Protecting Ohio's Drinking Water Sources

Ohio EPA
Division of Drinking and Ground Waters

Drinking Water Source Protection Update

September 2009

Mahoning Valley Sanitary District Comes in First

In March 2009, the Mahoning Valley Sanitary District (MVSD) became the first surface water provider in Ohio to complete an endorsable source water protection plan. MVSD provides drinking water and wastewater services to numerous communities in northeast Ohio, with a combined customer base of about 220,000 people. The drinking water source is Meander Creek Reservoir, which drains a watershed covering 86.5 square miles. The District owns 5,500 acres of land along the reservoir, reforested with 4 million evergreens and closed off from the public by 35 miles of fence. In addition to these measures, the District monitors surface water throughout the watershed, promotes filter strips on agricultural land adjacent to tributaries, coordinates with the Trumbull County Health Department on residential septic tank issues, oversees storm water management plans, conducts public education and is exploring zoning.

MVSD Director Tom Holloway (left) receives endorsement certificate from Ohio EPA.

More Protection Plans Endorsed in 2009

Ohio EPA congratulates the following ground water systems, whose local source water protection plans were endorsed by Ohio EPA in State Fiscal Year 2009 (July 1, 2008 to June 30, 2009).

- City of Kent
- Village of Hicksville
- Ohio-American Mansfield System #2
- Ohio City
- Village of Sherwood
- Hecla Water Association (for new wellfield)
- Leading Creek Conservancy District
- City of Marietta
- Warren Community Water and Sewer Assoc.
- Village of Versailles

May 13, 2009: The Village of Versailles' source water protection planning team receives an endorsement certificate from Ohio EPA.

Combined, these systems provide water to approximately 128,000 Ohioans. Throughout Ohio, 115 systems now have endorsed source water protection plans.

Highlights

Technical Assistance and Outreach

District Source Water Protection (SWAP) staff continue to assess new systems as they come online, unless the system opts to do it themselves. From July 2008 to June 2009, SWAP staff completed and issued 109 source water assessment reports. Of these, the majority were for transient systems pumping small amounts of water. Additional outreach activities during this time period included:

Protection Plan Workshops

SWAP program staff completed multi-session source water protection planning workshops for municipalities in Medina, Holmes and Wayne counties as well as communities in the Maumee River watershed. New workshops were initiated for: Minerva, a group of systems in northeast Ohio, Alliance, Akron, the Lower Muskingum watershed, the Sandusky River watershed, a group of surface water systems in southwest Ohio, and a group of systems operated by Ohio-American Water Company.

Individualized Outreach

In addition to outreach at workshops, SWAP program staff met at least once with more than 40 additional public water systems, where they provided information and guidance on developing or implementing a local source water protection plan.

Certificates of Recognition

Ohio EPA staff provided certificates of recognition to 126 public water systems that submitted an endorsable source water plan (municipal systems) or a checklist (nonmunicipal systems).

Site-Specific Maps

Central Office staff responded to 586 technical assistance requests for site-specific maps showing the locations of source water protection areas near regulated facilities or proposed mining areas. The average response time was less than two working days.

Web Page

The source water assessment and protection Web site was accessed 6,842 times. *(http://www.epa.ohio.gov/ddagw/swap.aspx)*

SWAP Secure Web page

During fiscal year 2009, 125 new users registered for the source water protection secure Web page, bringing the total to 450 users. Registrants use an assigned password to view the SWAP reports completed for all Ohio systems. They can also view 37 large-scale county maps showing the locations of public water supply wells and source water protection areas.

"SWEET" Outreach

The Ohio Department of Natural Resources, Division of Soil and Water Conservation, in collaboration with Ohio EPA's Division of Drinking and Ground Waters received an Ohio Environmental Education Fund grant for $47,540 in December 2008 for "Source Water Environmental Education Teams Enhanced Resources (Project SWEETER)". Project SWEETER equipped the existing SWEET teams with the new EnviroScape Drinking Water and Wastewater Treatment models. The popularity of Project SWEETER resulted in the formation of 11 new teams, bringing the total to 54 (serving 58 counties). The objective of these teams is to strengthen source water protection education efforts statewide. From July 2008 to June 2009, 26 teams participated in 80 events reaching 7,607 people. Since the inception of SWEET teams in October 2005, SWEETs have reached out to almost 50,000 people. (*http://wwwapp.epa.ohio.gov/ddagw/SWEET*)

Source Water Protection Outreach to Ohio River Industries

In April 2009, the Ohio River Valley Water Sanitation Commission (ORSANCO) hosted an informational meeting for drinking water utilities and industries located along the Ohio River between Cincinnati and Huntington, WV. The goal was to increase their awareness of the public water systems that provide drinking water from the Ohio River.

Over its 981-mile stretch, the river is impacted by 150 commercial docks handling 280 million tons of goods (largely coal and chemicals), 144 industrial intakes, over 600 wastewater outlets, 1,300 combined sewer overflows, 50 power plants, and numerous pipelines, railroads, bridge crossings, petrochemical refineries and tank farms. Individuals responsible for preventing and responding to spills at these sites need to be aware of potential impacts on drinking water intakes in the Ohio River.

Representatives of 13 industries located along the Cincinnati-Huntington area attended the meeting. A similar meeting is being organized in September for the Ohio River stretch from East Liverpool, OH, to Sistersville, WV. For more information, contact ORSANCO's Jerry Schulte at *jschulte@orsanco.org*.

Stream Flow Studies Improve Accuracy of Spill Models

When toxic chemicals enter a water body upstream from a drinking water intake, the water system operator needs to know when the chemical will reach the intake and how concentrated it is likely to be when it reaches the intake. If there is sufficient time, the operator will try to fill the water tanks and possibly prepare to treat the chemical. In all cases, the operator will close the intake while the plume of contaminant is passing by.

RiverSpill is a computer model used to calculate time-of-travel from a stream spill site to points downstream. It also predicts the concentration of the chemical at any point along the way. To improve the accuracy of RiverSpill, Ohio EPA recently contracted with the U.S. Geological Survey (USGS) to conduct time-of-travel studies in portions of 10 Ohio streams during 2008-2010. USGS staff pour non-toxic rhodamine dye into the river (see photo).

Underwater sensors installed at various points downstream record when they are detecting the dye, and at what concentrations. The data obtained from these sensors will be used to improve the time-of-travel and concentration curves for the 10 river segments being studied. For more details, visit *http://www.oh.water.usgs.gov/riverspill.htm.*

Ohio EPA Investigates Karst Aquifers of Northwest Ohio

Source water protection is critical in near-surface karst aquifers. "Karst" is a unit of limestone or dolomite that is highly fractured and sometimes cavernous, and ground water can move very quickly through these openings. When a contaminant enters a karst aquifer, the contaminant may reach distant water supply wells within days or even hours. (In other types of aquifers, ground water moves much more slowly, typically only feet or inches per day.) To prepare for such contingencies, communities using water from karst aquifers need to know how quickly the ground water flows. This information also helps them identify the areas that need to be protected against contaminant spills or releases.

In 2009, Ohio EPA's source water protection staff conducted three dye-trace studies in two karst aquifers in northwest Ohio, to measure the velocity of ground water flow. The first study was conducted in a unit of surficial karst known as "Lime Ridge" in northwest Wyandot County. Staff injected non-toxic fluorescein dye into a pool at the bottom of a 60-foot-deep cave (see photo). Within days, dye was detected in various springs, wells and ditches up to four miles away. The preliminary data yielded a ground water flow velocity of 1,700 to 67,000 feet per day.

The second and third studies were conducted in Gibsonburg, Sandusky County. Fluorescein dye was injected into a 30-foot deep monitoring well and was detected in nearby monitoring wells and drinking water

wells at levels up to 20 times above background levels. Dye also was detected in a quarry about a quarter mile away. Because this study area included a municipal water system serving several thousand people, a second study was conducted to confirm the results of the first. Preliminary analysis indicates ground water flow velocity ranging from 900 to 3,500 feet per day.

Over the next year or so, Ohio EPA staff will use these data to revise source water protection areas for public water systems within these areas, as needed. Reports on these studies will be available on the source water protection Web page by December 2009 *(http://www.epa.ohio.gov/ddagw/swap.aspx)*

Emerging Contaminants: A Good Reason for Source Water Protection

All public water system operators know source water protection is the first barrier in the "multi-barrier approach" to providing safe drinking water. However, operators tend to focus on the barriers that are more directly under their control and required by law, such as operator certification and chemical treatment. Considering how little control operators may have over activities in the protection area, that choice is understandable. However, there are good reasons to focus more attention on protecting the source water. Consider these examples.

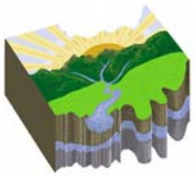
Cryptosporidium. One compelling reason is that contaminants emerge constantly that are difficult or impossible to treat. Twenty years ago, *Cryptosporidium* (a pathogenic protozoan found in the feces of various mammals) was not even on the radar for public water suppliers. After sickening thousands of municipal water consumers in Milwaukee in 1993, it is now a significant concern for public water suppliers using surface water. However, *Cryptosporidium* is extremely expensive to detect and treat. Preventing sewage overflows and run-off from manure application and storage into public water supply water bodies may be a more cost-effective option.

Blue-green Algae. Other microorganisms that have recently become a concern for public water suppliers are cyanobacteria (*blue-green algae*). Some of these algae can produce taste and odor compounds and powerful toxins, including liver, nerve and skin toxins. Documented acute and chronic effects in humans include diarrhea, respiratory problems and liver damage. Numerous reports exist of dog, wildlife and livestock deaths following exposure to these toxins. *(http://www.oehha.ca.gov/ecotox/pdf/microfactsheet122408.pdf)*. Water bodies most susceptible to formation of blue-green algae are shallow lakes and reservoirs and slow-moving rivers or backwaters receiving high levels of phosphorus from nutrient runoff. Currently there is uncertainty about the effectiveness of conventional treatment techniques for removing blue-green algae; for one thing, destroying the algae can release toxins into the water. Supplemental treatment techniques, such as granular activated carbon filtration, appear to be effective. However, the best way to protect the drinking water is to prevent algae formation in large water bodies by preventing nutrient runoff—a primary source water protection goal.

Others. In recent years, concern has focused on the unknown impact of so-called "wastewater contaminants" in drinking water— substances that are not removed from water during the wastewater treatment process, such as caffeine, personal care products and various pharmaceuticals. Given these concerns, efforts to avoid contamination of the water source should be a high priority for any water system.

New Rules Require Source Water Protection Plans

Effective September 1, 2009, Ohio Administrative Code Rule 3745-91-10 requires certain public water systems to develop or update a source water protection plan upon receipt of Ohio EPA plan approval for installing a new well. The public water supplier must submit the protection plan within two years of the new well plan approval date. ***The rule only applies to community public water systems serving a political subdivision and a minimum of 250 people.*** Additional exemptions may apply for systems that already have an endorsed source water protection plan. Details are available at *http://www.epa.ohio.gov/portals/28/documents/rules/Final/3745-91-10_effective_9-1-09.pdf*



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