Water Watch Trainees Get Their Feet Wet

Community volunteers monitoring local waterways

by Sue Smith-Heavenrich

Broader View Weekly, October 7, 2010

About two dozen community volunteers showed up last month for the second in a series of Cayuta-Catatonk Water Watch training sessions being held in Spencer. “We’ll be doing some water tests,” Dr. Steve Penningroth told the group. But they wouldn’t be collecting data – the workshop was an opportunity for participants to get some hands-on experience using some of the water testing equipment.

Penningroth, director of the Community Science Institute in Ithaca, has already developed a successful program for volunteers who monitor the tributaries of Cayuga Lake. That program focuses on agricultural pollutants – the nutrients phosphorus, nitrogen and potassium as well as sediments and coliform bacteria.

Cayuta-Catatonk Water Watch (CCWW), however, will focus on potential contamination from industrialized gas drilling activities. The potential for increased shale gas activity spurred Van Etten resident Autumn Stoscheck to organize the water monitoring group. She’s hoping volunteers will begin testing water in local streams before drillers move into the area. Not only will the baseline data they gather provide important information about stream health, but it will help the community protect its valuable water resources.

The challenge for Penningroth was to come up with a series of tests that would detect changes due to drilling activity – at a price community volunteers can afford. And that meant focusing on specific indicators of contamination. After reviewing the parameters used by the Susquehanna River Basin Commission in their monitoring program, Penningroth selected half a dozen tests including conductivity, hardness, alkalinity and dissolved oxygen.

There’s a difference in the quality of water running off a farm field compared to runoff that contains chemicals from a drilling wellpad. Farm runoff tends to show higher levels of nutrients. Runoff from a drilling site could include minerals that cause conductivity and hardness to increase. Normally, those would go down with rain and dilution, Penningroth explained. So an increase would be a red flag.

A standard test is the pH test, which measures how acidic or basic the stream water is. Pure water is neutral, with a pH of 7. Most of NY streams and lakes aren’t neutral, Penningroth said. They may range in the 6 – 7 range, which is slightly acidic, to very acidic lakes in the Adirondacks.

The pH test tells how many hydrogen ions are in the water sample, Penningroth explained. But you need another test – alkalinity – to put that into perspective. “Alkalinity reveals the capacity of water to absorb hydrogen ions without changing its pH,” Penningroth said. It measures the buffering capacity of a stream – the ability of dissolved minerals and salts naturally present in a stream to help the water resist changes in acidity.

Another important test is dissolved oxygen. This is a test widely used by the NY Department of Environmental Conservation (DEC) to evaluate stream health, and is one of the tests listed in the 1992 Generic Environmental Impact Statement (GEIS).

There are many factors that can affect the amount of oxygen dissolved in stream water, including temperature. Warmer water holds less oxygen than colder water. Decreased dissolved oxygen levels may also indicate an increase of “biological oxygen demand”. For example, Penningroth said, waste fluid from a well might contain organic matter that could serve as food for microorganisms in the stream. More food means more bacteria, and more bacteria means less oxygen available for fish and water plants.

The dissolved oxygen test is very useful in monitoring the long-term health of streams. Especially if there’s a constant source of the pollutant that would affect that parameter, such as a leaking tank or rip in a pit liner.

Everyone wants to catch the catastrophic spill, but Penningroth is more worried about what he calls “contamination creep”. The dissolved oxygen test, he said, will be one of the best ways to monitor long-term impacts in a stream.

For volunteers willing to put in a bit of extra study, Penningroth suggested biological monitoring. That means keeping track of stonefly larvae, caddisflies and other insects that live in the streams for a long time. While labor-intensive, the data complements the information gleaned from chemical tests.