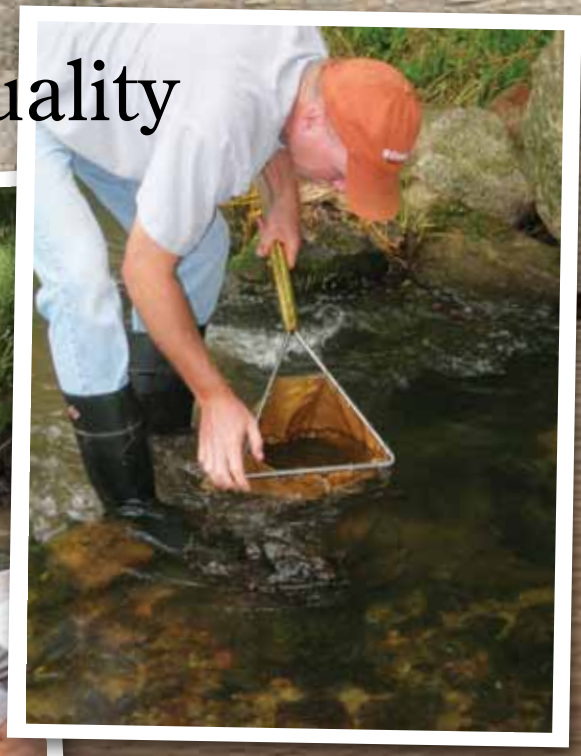
A BUG'S LIFE

Using Aquatic Life as Messengers of Water Quality

STORY AND PHOTOS BY KAREN GRIMES





Examining a stream's aquatic life may be the best way to take its pulse. Sampling only the chemical or physical traits of a stream gives just a fleeting look at the indicators of stream health.

Streams talk. They babble, they gurgle. They ripple and splash. This small stretch of stream makes a sharp U-turn, digging away at the base of the bluff, lapping against a sandy beach on the inside of the turn.

Its gentle melody plays in the background as children giggle and splash. But wait—these aren't children wading in bare feet and scruffy cutoffs. These are adults in hip boots and chest waders, using nets and fingers to overturn rocks and dig into bottom sediments, seeking small critters that reflect the stream's condition.

They are foresters, biologists, conservation professionals, a private engineer and a city elected official. They have a common love of the land and desire to improve stream health. Improvement comes from understanding, so these professionals are learning more at the three-day Stream and Watershed Integrated Management (SWIM) workshop.

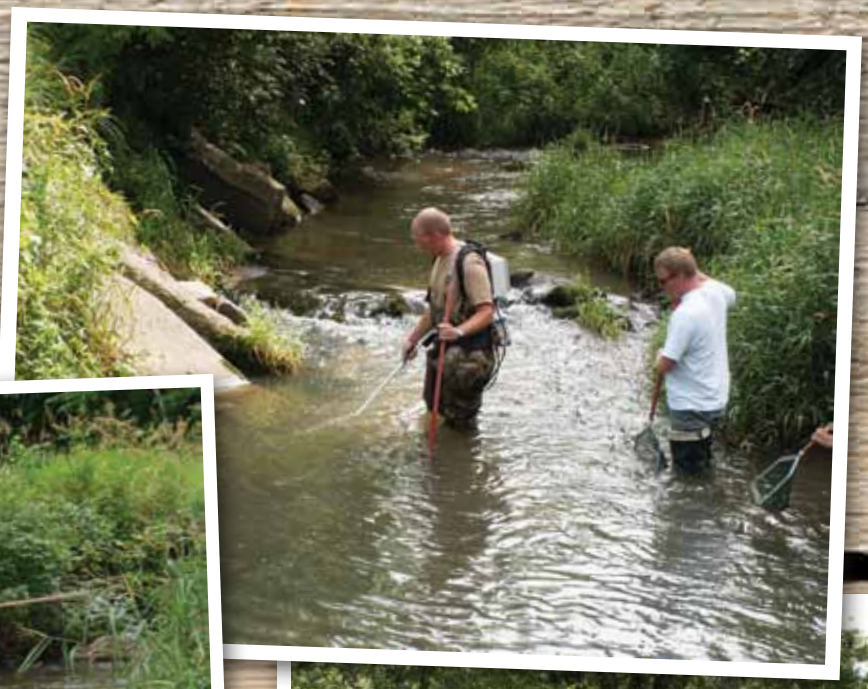
By their inherent nature, streams are moving targets. To learn about water quality in a stream, a student must move with the water or return repeatedly to the same spot, taking measurements and samples in all seasons. Even then, "You cannot step twice into the same river," as Greek philosopher Heraclitus wrote around 500 B.C.

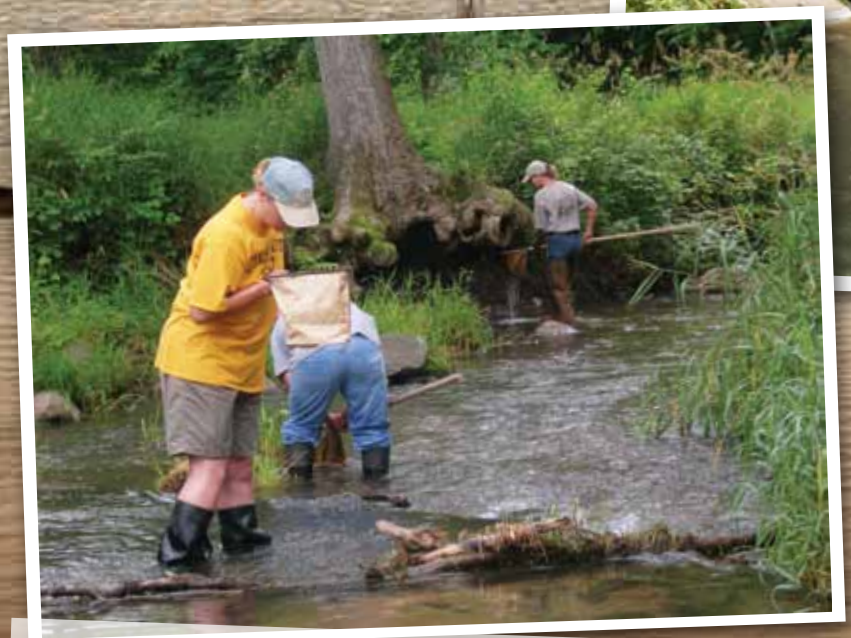
Capturing aquatic insects and other invertebrates is one way to evaluate the ever-changing nature of streams. Identifying, sorting and recording the frequency of stream invertebrates tells these students that Springbrook Creek is ailing. The lack of caddisflies and mayflies, coupled with abundant aquatic sowbugs, suggest a water quality problem. Sowbugs, bloodworms, leeches and other pollutant-tolerant invertebrates thrive in streams that are rich in nutrients, choked with algae or have periodically low oxygen levels.

The students move to a fisheries station, electrofishing to see what fish species flit around this central Iowa stream which flows from a tile outlet to the Middle Raccoon River. Then it's on to a physical and chemical assessment of the waters, beds and banks. Measuring dissolved oxygen, pH, nutrients, bottom sediments, stream width and depth—streams are complex systems—the list is long. Deciphering the types of plant life and food available for animal life and identifying the mini-ecological niches such as riffles, deep pools and undercut banks are aides to

GET INVOLVED

SWIM *workshops are held in July at Springbrook Education Center in Guthrie County. Learn more at* www.iowadnr.gov/education/swim.html.





Aquatic critters are like a melody playing against a symphonic harmony of geology, physical setting and water chemistry. The resident community of aquatic invertebrates and fish sums up the interactions of the stream's potential with its landscape and human activities on that landscape over time. A healthy stream has animals that waltz only in pollutant-free waters. An unhealthy stream, inundated with excessive nutrients, organic matter or siltation, is frequented by pollutant-tolerant species like sow bugs, filamentous algae and creek chubs.

Springbrook Conservation Education Center

understanding. At each station, students gain knowledge.

The work begins in the classroom where instructors from Iowa State University, DNR, Iowa Department of Agriculture and Land Stewardship, and Natural Resources Conservation Service introduce relationships between a stream's geology, energy, landscape and ecology.

Geology is the backbone of a stream. Just as a human skeleton determines a person's height, geology provides the framework that determines many of the physical and chemical characteristics of a stream. For example, streams in the karst topography of northeast Iowa are fed by cool groundwater, allowing them to support trout through Iowa's hot summers. Poor drainage and many natural lakes and wetlands shape the warm, slow-flowing prairie streams in the recently glaciated Des Moines Lobe. Whereas streams in the steep loess hills of western Iowa are subject to downcutting and gullying.

Classroom learning is no substitute for experiential learning, as the class discovers on a hot afternoon tromp through cropfields, pasture and woodland to compare two stream segments—one shaded by a narrow strip of trees and one in the midst of a cattle pasture.

For licensed civil engineer and surveyor Gary Casady with TeKippe Engineering of West Union, this in-the-field, hands-on experience augmented his expertise with urban storm water detention and pollution prevention plans on construction sites. He's been to expensive engineering seminars costing upwards of $1,000. But in this three-day, $75 workshop, he learned, "It's not necessarily the color of the water, it's what can survive out there that determines the quality of the water.

"As a design engineer," he says, "it's become absolutely necessary to understand and evaluate the downstream quality of a stream both pre- and post-construction." It was a revelation to him that he could learn more about a stream by slipping on a pair of hip boots and turning over some rocks than by sending water samples to a lab.

Streams are complex ecosystems with constantly varying inputs. Like listening to the many notes, rhythms and instruments that make up a symphony, understanding a stream requires examining many intricate and interrelated plant, animal and human actions that influence its health.