

# Chapter 7



Above: Copper Tap  
(photo: Gregory SJ Soltis)



Above Right: The Gold Coast in Lakewood, Ohio; viewed from Edgewater State Park on Lake Erie.  
(photo: Gregory SJ Soltis)

## SOURCE WATER PROTECTION

### Background

#### *What is source water?*

Source water refers to the sources of our drinking water. Sources of drinking water include groundwater from aquifers, as well as surface water such as lakes, streams, and reservoirs. In much of Ohio, groundwater is the primary source of drinking water. Approximately 95% of Ohio's 5,000 public water systems use groundwater and more than 700,000 households have their own wells. Most of Ohio's largest cities, however, use surface water or a combination of ground water and surface water. For example, Cincinnati, Columbus, and Akron all have intakes on major rivers. Toledo and Cleveland use water from Lake Erie. Altogether, six million people—half of all Ohioans—get their drinking water from surface water.

#### *Why protect source water?*

All living beings require clean drinking water to live. Although public water systems are designed to treat the types of contaminants expected in the source water, no process is fail-safe and treatment is usually not available for contaminants that are not expected. When a source of water becomes contaminated, the impacts on a community can be devastating.<sup>1</sup> Even when human health and lives

<sup>1</sup> Recent examples of drinking water contamination that caused illness outbreaks despite the water being treated at up-to-date water treatment plants include the E. coli outbreak in Walkerton, Ontario (May, 2000) where approximately 2,500 became ill and seven died, as well as the cryptosporidiosis outbreak in Milwaukee, Wisconsin (1993) that sickened almost half a million people and contributed to the deaths of over 100.

Nitrates are chemicals produced in soil and groundwater when plant and animal matter rot on the ground. It is usual to find small amounts of nitrates in well water, but levels can be elevated in farming areas where fertilizers are used, or in neighborhoods where there are many septic tanks. Water with nitrate levels in excess of 10mg/L is unhealthy for infants younger than six months of age. There are a number of 'best' or 'beneficial' management practices (BMP) which can be implemented as a low-cost means of protecting ground water and drinking water.

(Brethour, 2009)

are not jeopardized, the treatment required to make contaminated source water potable can be a burdensome expense for communities, including:

- Cost of purchasing a temporary water supply from another community or bottled water.
- New wellfield development if the affected wells must be abandoned.
- Real estate devaluation.
- Decline in consumer confidence in water quality.
- Potential lawsuits from the use of contaminated water.
- Lost jobs.

For all these reasons, protecting drinking water at its source has become a top priority in any community, and must be a priority in any balanced growth plan.

### ***How does source water protection relate to Balanced Growth?***

Source water protection is another example of local government policy that addresses the dual goals of Balanced Growth: environmental protection and economic development. Our Ohio source waters are critical environmental assets going forward, as they provide drinking water for many Ohioans, support a high quality of life, and are essential for many businesses. Pollution of source water can create environmental problems that can be very difficult and expensive to clean up, and can affect human health and our economic health for the long term. Avoidance of pollution is a benefit to environmental quality, and to our environment, and is in the authority of local government. Source water protection is implemented in zones based on distance from the well or intake to be protected. These can easily be mapped and incorporated into Priority Conservation Areas and Priority Development Areas in a Balanced Growth Plan. See the Balanced Growth web site for more information.



Cedar Falls, Hocking Hills, Ohio  
(photo: ODNR)

## Issues

### *What is Ohio's Source Water Protection Program?*

Formerly known as the "Wellhead Protection Program," Ohio's Source Water Protection (SWAP) Program is a statewide program to protect streams, lakes and aquifers that are used as public drinking water supplies. It was initiated through the Safe Drinking Water Act (SDWA) amendments of 1986 and 1996. The Source Water Protection Program involves two phases, the first of which is the "assessment phase." Assessments are completed by Ohio EPA's SWAP program staff or by private consultants, who must:

- Delineate the area to be protected;
- Inventory the potential contaminant sources within that area; and
- Determine the susceptibility of the source water to contamination from human activities.

The bulk of source water assessment reports for existing systems were completed by 2006; however, new public water systems are constantly being formed and Ohio EPA continues to provide SWAP assessments for them. Upon completion, an assessment report is sent to the public water system, to provide information for the second phase: developing a local source water protection plan.

### *How does the SWAP program protect public drinking water?*

Because source water is a local or regional resource, source water protection must be primarily a local effort. Staff from Ohio EPA's Source Water Protection Program encourage individual public water systems to complete a local Source Water Protection plan. The public water supplier, in cooperation with local leadership and other interested parties, is asked to develop a plan that addresses:

- **Education:** educating the local population about protecting the water source;
- **Protective strategies:** assisting facilities within the SWAP area with strategies to protect the source water from contamination by manmade chemicals;
- **Contingency planning:** updating the system's contingency plan to include a process for responding to spills in the SWAP area; and

- **Monitoring (optional):** sampling and analysis of the source water before treatment.

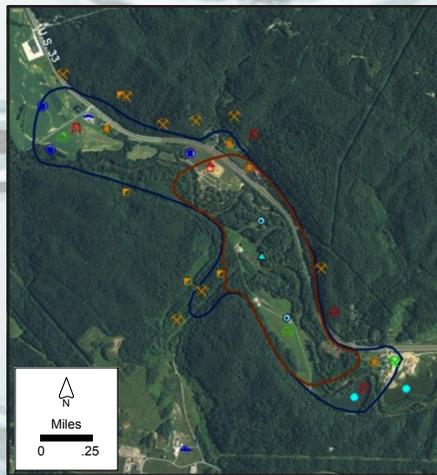
Upon completing a source water protection plan, the community submits it to Ohio EPA for endorsement. Endorsement merely indicates that the plan meets the basic guidelines for a source water protection plan. However, true source water protection does not happen until the community begins to—and continues to—implement the plan.

***Are all source water protection plans alike?***

No. Source water protection plans all contain the elements of education, protective strategies, contingency planning and (possibly) monitoring, but these elements look very different for ground water vs. surface water systems.

**Ground water.** Ground water travels through the subsurface very slowly compared to surface water—usually within the range of a few millimeters to a few feet per day. A chemical spill thousands of feet

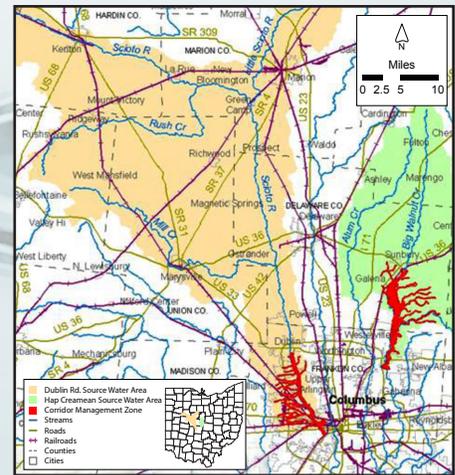
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*A Ground Source Water area in rural Ohio.*

**Ground Water**

SWAP areas for ground water systems are much smaller, typically comprising multiple acres. The red line encloses the one-year time-of-travel area; the blue-line encloses the five-year time-of-travel area.



*Metropolitan Columbus Source Water Areas*

**Surface Water**

SWAP areas for surface water systems can cover multiple counties and hundreds or thousands of square miles.

away from a well can usually be remediated before it seeps down to the water table and travels to the production wells. Therefore, SWAP areas may range from less than an acre to a few square miles . Such relatively small areas are much easier to protect.

Source water protection plans for ground water systems can be very specific, including such measures as removing an underground storage tank, or rerouting hazardous transport routes. If the area lies within the jurisdictional boundaries of a village or city, local ordinances may be passed restricting the activities that can be pursued in the SWAP area. It is important that a balanced growth plan recognize these areas and avoid designating them as Priority Development Areas, even if they are located in the center of town.

**Surface water.** Surface water travels very quickly compared to ground water. A chemical spill thousands of feet away from a surface water intake may arrive at the intake in less than an hour, giving the water plant personnel little time to prepare. SWAP areas for surface water systems are therefore much larger than those for ground water systems. They are delineated to include all of the watershed that drains into the water body above the intake; however, the source water protection plan focuses primarily on the river corridor that extends ten miles upstream from the intake (called the “Corridor Management Zone” or CMZ). In a balanced growth plan, the CMZ should be part of the Priority Conservation Areas. Since river corridors usually are so designated, this is consistent with the other protection and preservation goals of balanced growth.

In Ohio no community has jurisdictional authority over the entire CMZ. Therefore, source water protection plans for surface water systems emphasize cooperation with other jurisdictions and with the efforts of county health departments and Soil and Water Conservation districts. The protection plan may even comprise a subsection of a local watershed action plan. The protection plans are meant to focus more on general land uses than individual contaminant sources, and they should be especially concerned with areas of failing septic systems, malfunctioning wastewater treatment plants, animal feedlots, and runoff from agricultural fields. Most of the best local land use practices for balanced growth described in other sections of this document are equally valuable as source water protection practices. And the fact that a surface water body is being used for drinking water adds weight to the arguments for its protection and preservation.

***Are there any state regulations requiring source water protection?***

Currently, a municipal public water system that is installing a new well or wellfield must provide or update a source water protection plan within two years of receiving Ohio EPA plan approval for the new well/wellfield . In Ohio there are no other rules that require source water protection planning. This is true for the majority of states in the

country. As of 2012, almost a third of Ohio's municipal systems have endorsed source water protection plans, and most of them are ground water systems.

Beyond this, several state programs have rules that prohibit or restrict certain activities within SWAP areas for ground water systems. For example, Ohio EPA's solid waste program prohibits the siting or extension of various types of landfills within SWAP areas. Ohio EPA's Division of Surface Water has rules prohibiting the application of Class B biosolids or wastewater on fields within the one-year time-of-travel portion of a SWAP area. Ohio EPA's Brownfields program and the State Fire Marshal have rules requiring more stringent cleanups within SWAP areas. The Ohio Department of Health's new rules for household septic systems (still in development) are expected to require setbacks from public water systems. Local regulations that conflict or circumvent these requirements, either as drafted or applied, are not recommended, as they would likely conflict with federal or state regulatory authority. For a complete list of SWAP-related environmental rules currently in force, see

<http://www.epa.state.oh.us/ddagw/swap.aspx>, (click on the third tab labeled "Reports, Maps and GIS Data")

## Recommendations

**1. Source Water Protection Plan.** Communities with public water supplies should develop a Source Water Protection Plan tailored to their needs, if they do not already have one, or continue to implement the ongoing strategies (such as education) of their plan.

**2. Comprehensive Plan.** A municipality's Comprehensive Plan should address the SWAP areas within its jurisdiction. SWAP assessment reports and maps of SWAP areas can be accessed through a password-protected Web site (for more information, go to [http://www.epa.state.oh.us/ddagw/swap\\_assessments.aspx](http://www.epa.state.oh.us/ddagw/swap_assessments.aspx))

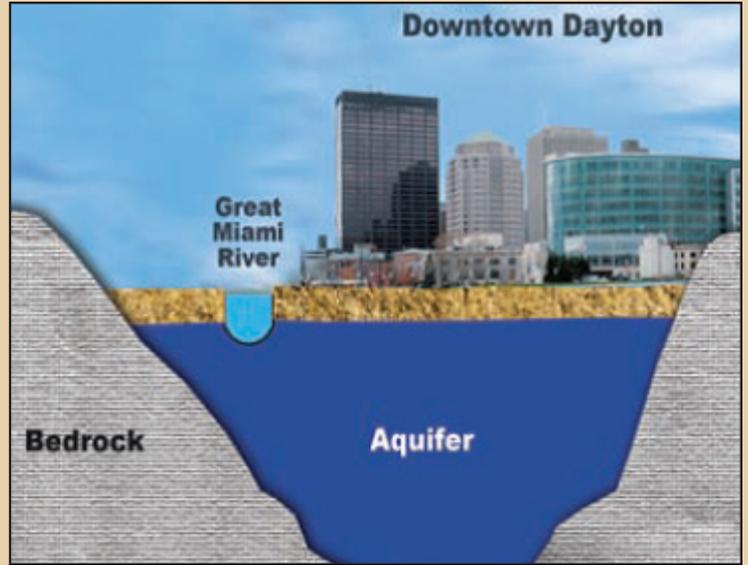
**3. Ordinance.** Communities with moderate to high potential for groundwater contamination of public or private water supplies should consider implementation of a local source water protection regulation (ordinance), tailored to their needs. The following should be included:

- Identify protection zones
- Establish prohibited and allowable uses within zones
- Include a process for the local planning agency to review new uses within the context of these zones
- Include requirements for geotechnical and hydrologic analysis to determine potential impacts and spill control procedures, particularly for variances

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Great Miami River Watershed  
 (map: City of Dayton Water Department)



Great Miami Buried Valley Aquifer  
 (City of Dayton Water Department)

Significant aquifers in Ohio contribute to economic prosperity and quality of life.



## Great Miami Valley Buried Aquifer in Metropolitan Dayton

Downtown Dayton from Gayle B. Price Bridge  
 (photo: Miami Valley Trails)

- Detail enforcement mechanisms and authority
- Require reporting of spills
- Require registration of industries within protection zones

The regulations might also include the following components:

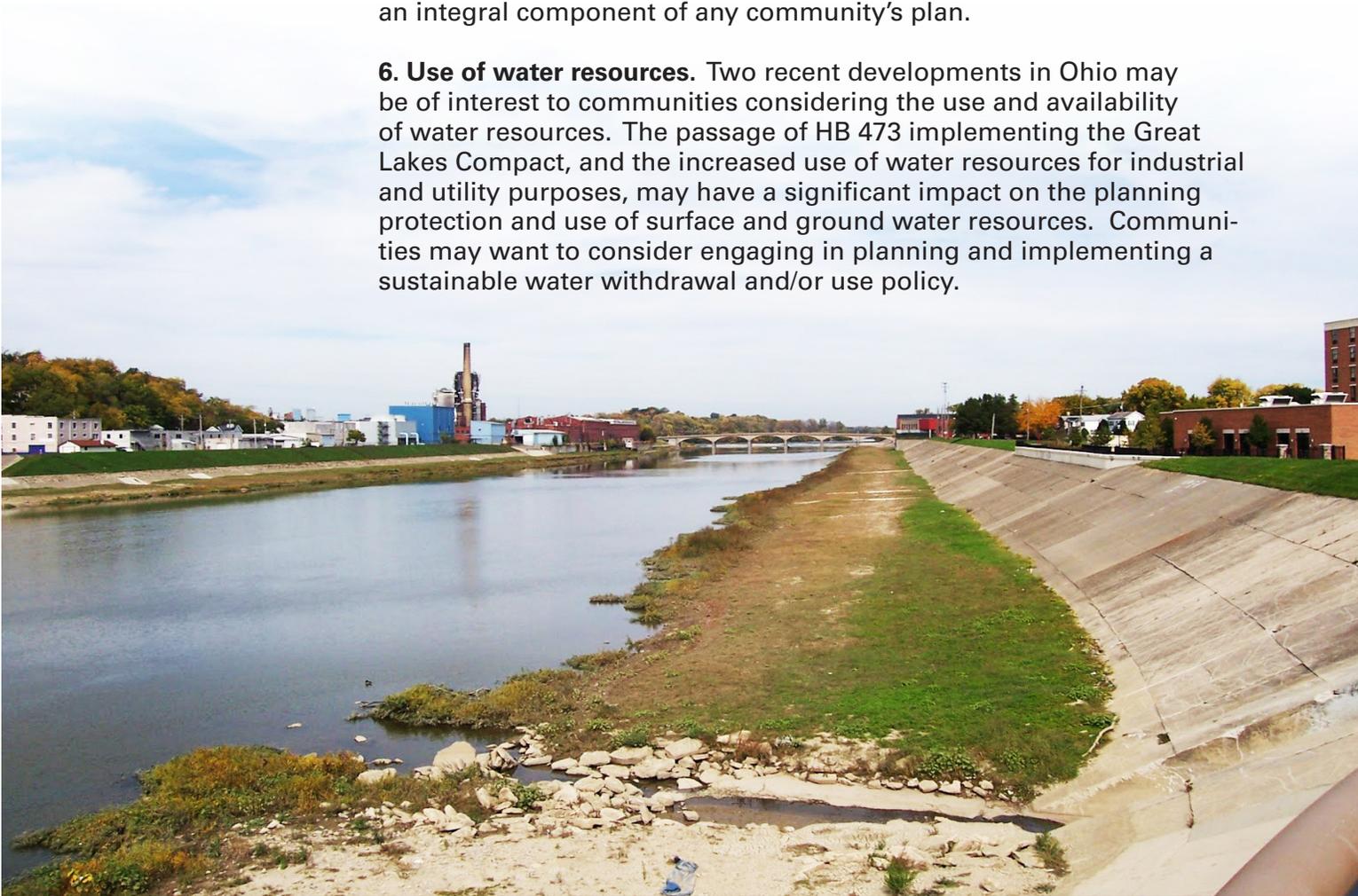
- Delineate multiple protection zones with different uses
- Establish maximum impervious cover allowable
- Establish fees for loan programs (Dayton, OH)

**4. Coordination.** Communities with surface water supplies for drinking water should implement a protection regulation similar to, or in conjunction with, a setback regulation for stream and floodplain protection. See the Stream, Floodplain, and Wetland Protection section for more information.

**5. Education.** Communities should be educated on source water issues. Decisions are made every day by people who are impacting the quality of drinking water, without understanding the consequences. Regardless of the extensiveness of a Source Water Protection Plan that a community chooses to employ, education is essential and should be an integral component of any community's plan.

**6. Use of water resources.** Two recent developments in Ohio may be of interest to communities considering the use and availability of water resources. The passage of HB 473 implementing the Great Lakes Compact, and the increased use of water resources for industrial and utility purposes, may have a significant impact on the planning protection and use of surface and ground water resources. Communities may want to consider engaging in planning and implementing a sustainable water withdrawal and/or use policy.

*Great Miami River in Hamilton, Ohio  
(photo: Kevin Buckley)*



## Example Regulations

**LARGE CITY:** City of Hamilton, Butler County (population 61,000)

Note: the City of Hamilton regulates wellhead protection through two ordinances, the Codified Ordinances and the Zoning Code.

Chapter 940 of the Codified Ordinance <http://www.conwaygreene.com/hamilton/lpext.dll?f=templates&fn=main-j.htm&2.0> (Copy and paste into web browser and then enter "Wellhead" in search box)

Chapter 1128 of the Zoning Ordinance (starts on page 163)  
<http://www.hamilton-city.org/Modules/ShowDocument.aspx?documentid=557>  
 (Copy and paste into web browser)

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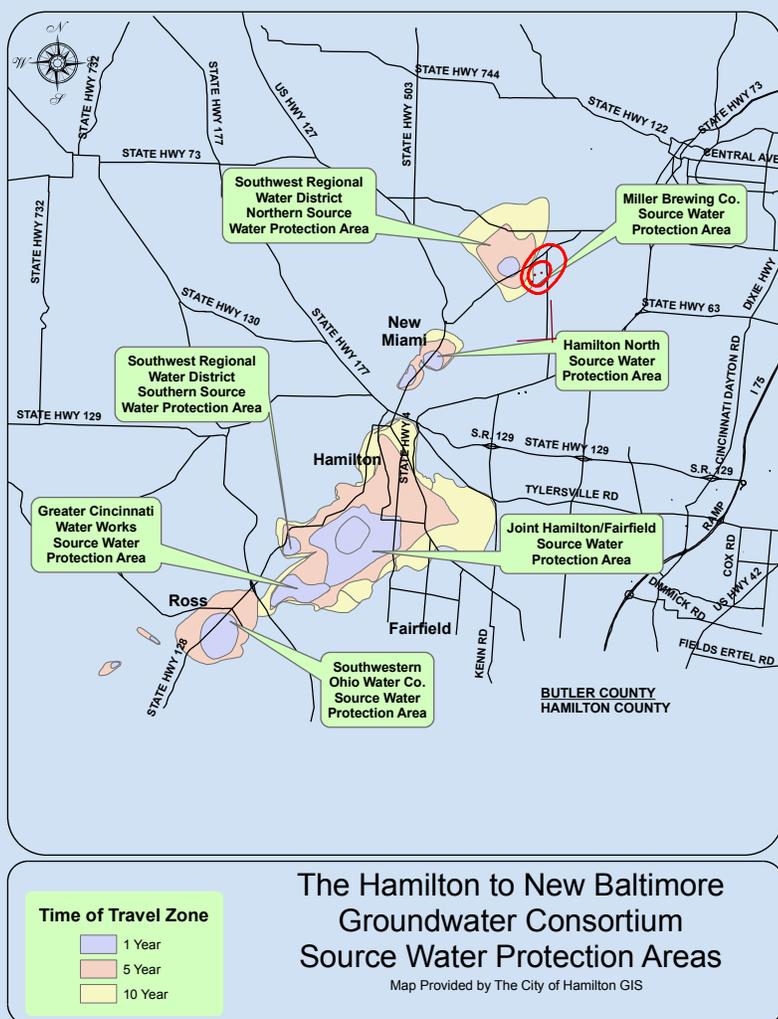


The City of Hamilton, Ohio on the Great Miami River  
 (Source: The Hamilton to New Baltimore Ground Water Consortium)

## Hamilton, Ohio

"Ground Water is critical to communities in southwest Ohio - for most, it is the only available source of water for residential, commercial, and industrial water needs. This reliance creates a special incentive to protect valuable ground water resources in order to insure a clean, reliable source of water for continued community growth."

(Gound Water Consortium)



Source Water Protection Areas with Phased Time of Travel Areas.  
 (Source: The Hamilton to New Baltimore GrounWater Consortium)

**SMALL CITY: City of Ontario, Richland County (population 5,280)**

[www.ontarioohio.org/pdf/Part\\_Eleven.pdf](http://www.ontarioohio.org/pdf/Part_Eleven.pdf)

Refer to Chapter 1195, pp. 114-121

More examples can be found at:

<http://www.epa.state.oh.us/ddagw/swap.aspx> (click on second tab labeled "Developing a Protection Plan," then click on Step 4)

## Use of the Guidance and Example Regulations

This example guidance and/or regulations **should never be adopted without careful legal review** to assure that they are adapted to fit the authority and needs of the specific governmental body. They may need to be adapted for use by the specific type of local government and must be independently evaluated against potentially applicable federal or state law. **The law director/ solicitor, county prosecutor or other appropriate qualified legal counsel should always be consulted prior to adoption of any enforceable measures** based upon this guidance document to insure compliance and consistency with any applicable state and federal law, and to consider potential legal ramifications and liability in the implementation of the laws or rules to be adopted. Questions about the models and guidance can be directed to the Ohio Balanced Growth Program.



## Resources

Always start by checking with your local resources. Local government agencies and non-government organizations might have the most up-to-date information on these issues and will have the most expertise for the unique characteristics of your region.

- **Your Local Metropolitan Planning Organization**
- **Your Local County or Municipality Planning Commission and**

### **Engineer's Office**

- **Your Local County Soil and Water Conservation District**
- **Your Local Watershed Group**
- **Your Ohio EPA District Office**

**Ohio Environmental Protection Agency**, Source Water Protection Program; <http://www.epa.ohio.gov/ddagw/SWAP.aspx>

On this Web page, detailed information about various aspects of source water protection can be found by clicking on the Section link (in the box to the left) for "Publications, Fact Sheets". The most useful materials for Balanced Growth efforts are:

### **GUIDANCE DOCUMENTS:**

- Ohio's Source Water Assessment and Protection Program (1999) [PDF]
- Developing Source Water Protection Plans for Public Drinking Water Systems Using Inland Surface Waters (2009) [PDF]
- Developing Local Drinking Water Source Protection Plans in Ohio (2003)[PDF]

### **FACT SHEETS**

- Ohio's Source Water Environmental Education Teams (SWEET) (2009)[PDF]
- Source Water Protection in Ohio (2010 [PDF]
- Ground Water in Ohio (2003)[PDF]

### **EDUCATIONAL MATERIALS**

- COLORING BOOK – Once Upon a Wellfield: The Adventures of Dew [PDF]
- POSTERS: Living/Working/Farming in a Source Water Protection Area [PDF]
- POSTER: Potential Impacts to Your Source of Drinking Water
- VIDEO – Ground Water and the Ohio Wellhead Protection Program (1995)

## Other Resources

**Hamilton to New Baltimore Groundwater Consortium;** Tel: 513-868-5993 <http://www.gwconsortium.org/>

**Ohio Department of Natural Resources, Division of Soil and Water Resources, *How to Read and Use Ground Water Pollution Potential Maps*;** <http://www.ohiodnr.com/water/tabid/3543/Default.aspx>

**Ohio Department of Natural Resources, Division of Soil and Water Resources;** <http://www.dnr.state.oh.us/tabid/21817/Default.aspx>

**U.S. Environmental Protection Agency, *Ground Water and Drinking Water*;** <http://water.epa.gov/drink/index.cfm>

*Downtown Cincinnati on the Ohio River*  
(photo: National Underground Freedom Center)

