

Protecting Ohio's Drinking Water Sources

Ohio

Environmental
Protection Agency

Division of Drinking and Ground Waters

Drinking Water Source Protection Update

September 2011

2011 Survey Summarizes SWAP Implementation in Ohio

Thank
you

During the summer of 2011, Ohio's Source Water Protection (SWAP) program launched an online SWAP survey. The agency sent letters and e-mails to 750 operators and administrators of community public water systems with a high- or moderate-susceptibility water source, providing information on how to access the survey online. The program extends its sincere thanks to the 506 public water systems who responded (approximately 67 percent).

The survey's purpose is twofold: to obtain credible information for U.S. EPA which Ohio communities are actively implementing source water protection strategies, and to learn how the program can offer assistance more effectively. Some highlights for municipal systems:

Education/Outreach: Plant tours continue to be a favorite strategy (42 percent), followed by road signs and personal contact (both 25 percent). However, only 6 percent of respondents reported using Source Water Environmental Education Teams (SWEETs) to help with general education. This indicates that many systems may still be unaware of this resource.

Strategies for Specific Contaminant Sources: Visual inspections are conducted by 27 percent of respondents to monitor specific activities or facilities that may be source water contaminant sources. More than 19 percent have recently extended sewer lines into formerly unsewered areas.

Contingency Planning: More than 70 percent of respondents reported updating their contingency plans within the previous three years. Also, 45 percent reported including a process for responding to chemical spills within the SWAP area. More than 10 percent reported implementing the process within the previous three years. Only 40 percent were certain that local emergency response staff are aware of the SWAP area location.

Monitoring: Almost 70 ground water systems monitor raw water to provide early warning of contamination. Only 18 surface water systems claimed to have a process in place for detection of harmful algal blooms.

Coordination and Implementation: Respondents coordinate most readily with the health department (30 percent) and local emergency response offices (25 percent). Almost 12 percent of respondents reported they have SWAP zoning ordinances in place and 11 percent report that implementation of various aspects of source water protection is written into the job description of municipal or other local staff.

Concerns: Oil and gas drilling topped concerns for future water quality (22 percent), followed by industry and mining (9 percent each).

Financial Assistance: Public water systems indicated that they would most value financial assistance for installing monitoring wells, conducting sampling and analysis for these wells, and purchasing additional land as buffer areas. The SWAP program continues to explore options for offering such assistance.



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SWAP Program Technical Assistance and Outreach in 2011

District Source Water Protection (SWAP) staff continue to assist with assessing new systems as they come online. From July 2010 to June 2011, staff completed and issued 109 source water assessment reports. They included 44 new wells and 40 revisions of earlier reports, due to changed pumping rates or other changes. Thirty-five were revisions using an improved methodology for wells located in shallow karst (described in the 2010 SWAP newsletter; see www.epa.ohio.gov/portals/28/documents/swap/2010_SWAP_Newsletter.pdf)

During this year, 16 communities completed endorsable source water protection plans: Granville, East Palestine, Portage County (Brimfield and Shalersville plants), Clarington, Le-Ax Regional Water District, Matamoras, Midvale, Monroe Water District, Nelsonville, New Concord, village of Tuscarawas, West Lafayette, Brown County Rural Water System, Gratis, and Milford.

Other types of technical assistance and outreach completed by SWAP staff members during this period include:

- preliminary assessments for 85 proposed new wells;
- multi-session protection planning workshops with eight communities;
- one-on-one protection planning meetings with more than 20 communities;
- responses to 429 requests for a site-specific map of protection areas; and
- passwords provided to 96 new users of the SWAP secure web site; there are now 650 registrants.

At least quarterly, the program updates the county maps showing protection areas, the list of systems with endorsed protection plans, and general information available on the SWAP website. New assessment reports are added to the secure website within a few days of completion. From July 2010 to June 2011, the website was accessed 4,255 times.



Communities receive framed certificates of recognition for completing an endorsable source water protection plan. Shown above, the team for Monroe Water Systems, whose protection plan was endorsed in May 2011.

Source Water Protection and Geothermal Wells

In 2011, an Ohio Water Resources Council workgroup completed a guidance document describing best practices and existing environmental regulations for siting and installing geothermal heating and cooling systems. With regard to source water protection, the guidance recommends that if a closed-loop system is proposed within the inner management zone of a SWAP area, the heat exchange fluid circulating in the loop should be food-grade (for example, propylene glycol). Once finalized, the guidance will be posted on the State Coordinating Committee for Ground Water's website at: www.wpp.epa.ohio.gov/ddagw/SCCGW/.

Time-of-Travel Study Results

Ohio EPA collaborated with the U.S. Geological Survey-Ohio Water Center to develop time-of-travel tables for nine Ohio public water systems using surface water. The goal was to enable the suppliers to predict how quickly an upstream contaminant spill into the source water stream would arrive at their intake. The project involved releasing rhodamine dye into the stream, measuring flow velocity, and then calculating stream-specific coefficients to predict velocities under various flow conditions.

In July 2011 Ohio EPA sent a report detailing results to each of the participating public water systems. Each report included a map showing stream miles upstream from the intake, which enables the public water supplier to estimate the distance to an upstream contaminant spill. By obtaining real-time flow information from a stream gage and referring to a table provided in the report, time-of-travel can be estimated for the plume's arrival, peak, and trailing edge during low, medium, or high flows of the source water stream.





Harmful Algal Blooms and the State of Ohio's Response

In recent years, harmful algal blooms (HABs) have become a seasonal headline in many Midwestern states, including Ohio. HABs often resemble algae, but they are actually caused by cyanobacteria. HABs are a concern because they can produce toxins that cause skin, liver and neurological illnesses. In 2010, HABs resulted in the state posting advisory signs on 20 inland lakes and two Lake Erie beaches. The Ohio Department of Health attributed 48 human illnesses and five dog deaths to recreational exposure to algal toxins in 2010.

The most severe HABs in 2010 were at Grand Lake St. Marys (GLSM). At one point, the foul-smelling, toxin-producing bloom covered the entire lake. In response, Ohio EPA, ODNR and the U.S. Geological Survey worked with local groups in the GLSM area to find solutions and funding to address the lake's problems. Projects currently being implemented include installing sediment traps and wetlands where nutrient-laden tributaries enter the lake and treating the lake with alum to precipitate phosphates—a nutrient linked to HABs—out of the water column.

In 2010, an interagency workgroup was formed to provide guidance on addressing future HABs in Ohio. The group's documents and additional HAB-related information are now available on Ohio EPA's website. These include:

- Ohio Harmful Algal Bloom Response Strategy (includes algal toxin thresholds)
- Online Bloom Report Form
- AWWA White Paper on Algal Toxin Treatment
- Algaecide Application Fact Sheet
- Bloom Characterization Photo Gallery
- Algal Toxin Testing Information



South Bass Island, Lake Erie

Since algal toxins are not currently regulated by U.S. EPA, public water systems are not required to monitor for them but are encouraged to do so.

Ohio EPA will monitor for toxins if there is an elevated risk of toxins in finished drinking water. Factors Ohio EPA will consider when determining if toxin monitoring is necessary include: bloom severity and proximity to intake; whether advanced treatment is in use and working properly; raw water quality characteristics; reported human illnesses or animal deaths; if there is a history of toxin-producing blooms for that water source; and any additional screening information that may be available.

If finished water detections are greater than newly established drinking water thresholds, a Tier 1 public notice use restriction will be required. The "do not use" threshold values are the same as the algal toxin advisory values used for recreational waters. Thresholds were established based on the best available epidemiology studies available for each toxin.

The following table summarizes the toxin thresholds and the associated public notice use restrictions:

Tier 1 Public Notice Use Restrictions	Toxin Level (µg/L)			
	Microcystin	Anatoxin-a	Cylindrospermopsin	Saxitoxin
DO NOT DRINK WARNING	1 - 20	20 - 300	1 - 20	0.2 - 3
DO NOT USE WARNING	> 20	> 300	> 20	> 3



Woodsfield Reservoir

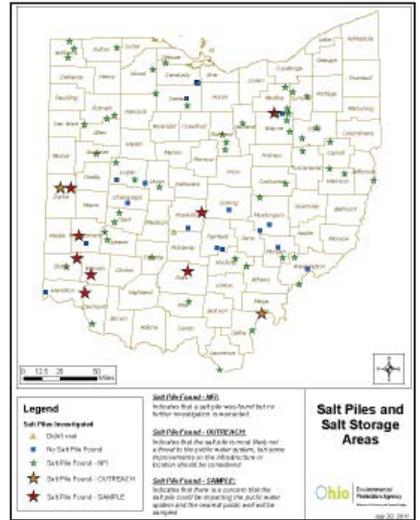
In 2011, sampling for algal toxins began as early as January. By the end of August, more than 260 samples had been analyzed from nearly a dozen water bodies. Microcystin levels ranged from nondetect to more than 100 ppb in raw water, but microcystin was never detected in finished drinking water. Ohio EPA staff responded to bloom reports from the general public, NOAA and public water systems, and coordinated with public water systems on sampling HABs. Meanwhile, staff continue to encourage public water suppliers using surface water to develop a source water protection plan that includes efforts to control the levels of phosphorus entering their sources of drinking water. A wealth of additional information on HABs is available at www.ohioalgaefinfo.com.

Salt Contamination Incidents and Ohio EPA's Response

Since 2009, Ohio EPA has initiated investigations at six sites where nearby piles of road salt may be causing high chloride concentrations in ground water. The most disruptive of these was at the Village of Camden in Preble County. As reported in the 2010 SWAP newsletter, this community had to abandon its public water system because a plume of salty water from a road salt storage facility almost a half-mile away has made the drinking water unpalatable.

In 2011, Ohio EPA resolved to address the issue proactively. Staff reviewed the source water assessment database and identified 81 salt piles located within source water protection areas. They visited these sites during April and May 2011, assessed the adequacy of runoff containment, then targeted facilities for additional effort. In August, they collected pretreatment water samples from the public water system well closest to each target salt pile to determine whether chloride levels in ground water are a concern. Staff also conducted outreach to the facility owners, encouraging them to improve containment and/or move the salt piles to a location more distant from public water supply wells.

In July, the Ohio Water Resources Council asked the State Coordinating Committee on Ground Water (SCCGW) to form a workgroup to determine the best ways to prevent future contamination by stockpiled road salt. The group will evaluate strategies such as developing guidance and revising storm water permits for salt storage facilities to address ground water as well as surface water.



Large stars indicate sites that will be investigated further in 2011; small green stars indicate locations where salt piles were found but require no further investigation; squares indicate locations where salt piles listed in SWAP reports were not found.

FACTS ABOUT CHLORIDE

- Elemental chlorine is a dangerous gas that does not exist in the free elemental state in nature because of its reactivity. However, chlorine's ionic form—chloride—is essential for sustaining human metabolism and occurs naturally in combination with other ions, such as sodium chloride (table salt, water softener tablets) or calcium chloride (road salt).
- **Chloride is not "toxic,"** but it gives water an unpleasant taste.
- There is no health-based Maximum Contaminant Limit (MCL) for chloride. There is a secondary (taste and odor-based) MCL of 250 mg/l, which is the concentration at which most people can taste it in water.
- "Natural" background chloride concentrations in Ohio's ground water average around 40 mg/l.
- Some people find water unpalatable when it contains chloride levels of several hundred mg/l; others can tolerate chloride levels of several thousand mg/l.
- Chloride levels in seawater average around 20,000 mg/l. Humans cannot survive on sea water because our kidneys cannot excrete the *sodium* in sea water quickly enough to maintain a proper electrolyte balance.



Looking Ahead...

Non-potable Well Guidance in Development

Did you know that many portions of Ohio EPA's Water Well Standards (Ohio Administrative Code Chapter 3745-9) also apply to *non-potable* wells? Non-potable wells include irrigation wells, industrial wells, and geothermal heating and cooling extraction wells. DDAGW is developing outreach and guidance materials to help well installers and owners better understand the construction, grouting and siting standards that apply to these wells. Stay tuned!

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