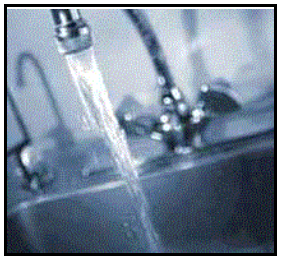
Developing Local Drinking Water Source Protection Plans in Ohio



Guidance for Public Water Systems Using Ground Water

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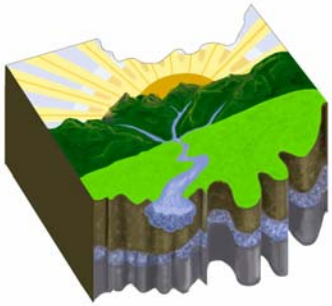

Protecting Ohio's Drinking Water Sources

July 2003

Developing Local Drinking Water Source Protection Plans in Ohio

Guidance for Public Water Systems Using Ground Water

Prepared by Ohio Environmental Protection Agency
Division of Drinking and Ground Waters

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1.0 INTRODUCTION

Protecting drinking water is a top priority in Ohio. A 1995 statewide survey of citizens indicated that Ohioans rank drinking water quality as one of the top three environmental concerns facing Ohio (Ohio EPA, 1995). Another statewide survey conducted in 1998 indicated that 90% of Ohioans consider the quality of drinking water to be a "very important" water resource issue (Ohio Water Resources Council, 1998). This was the highest ranking of any water resource issue rated in the survey. Beginning in the 1970s, federal environmental laws were passed to address the need for reliable supplies of safe drinking water, primarily by cleaning up contaminated air, soil, and water. In 1986 the Safe Drinking Water Act established health and treatment standards for public drinking water systems. Environmental goals at the national, state, and local levels are now shifting to protecting resources from potential *future* damage.

Because safe drinking water is a necessity to everyone, Ohio EPA considers protecting this valuable resource to be a primary goal. Thanks in part to drinking water treatment, design of treatment systems, certification of plant operators, and regulations on contaminants, public water systems in this country set the world standard for providing safe drinking water to the public. However, even these efforts may not prevent serious outbreaks of waterborne disease. This was demonstrated in 1993 when the City of Milwaukee's public water supply became contaminated with *Cryptosporidium*, leading to several deaths and hospitalizing thousands more. The water treatment plant's filters were unable to remove the tiny micro-organisms and chlorine could not destroy them. In addition to the concern for public health, the economic costs incurred by a public water system when its drinking water source becomes contaminated also can be devastating. (Figure 1.1). For example, since trichloroethylene was first detected in the local drinking water supply wells at the City of New Philadelphia, Ohio, the city and the party responsible for the contamination have spent approximately $1 million for investigations, treatment, and monitoring, and over $20,000 in additional annual expenses.

DIRECT COSTS OF TREATING GROUND WATER CONTAMINATION

- Investigation costs (soils and water)
- Legal fees to recover investigation and treatment costs
- Cleanup and remediation costs
- Costs of buying a temporary water supply from another community
- Professional consulting fees
- Costs of new wellfield development
- Costs of distributing information to public

ADDITIONAL, INDIRECT COSTS

- Increased monitoring costs
- Real estate devaluation
- Redevelopment of contaminated sites
- Lost jobs (if industry relocates due to water costs or new industry declines to locate)
- Decline of consumer confidence in water supply
- Potential lawsuits from actual or alleged consumption of contaminated water.

Figure 1.1 - Costs of drinking water contamination.

Due to these and other incidents, protecting drinking water *at its source* has become a top priority. Sources of drinking water include portions of **aquifers** (water-bearing rocks and sediments), as well as

Drinking Water Source Assessment Reports for community and other large ground water-based public water systems document the efforts of Ohio EPA staff to (1) determine a reasonable protection area around the wellfield, based on scientific principles of ground water flow; (2) locate any potential contaminant sources within that area; and (3) determine the susceptibility of the aquifer to contamination. Maps of the protection area, with the identified potential contaminant sources, are also provided. The last section of the report identifies the potential contaminant sources that may pose the greatest risk to the aquifer, and provides suggestions for protective strategies.

A drinking water source protection area and potential contaminant source inventory endorsed through Ohio's Wellhead Protection Program are equivalent to the protection area and potential contaminant source inventory identified in the Drinking Water Source Assessment Report.

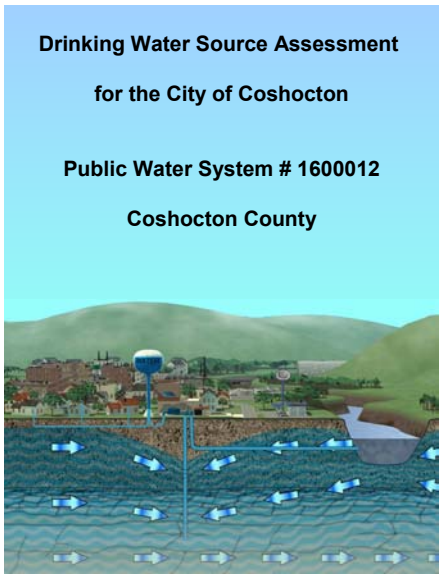

Figure 1.2 - Drinking Water Source Assessment Report

lakes, streams, and reservoirs. The 1986 and 1996 Amendments to the Safe Drinking Water Act established the **Wellhead Protection Program** and the **Source Water Assessment and Protection Program**, respectively. These programs were established to help public water systems develop plans for protecting their drinking water resources. If a public water system does not determine its **drinking water source protection area** and identify **potential contaminant sources** in the **protection area**, Ohio EPA staff will assemble information and provide it to public water systems in the form of a **Drinking Water Source Assessment** Report (Figure 1.2).

1.1 PURPOSE OF THIS GUIDANCE

This guidance is designed for ***ground water****-based* public water suppliers serving cities, villages, or other large populations (such as school districts or industrial facilities), but can be used by any *ground water-based* public water system. It explains how to use the Drinking Water Source Assessment provided by Ohio EPA to protect a designated area from becoming contaminated. It also provides guidelines for developing a written **drinking water source protection plan** (also referred to as a **protection plan**).

This document divides the protection planning process into two basic components: development (Section 2.0) and implementation (Section 3.0). Section 2.0 describes the steps communities have used to develop drinking water source protection plans, from forming a **protection team** to selecting **protective strategies** to help minimize threats to the drinking water source. This section also discusses the contents of the protection plan. Section 3.0 provides information on implementing the plan, and draws examples from the experiences of other public water systems.

2.0 DEVELOPING A DRINKING WATER SOURCE PROTECTION PLAN

Every public water system should have a written drinking water source protection plan (referred to in this guidance as a protection plan) that explains how the drinking water source will be protected. This plan should present workable strategies for preventing, detecting, and responding to ground water contamination within the drinking water source protection area (referred to in this guidance as the protection area). These strategies should be based, at a minimum, on information in the public water system's Drinking Water Source Assessment Report. The plan should focus on potential contaminant sources identified in the protection area. Finally, it should reflect the community's financial and administrative resource commitment and the needs and desires of its citizens.

The recommended steps for developing a protection plan are shown in Figure 2.1 and are discussed below.

2.1 FORM A PROTECTION TEAM

To ensure widespread acceptance and commitment to the protection plan, develop the plan with a group of people representing the diverse viewpoints and local expertise of the community. A protection team is especially advisable when the protection area is large, extends into multiple political jurisdictions, or has a large number of potential contaminant sources.

Participants should include individuals who will play a role in implementing protective strategies, as well as those most likely to be affected by any decisions made (generally people who live, work, or own businesses in the protection area). Membership should reflect the size and resources of the system. At a minimum, the team should include local decision makers and water supply staff members and preferably someone with knowledge of emergency response and/or environmental compliance. A public relations specialist ensures frequent and accurate publicity of the team's efforts. Members drawn from groups such as the Natural Resources Conservation Service, the Farm Bureau, or a local watershed planning organization, ensure

Form a Protection Team

Review the Drinking Water Source Assessment Report

Prioritize the potential contaminant sources

Evaluate protective strategy options for each source

Decide which options to implement

Figure 2.1 - Steps for developing a drinking water source protection plan.

coordination their respective organizations. Figure 2.2 presents "sample protection teams" for three different types of public water systems: a village, a school, and an industrial plant.

In the end, the most successful drinking water protection efforts are those publicized early and often, and presented as a community source of pride. These successes can be traced back to the protection team.

Village: water system operator, mayor/township trustee/county commissioner, area resident, local farmer, local business owner, public relations specialist, fire chief, teacher, watershed planning group member

School: superintendent, water system operator, school board member, PTO representative, teacher, students

Industrial plant: plant superintendent, water system operator, environmental manager, mayor/township trustee/county commissioner

Figure 2.2 - Sample protection team members.

2.2 REVIEW THE DRINKING WATER SOURCE ASSESSMENT REPORT

Each member of the team should be familiar with information in the Drinking Water Source Assessment Report. This report provides a map of the protection area, and identifies the potential contaminant sources within the protection area. Reports prepared by Ohio EPA also describe the sensitivity of the aquifer and ranks its **susceptibility** to contamination as high, moderate, or low. These reports also provide suggestions for protective strategies. Reports prepared by the public water system generally do not discuss the of the aquifer sensitivity and susceptibility. Ohio EPA will complete a susceptibility analysis for any public water system with an endorsed protection area and potential contaminant source inventory.

Information in the report is based on published reports, data drawn from various state environmental agencies, and on-site inspections, and is limited by the availability and quality of this information. Members of the protection team may be able to supplement this information from their own experience and familiarity with the area. For example, the existence of former potential contaminant sources (a former landfill, now covered) or open abandoned wells might have been overlooked during the original inventory. The location of septic systems and pipelines may be unknown. In most cases, there is little or no information about the types and quantities of chemicals that are stored in unregulated facilities. The protection team members should review the Drinking Water Source Assessment Report critically and attempt to add information to it. Some protection teams have conducted inventories of their own within the protection area, to obtain more detailed information. For more information on conducting a potential contaminant source inventory please see Ohio EPA publications *Potential Contaminant Source Inventory Process Manual* and *Guidance for Conducting Potential Pollution Source Inventories in Wellhead Protection Areas*. To obtain copies of these documents, please contact Source Water Assessment and Protection Program staff.

Team members should be aware of any environmental regulations that apply to the facilities or land-use activities occurring within the protection area. Compliance with these regulations may provide sufficient protection of the aquifer and make additional

efforts unnecessary. Ohio EPA and other state and local agencies can provide assistance on environmental regulations.

2.3 PRIORITIZE POTENTIAL CONTAMINANT SOURCES

Some potential contaminant sources may pose a very significant risk, while others pose a marginal risk. It makes sense to prioritize the potential contaminant sources and apply existing financial and administrative resources first to those facilities or activities that are most likely to impact the drinking water source.

If the source of drinking water is a deep aquifer rated with a low susceptibility, give the highest priority to potential contaminant sources with a direct connection to the aquifer, such as old wells (drinking water, irrigation, oil or gas production, monitoring, or injection wells) that have not been properly abandoned, or deep excavations (such as quarries). Where the source of drinking water is a relatively sensitive aquifer with a moderate or high susceptibility rating, consider the following criteria:

- **Distance to the public water supply wells.** Closer potential contaminant sources pose a greater threat than more distant ones.

- **Number of sites present within the protection area.** Public water systems will accomplish more by focusing on protective strategies for a type of contaminant source that exists at numerous sites in the protection area (such as multiple septic systems or fuel oil tanks). Use this standard carefully so unique sources that may pose a high risk, such as abandoned landfills, are not overlooked.

- **Whether the chemical is stored, disposed or released above-ground or below-ground**. If a chemical is stored below-ground (like in an underground storage tank), or washed into a floor or storm drain leading to a septic system, it is more likely to enter ground water at significant concentrations.

- **Whether pollution prevention or control measures are in place**. If a chemical is stored in an area with adequate secondary containment or on an impervious surface, it is less likely to enter ground water in significant concentrations.

- **Amount of chemicals stored, disposed or released at a site.** Greater amounts imply a higher risk.

- **Whether or not environmental regulations or voluntary protective activities are already implemented at the site.** If so, the risk is lower.

- **Toxicity of chemicals.** More toxic chemicals present a higher risk.

- **Whether or not the chemical is containerized.** Chemicals in containers can make a potential contaminant source less of a threat. Unused chemicals and chemicals slated for disposal are less of a threat if stored in structurally sound vessels or specially designed buildings.

- **Mobility of the chemicals within the subsurface.** A chemical's mobility within the subsurface depends on the make up of the subsurface and the characteristics of the chemical. In general, chemicals move relatively rapidly through sandy sediments and less rapidly through clay-rich sediments. Chemicals that are volatile and/or highly soluble in water tend to be more mobile in the subsurface. This explains why such volatile chemicals as benzene (a component of gasoline) and trichloroethylene (a common de-greasing agent) are so frequently found in ground water contaminant plumes.

- **Status of the facility where the chemicals are stored, disposed or released at a site.** Containerized chemicals abandoned or buried decades ago only now may be starting to leak, while un-containerized chemicals disposed of long ago may have been diluted and chemically decomposed.

Of these criteria, the first two are the most straightforward. Both can be easily determined from the map provided in the Drinking Water Source Assessment Report. The other criteria require more detailed information about each potential contaminant source, which the protection team may decide to obtain. The Drinking Water Source Assessment Report also suggests which types of potential contaminant sources may warrant prioritization.

2.4 EVALUATE PROTECTIVE STRATEGIES

Once the priority potential contaminant sources have been determined, the protection team should evaluate options for reducing the threat posed to the aquifer. The first questions to resolve: (1) Are existing environmental regulations sufficient? (2) Are regulated facilities in compliance? If so, the team should include a review of the environmental records as a protective strategy. The water supplier and water consumers have a right to know how adequately the water they drink is protected from activities at a regulated facility. The records of compliance inspections conducted by government agencies are public records and can be obtained for review. Regulatory agency staff are available to help the reviewer understand the findings of these inspections.

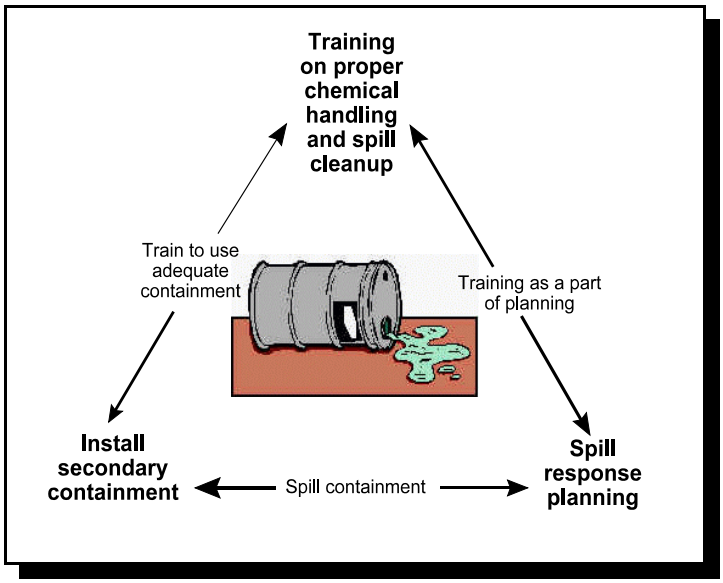

Figure 2.3 - Relationship of strategies to each other. Education, emergency response planning, and potential contaminant source controls work together to protect the drinking water source from a potential contaminant source.

If regulations are not sufficient the protection team may need to propose additional measures. Ideally, several measures will be proposed to integrate education and outreach, drinking water

shortage/emergency response, and potential contaminant source control activities (Figure 2.3), as discussed in Section 2.4.1 of this document.

2.4.1 TYPES OF PROTECTIVE STRATEGIES

Any activity intended to prevent a source of drinking water from becoming contaminated is a protective strategy. In this document protective strategies are grouped into four categories: education and outreach, drinking water shortage/emergency response, potential contaminant source control measures, and ground water monitoring.

2.4.1.1 EDUCATION AND OUTREACH

The main goal of drinking water source education and outreach is to make people who live and work in the protection area aware of how their activities can impact ground water and what they can do to prevent contamination. Techniques developed for teaching and public relations are all applicable, but clearly some techniques can be more effective (and cost-effective) than others. What works for children may not work for adults; what works in a large urban community may not work for a small rural community. The type of information needed by an employee handling chemicals at a commercial site in the protection area is different from the kind of information needed by a homeowner who lives there, or a traveler simply driving through the protection area (Figure 2.4).

Figure 2.4 - Road signs. Road signs marking drinking water source protection areas, like this one in Brown County, are one way of educating the general public about the protection area. The Ohio Department of Transportation will erect these signs on state routes and U.S. highways that cross protection areas for community water systems serving more than 500 people at no cost to the public water system.

Outreach. The most common outreach tool is a brochure. In numerous communities, the public water supplier includes a brochure with the water bill that explains where the drinking water comes from and includes a map of the protection area. A sample brochure, developed by Ohio EPA for the City of New Carlisle, is included as Appendix A, and a template for developing a similar brochure is available on Ohio EPA's Web page at http://www.epa.state.oh.us/ddagw/swap.html. Brochures can be designed to reach all the public water consumers or can target specific portions of the population, such as those who actually live or work in the protection area. An effective means of distributing brochures and other outreach materials is hand delivery by local youth organizations, such as a local boy or girl scout troop, or delivery by a city official or protection team member.

Other outreach materials include periodic articles in the local newspaper (which has proven to be very effective), as well as posters and fact sheets in workplaces and public areas such as libraries and municipal buildings. Presentations may be given before city

and village councils and before service groups (such as Kiwanis and Rotary Clubs). For communities with their own broadcasting facilities, radio and cable TV are another outlet. Many communities have their own Web pages. Booths at local community events (such as festivals and county fairs) are another outreach tool. These are particularly successful when they feature educational hands-on displays. Ohio EPA staff are also available to provide presentations at community meetings.

Education. An appreciation of ground water flow and how aquifers can become contaminated should be part of the elementary and high school curricula. Standard textbooks can be complemented by materials from numerous environmental organizations, and most teachers are open to incorporating such information. Ohio EPA has a coloring book for children and a video about drinking water protection that may be borrowed or copied, and other materials. Sand tank models are excellent tools for explaining how ground water moves through the subsurface, and how it becomes contaminated (Figure 2.5). Source Water Assessment and Protection Program staff can provide additional information about the educational materials available from Ohio EPA.

Figure 2.5 - Educating children. An Ohio EPA staffer uses a sand-tank model to show fourth grade students how water and contaminants move through the subsurface to a well.

Public water systems should also make an effort to educate adults working and living in the protection area. Creating an appreciation of how everyday activities can affect the quality of the drinking water source is an important aspect in planning protection strategies. Many of the daily activities of a public water system can incorporate an educational message. For instance, city officials can have building inspectors include a short message on drinking water source protection during their inspections. Industrial facilities can include material on drinking water source protection in new employee orientation or other training or meetings.

Education and outreach is an ongoing process. For these efforts to be successful, they must be repeated periodically. Ohio EPA's Web page provides links to numerous Web sites for general environmental educational materials at http://www.epa.state.oh.us/ddagw/pdu/swap_links.html.

2.4.1.2 DRINKING WATER SHORTAGE/EMERGENCY RESPONSE

Protective strategies in the drinking water shortage/emergency response category prepare for (1) a drinking water shortage; and (2) spills that require emergency response. All community public water system owner/operators are required by Ohio Administrative Code 3745-85-01 to have a written contingency plan on the premises. The contents of the plan are also contained in of Ohio Administrative Code 3745-85-01 (see Appendix B for a copy). A plan written to meet these regulatory requirements typically addresses contingencies such as power failures, floods, and numerous other accidents, but it often does not include guidance for what to do if the aquifer becomes permanently unusable (due to contamination), or if a catastrophic spill of chemicals occurs in the protection area. Drinking water shortage/emergency response planning for drinking water source protection adds additional detail to the requirements of the Ohio Administrative Code.

Drinking Water Shortage planning. The most common short-term response to a total loss of drinking water supply is providing bottled water or water purchased from another community. The protection plan adds additional details, indicating from whom the water would be purchased, how it would be transported, and how it would be distributed. Long-term measures may also include tying into a neighboring community's water system or developing a new **wellfield**. A public water system should consider any options available to it and research and document the financial alternatives for funding them. Future water supply needs may involve expanding a current wellfield or developing a new one. A community needs to plan for such major expenditures, and may need to acquire options on or secure relatively undeveloped land many years in advance.

Emergency Response.

Catastrophic chemical releases in a wellfield should not catch a public water supplier unprepared. The chain-of-command and procedures for notification and response should be posted and known by all water system employees. Procedures should be in place for the kinds of catastrophic spills that can reasonably be expected. If the protection area contains large holding tanks, for example, plan for a catastrophic failure. If roads or railroads cross the protection area, anticipate tanker spills. Any facility in the protection area has the potential to burn. If it contains large amounts of chemicals, the aquifer could be contaminated - especially if the fire department applies large quantities of water to douse the fire, and there is no way to channel the water away from the

Figure 2.6 - An environmental nightmare - The Sherwin-Williams warehouse fire in 1987. The reportedly "fireproof" facility was located in one of the City of Dayton's wellfields, over an aquifer that is the sole source of drinking water for 1.5 million people. Emergency responders let the site burn to the ground rather than douse it with water that would immediately seep into the ground, carrying toxic solvents into the drinking water supply. Clean-up and subsequent monitoring cost an estimated $12 million (Ohio EPA, October 1999).

wellfield (Figure 2.6). Contact the local fire or emergency services department to help develop procedures for handling spills and fires in the protection area.

2.4.1.3 POTENTIAL CONTAMINANT SOURCE CONTROL STRATEGIES

Potential contaminant source control strategies are any action taken to protect the aquifer from *a specific potential contaminant source or type of source*, which may be a specific facility or activity (such as lawn chemical application). Source control strategies limit the risk from or totally eliminate a potential contaminant source, protecting the aquifer for the public water system. Some types of source control strategies include:

- ***Prohibitions.*** New potential contaminant sources (certain types of facilities, land uses or specific chemicals) are not permitted to move into or be used in the protection area. Prohibitions are usually achieved through zoning ordinances, but may also be implemented through the purchase of land or development rights, or by obtaining an easement, deed restriction, or restrictive covenant.

- ***Restrictions.*** A specific chemical may be used or stored in the protection area in restricted amounts. Or, certain types of land use may be restricted, but not altogether banned.

- ***Chemical use reduction.*** Pollution prevention strategies can reduce the amount of chemicals of concern that are stored, used, or disposed at the site. Ohio EPA's Office of Pollution Prevention can provide technical assistance in this area.

- ***Design standards.*** Facilities are required to meet certain design standards, such as containment berms, impermeable storage surfaces, overfill protection, leak detection systems, secondary containment systems, etc. Many design standards are already required by existing state and local building codes or state and federal building environmental regulations (Figure 2.7).

- ***Operating standards.*** Operators would be required to follow certain operating standards such as periodic inspection, testing and maintenance.

- ***Reporting requirements and documentation.*** Owner/operators must report the types and quantities of chemicals used, stored and disposed on the property, and document source management efforts.

- ***Land Purchases.*** Purchasing undeveloped property in the protection is an ideal way to control the location of potential contaminant sources by developing the land into a greenspace.

Figure 2.7 - Design standards. These above ground storage tanks are surrounded by a dike to contain spills. Spill containment is one type of design standard that can be used as a source control strategy.

- ***Conservation easements.*** Conservation easements can be purchased or leased from a property owner or donated by a property owner to a qualifying organization. Conservation easements can be used to control land use in the protection area.

- ***Development rights.*** A property owner can sell or donate the rights to develop a property to a qualified organization. This allows the property to remain in it's current state, usually farmland or other undeveloped land.

Many facilities or activities are already subject to environmental regulations. In some cases, it may be enough simply to request copies of reports documenting a facility's ongoing compliance record.

2.4.1.4 GROUND WATER MONITORING

Unlike the other types of protective strategies, ground water monitoring does not help prevent contamination, but it may provide information that leads to preventative strategies. Not all public water systems need to develop a ground water monitoring plan beyond the compliance sampling already required, but all large public water systems should assess the need for ground water monitoring. The three primary functions of ground water monitoring are:

- **Early warning.** Properly sited and appropriately sampled ground water monitoring wells can provide early warning of contaminant plumes from specific sources, so corrective actions can be taken before the public water supply is affected.
- **Tracking ground water quality trends.** Where **non-point sources** pose a threat, monitoring may warn of generally rising levels of contaminants, so that corrective actions and more effective prevention measures can be implemented.
- **Evaluating the effectiveness of selected protective practices.** Ground water monitoring may enable evaluation of the effectiveness of specific protective strategies.

The need for ground water monitoring depends upon: (1) the susceptibility of the aquifer being used; (2) the presence of contaminant plumes and **point sources**; and (3) the protective strategies selected to protect the aquifer. Because of the technical nature of ground water monitoring, a community may want some assistance from a ground water professional when drafting this section. Additional information on ground water monitoring can be found in Ohio EPA's guidance document, "*Ground Water Monitoring Guidance for Wellhead Protection*". Copies of the document are available from Ohio EPA.

2.4.2 SELECTING PROTECTIVE STRATEGIES OPTIONS

Not all protective strategies are right for every public water system. Some questions to ask when considering a protective strategy include:

- How effective is it in protecting against contamination?
- Can it apply to various potential contaminant sources or just one?
- Is it compatible with existing approaches?
- Is it compatible with existing laws, regulations, ordinances, or programs?
- Are staffing and expertise available from existing resources?
- Are other local groups engaged in similar efforts?
- Do other initiatives compliment or enhance the strategy?
- Is cost a factor in implementing this strategy?
- If so, are funding sources available to cover these costs?
- Is there buy-in to the strategy?

The types of protective strategies proposed will be influenced by technical, administrative, financial and political concerns. For a community struggling with more obviously pressing capital expenses, it may prove more effective to focus on strategies that are least expensive first, and build up support based on early modest efforts. For example, the ideal solution to the risk of vehicular accidents in the protection area may be to work with the Ohio Department of Transportation to re-route trucks carrying hazardous materials. However, this strategy may be impractical or impossible, even in the long term. A second choice might be to redesign drainage along the highway to control the spread of any spilled materials, which is technically feasible but may be prohibitively expensive. The third choice might be simply to work with the appropriate agencies to lower the speed limit to reduce the potential for accidents due to speeding. Finally, drinking water protection area signs could be placed on major roads crossing the protection area. Signs can inform people of how to report spills and alert emergency responders that they have entered the protection area.

2.5 WRITE THE DRINKING WATER SOURCE PROTECTION PLAN

The best way to ensure that protective strategies are carried out is to prepare a written drinking water source protection plan (also referred to as a protection plan). This provides an opportunity to capture the decisions of the protection team. This plan documents *what* will be done, *why* those activities were selected, *who* will be responsible for which strategy, and *when* each strategy will be implemented. The plan

should explain how the public water system will focus its efforts on the protection area, and how the various strategies proposed will work together to reduce the risk of contamination. Since public water system staff and community leadership changes over time, preparing a formal protection plan will help provide continuity in succeeding years.

A protection plan should begin with an introduction summarizing the Drinking Water Source Assessment Report provided by Ohio EPA. It should discuss the potential contaminant sources in the protection area, how the protection team has prioritized them, and why. The protective strategies proposed to address these potential contaminant sources should be discussed in separate sections as outlined below.

Education and Outreach
This section of the protection plan describes the activities that will be undertaken and the target groups for these activities. Some activities will be focused toward specific groups of people (for example, schoolchildren, city officials, or employees at a particular facility) and others will be very general in nature, intended for the general public. Ohio EPA recommends that both first-year and long-term time lines be included for the planned activities. The protection plan should describe how the educational activities will be maintained over time and how the program's effectiveness will be evaluated. The latter will allow a public water system to improve its education and outreach activities from time to time. Ohio EPA also recommends the membership of the protection team be listed in this portion of the plan.

Drinking Water Shortage/Emergency Response
The strategies described in this section of the protection plan will identify short- and long-term alternative sources of drinking water and the financial mechanisms that could be used to implement those alternatives. It will also provide a plan for responding to spills that may require an emergency response, with a chain of command, telephone numbers, and back-up staff to address emergency spills in the protection area. Because the timing of emergency situations cannot be controlled, alternate contacts and phone numbers should be included.

Community public water systems must develop a contingency plan meeting the requirements of Ohio Administrative Code 3745-85-01. Public water systems that have approved contingency plans should use the drinking water shortage/emergency response section of the protection plan to show how it builds on the existing contingency plan.

Potential Contaminant Source Control Strategies
Strategies listed in this section are those selected either specifically for a certain potential contaminant source, or a category of potential contaminant sources. They may include any of the strategies discussed in Section 2.4.1.3 of this guidance, or other strategies developed b the protection team. This section should propose specific strategies for each individual or type of potential contaminant source in the protection area, or else explain why no strategies are proposed. For example, the protection team may consider that strategies covered under education and outreach or emergency

response are sufficient for a particular potential contaminant source. This section should provide a time frame for implementation of the proposed strategies and list by title those who will be involved in the implementation.

Ground Water Monitoring

If a public water system determines ground water monitoring is needed, this section should include a map of the area showing the locations of the proposed monitoring wells, the public water supply wells, the protection area, and the potential contaminant sources. The protection plan should discuss the potential contaminant source, or existing contamination, and the contaminants each well is intended to monitor. The protection plan should also include figures or text describing construction details, including total depths and screened intervals, of the planned well or wells and a sampling schedule showing monitoring frequency and parameters. If a public water system decides that ground water monitoring is appropriate, designing an early warning detection system may require the assistance of a professional hydrogeologist.

Submitting the Plan

Ohio EPA has established criteria for endorsing protection plans. A checklist can be found in Appendix B. Public water systems with drinking water source protection plans endorsed by Ohio EPA receive extra consideration when applying for Drinking Water State Revolving Loan Fund monies and Clean Water Act Section 319 grants.

For endorsement, submit the protection plan to the appropriate Ohio EPA district office. It will be reviewed against the criteria provided in Appendix B. If it meets them, it will be endorsed and a formal endorsement letter will be sent to the public water supplier, usually with some suggestions for improving the plan. If not, a letter will be sent explaining why the plan was not endorsed and suggesting revisions that will make it endorsable.

3.0 IMPLEMENTING THE PROTECTION PLAN

For a protection plan to be effective, protective strategies must be implemented. Implementation options include:

- voluntary compliance with recommended environmental improvements or **best management practices** promoted by education and outreach;
- incentives such as tax breaks by a city or village;
- local ordinances that apply in the defined protection area; and
- public education.

How public water systems implement protective strategies will vary. The following sections describe how some Ohio communities have achieved their drinking water source protection goals. Additional information can also be found in Appendix C.

Regardless of the approach or combination of approaches a public water system selects, federal and state regulations will still apply to many of the potential contaminant sources in the protection area. At a minimum, all waste management and chemical storage activities should meet the applicable requirements. Consider these requirements when determining how to implement the protection plan.

The following sections of this document describe the primary implementation options available to public water systems. Each also contains a case study of the implementation method the protection team chose for its protection plan. The protection plans described in these case studies were selected because each emphasizes implementation methods.

3.1 VOLUNTARY ACTIONS

Voluntary compliance is attractive, but requires constant attention and educational campaigns. Most of these activities are best management practices or pollution prevention activities, and are most effective on existing potential contaminant sources. This option provides an opportunity for the public water system representative to meet with the businesses identified as potential contaminant sources and provide information about voluntary actions that can readily be implemented. Best management practices and pollution prevention activities are easily customized to the practices, processes, and materials in use at a potential contaminant source. In many cases, pollution prevention activities can help businesses save money; examples of savings can provide incentive for other businesses to implement their own pollution prevention activities. Ohio EPA's Office of Pollution Prevention visits businesses and provides recommendations on how they can modify their processes, materials and practices to generate less pollution in a cost-effective and technically feasible manner. When using voluntary approaches, remember that these types of strategies work best if there is an incentive to implement them.

Case Study: Village of Malta

Malta (population: 800) is located along the Muskingum River in Morgan County, south of Zanesville. The Village derives its drinking water from a sand aquifer located adjacent to the Muskingum River. Malta developed a wellhead protection program in 1995 after volatile organic compounds were found in one of its drinking water supply wells.

The village formed a wellhead protection committee and, assisted by the Great Lakes Rural Community Assistance Program, developed a protection plan. During plan development, the committee conducted a survey of citizens to determine what they considered the greatest threat to their drinking water source. Members of local 4-H clubs delivered these to each house. Additional outreach included: providing information on proper septic system maintenance to septic system users, publishing a brochure about wellhead protection, and holding a number of informational presentations.

Based on the hydrogeologic setting and input from various sources, the committee identified the highest priority sources. Facilities that use, store, and dispose of chemicals and wastes (industries and home-based businesses) were a high priority due to their proximity to the wells. Septic systems were a high priority due to the large number of systems in the protection area. Unused wells were a high priority because they provide a direct connection to the aquifer. Other sources considered lower priority included underground storage tanks, agricultural chemicals, businesses upgradient of the protection area, oil and gas wells, transportation spills (including spills into the Muskingum River), and use of road salt and lawn and garden chemicals.

The committee developed a plan based on these potential contaminant sources. The plan focuses on education: training workers in waste handling; educating small business owners on waste disposal options; working with local farmers on reducing chemical use and implementing best management practices; and working with the owners and operators of oil and gas wells to ensure proper operation and maintenance. The plan also calls for the village to monitor business and industry compliance with existing regulations as a primary source control strategy. Other source control strategies include working with small business owners on waste assessments and disposal plans; working with the surrounding township to develop a waste disposal ordinance; and implementing oil and gas well inspections to ensure proper containment, operation and maintenance. Additional outreach includes presentations about ground water and drinking water source protection to government agencies, community service groups, and water users. Contingency planning for shortages includes investigating locations for new wellfields or tapping into an existing emergency connection with the Village of McConnelsville. Ground water monitoring is ongoing due to the volatile organic compounds found in the aquifer.

3.2 INCENTIVES

Incentives are also attractive but may require a greater investment of money and effort by the community.

Case Study: City of Dayton

The City of Dayton provides drinking water to approximately 440,000 people in the city and surrounding communities in Montgomery County. The city's current source of drinking water is two wellfields located along the Great Miami and Mad Rivers. The wells for the city draw water from the Great Miami Buried Valley Aquifer System, consisting of glacial sand and gravel deposits. This aquifer system has been granted Sole Source Aquifer status by U.S. EPA. Wellhead protection is a priority for the city, because the well fields are surrounded by development, and there would be few – if any -- options available if either well field were to become contaminated. After determining the one- and five-year **time-of-travel** zones for the municipal wellfields, the city conducted a potential contaminant source inventory. More than 600 businesses are located in the protection area, including warehouses, automotive facilities, and industrial plants. The protection area includes land in five other jurisdictions, with 58% of the area and over half of the businesses being outside the City of Dayton.

Due to the size of the protection area and the diversity of potential contaminant sources, the city has developed a comprehensive protection plan. The city has established a zoning ordinance that requires businesses to inventory their use of specific regulated substances. The township, neighboring cities, and Air Force base in the protection area have enacted parallel measures to protect Dayton's wells. The city also conducts education activities targeted at students, businesses, and the general public, and has worked with the local Fire Department, regional Hazardous Materials Team, and Ohio EPA to help prevent and prepare for fires and spills in the protection area. The city also maintains an extensive ground water monitoring network, totaling over 230 wells.

The cornerstone of the program is an economic development fund of up to $10 million accumulated from a surcharge on the city's water customers. Five million dollars has been set aside for use in case a major spill occurs. The remainder is used to promote ground water-friendly development and operations. The primary, incentive-based program is the Risk Point Buy Down Program. Business inventories may qualify for forgivable loans (conditional grants) - if owners are willing to make a 97 percent reduction in their maximum daily inventory of regulated substances and sign a conservation easement agreeing to maintain this level. Businesses that perform projects that reduce the risk to groundwater are eligible for zero percent interest loans, even if there is no decrease in the inventories of regulated substances. City documents show that between 1993 and 1999, this program led to a reduction of 16,246,005 pounds of regulated substances in the protection area. This does not mean that businesses consider the protection area an undesirable location. On the contrary, between 1988 and 1999, $38,127,312 in construction has been approved just in Dayton's portion of the protection area.

Dayton's program was the first in the state to be endorsed by the Ohio EPA and has been cited by former U.S. EPA Administrator Carol Browner as a model for communities across the nation. Dayton's drinking water source protection program has been recognized for its innovation and service to the community by the International City and County Management Association, the National Civic League, the National League of Cities, The Groundwater Foundation, and The Ground Water Protection Council. The City of Dayton received the "Ohio Exemplary Wellhead Protection Award -- Large System Category" from the Ohio Section of the American Water Works Association in 1997 and the "National Exemplary Wellhead Protection Award -- Large System Category" from the American Water Works Association 1998.

3.3 ORDINANCES

Ordinances can be a powerful option for addressing a large number of contaminant sources, and can provide the authority for ongoing enforcement at the local level. However, passing a local ordinance and then enforcing it may involve some political risk for community leaders. Environmental regulations at any level are frequently believed to discourage business investment and development. Such claims overlook the positive economic values of a well-protected water source. Local ordinances can impose zoning overlays, site plan review requirements, and design/operating standards, and require mandatory action from the owner of a potential contaminant source in the area.

Zoning channels future development away from the wellfield to a less sensitive area. If the protection area is undeveloped and not zoned, the community can zone it a "natural resource protection area." If the protection area is developed and not zoned, the community may introduce zoning, with recognition that existing development needs to be grandfathered. If the protection area is already zoned, "overlay zoning" may be introduced. See Appendix C for additional information on regulatory options.

Case Study: City of Lancaster

Lancaster (population: 40,000) is located along the Hocking River in Fairfield County, southeast of Columbus. The city's current source of drinking water is the Miller Park wellfield located in a city park along the Hocking River. This wellfield has been the primary source of drinking water since the 19th century. The wells for the city draws water from glacial sand and gravel deposits. Wellhead protection is a priority for the city because the wellfield is surrounded by development. After determining the one- and five-year time-of-travel zones for the municipal wells, the city conducted a potential contaminant source inventory. These sources account for more than 500,000 gallons of fuel and other petroleum storage. Within the inner management zone alone, 47 potential contaminant sources were identified. Of those, 15 are automotive facilities or are associated with petroleum product storage and four have documented releases that have affected ground water.

Based on these figures, the city has placed a priority on controlling petroleum and chemical storage and use in the protection area. The city has instituted a zoning ordinance that prohibits certain activities throughout the protection area, and additional

activities in the inner management zone. Existing facilities are considered non-conforming facilities and must register with the city. The ordinance also provides for inspections and penalties. The prohibitions in the ordinance have kept additional potential contaminant sources from locating in the inner management zone. The ordinance has also caused some facilities that contaminated ground water to actively clean up contaminated soil and ground water. The ordinance has helped the City of Lancaster maintain the integrity of its source water.

The city also conducts education activities targeted at the general public. The city has installed a ground water monitoring network throughout its inner management zone. The locations of the wells in this network were chosen based on sources identified in the potential contaminant inventory.

3.4 REGIONAL PROTECTION PLANS

It's common for public water systems of all types to be located in close proximity to one another. Being in the same geographical area, these systems may have many common potential contaminant sources. These systems may also share a lack of financial resources needed to address their protection plan. Protecting the shared drinking water source of these systems may be more efficiently accomplished through regional source water protection planning. Regional planning is generally done by a group of organizations and local governments that share common concerns. The area covered may be a county, group of counties, metropolitan area, or watershed. The planning process can help identify regional solutions to local issues. Successful protection planning will address the needs of all water systems in the area. Regional source water protection planning can also help ensure that sufficient supplies of water will be available for the area's continued economic growth.

Case Study: Hamilton to New Baltimore Ground Water Consortium

The Hamilton to New Baltimore Ground Water Consortium is located along the Great Miami River north of Cincinnati. The consortium includes six public and industrial groundwater producers/users serving more than 300,000 people. The systems all derive their water from glacial sand and gravel deposits. Cooperation in drinking water supply planning and protection has been an important issue for these water systems for more than 30 years. After determining the one-, five- and 10-year time-of-travel zones for the wells, the consortium conducted a potential contaminant source inventory. The consortium decided to include a 10-year time-of-travel zone because of the many potential contaminant sources located just outside the 5-year time of travel. The inventory identified more than 700 potential contaminant sources at 394 sites in their joint protection area, including numerous small and potentially unregulated used oil tanks.

Based on these figures, the consortium worked to establish an ordinance which prohibits certain activities throughout the protection area and requires the registration of facilities that store or use certain regulated materials. Because the consortium does not have the authority to enact the ordinance, it has had to work with the cities, townships,

and county to enact it. Two municipalities in the consortium – the cities of Hamilton and Fairfield – have already enacted the ordinance. Although Ross and St. Clair Townships are not members of the consortium, they have recognized the importance of drinking water source protection and have enacted resolutions for their zoning that mirror the municipalities'. The consortium also has conducted an extensive education and outreach program, starting with the potential contaminant source inventory. The consortium has developed fact sheets and brochures, a curricula for school teachers, maintains a web site (www.gwconsortium.org), and sponsors the Butler County Children's Water Festival.

The consortium's contingency plan is based around three main components: notification to the Wellhead Protection Coordinator, submission of release information, and incident assessment. The consortium's contingency plan addresses both hazardous materials releases associated with an accident and releases detected through ground water monitoring. The primary objective of the plan is to ensure that the consortium is informed of, and kept up to date on, the status of hazardous material releases in the protection areas. This allows evaluation of the nature of a release, clean up activities, and potential for long-term groundwater quality impacts from these releases. Secondary objectives include tracking the occurrence of regulated substance releases in the protection areas, spill prevention awareness, and general ground water education for area fire departments.

The consortium utilizes the strengths of each of its members. One entity oversees the monitoring program, another management. All participate in public education and all pay for the installation and sampling of the monitoring wells. The monitoring wells serve as an early warning system for the production wells. Eighteen monitoring wells around the consortium's well fields are monitored monthly for water levels and semi-annually for various water quality parameters. Installation of additional monitoring wells around the consortium's wellfields is planned in the future as the members prepare to re-delineate all the wellfields.

3.5 Updating the Protection Plan

Over time, conditions in the protection area will change. New wells could be added to meet demand, enlarging the protection area. Old businesses will close and new businesses will replace them, eliminating some potential contaminant sources and introducing new ones. Existing businesses can change their operations, eliminating their potential contaminants from the protection area. As these changes occur, changes will also need to be made to the protection plan. Because the potential contaminant sources determine the protective strategies a system uses, most communities that have developed wellhead protection plans have set a standard time frame for updating their potential contaminant source inventory and protection plan. If conditions warrant changes, the public water system should use this manual as a guide to revising their plan.

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GLOSSARY

aquifer -rock or sediments that are saturated with water and transmit usable quantities of water to wells or springs.

best management practices - practical, effective, affordable, and technically feasible actions intended to minimize adverse impacts to natural resources. Best management practices focus on managing the impacts caused by specific potential contaminant sources.

contaminant - any physical, chemical, biological or radiological substance in water that is present at levels high enough to have harmful or undesirable effects.

drinking water source assessment - the three-step process of (1) determining a protection area around a wellfield or surface water intake: (2) inventorying that area for potential contaminant sources; and (3) evaluating how susceptible the source waters are to contamination.

drinking water source protection plan - the written document describing the strategies to be implemented by a public water system to prevent, detect, and respond to ground water contamination within the drinking water source protection area. The protection plan is based on information in the public water system's Drinking Water Source Assessment Report and focuses on the potential contaminant sources identified in the protection area.

ground water - subsurface water, located below the water table. (Above the water table subsurface water is called "soil water," and flows differently.)

non-point source - a diffuse potential contaminant source or group of potential contaminant sources such as agriculture, surface mines, forestry, home wastewater treatment systems, construction sites, and urban yards.

point source - a potential contaminant source with a concentrated origin, like an underground storage tank or a large registered feedlot with a specific point of discharge. Point sources are frequently registered and regulated by federal, state, and local laws.

pollution prevention - the use of source reduction techniques to reduce risk to public health, safety, welfare and the environment and, as a second preference, the use of environmentally sound recycling to achieve these same goals. Pollution prevention avoids cross-media transfers of wastes and/or pollutants and is multimedia in scope.

potential contaminant source - a facility or activity that stores, uses, or produces chemicals, and has the potential to release contaminants in an amount that could significantly impact the source waters used by a public water system.

protection area - an area around a well or surface water intake that is targeted for

special protective efforts to avoid contamination of an aquifer or surface water body that is used for public drinking water. Also called “source water protection area,” “drinking water source protection area,” and around wells, “wellhead protection area.”

protection team - a group of individuals that represent the organizations, businesses, and other participants in the drinking water source protection planning process and those most likely to be affected by any decisions made. Many participants will also play a role in implementing protective strategies.

protective strategies - actions taken to limit or eliminate the risk of contamination from a potential contaminant source or a type of source.

Source Water Assessment and Protection Program - Ohio EPA’s program is based on the Safe Drinking Water Act as amended in 1996 and was approved by U.S. EPA in November, 1999. The Source Water Assessment and Protection Program expands the Wellhead Protection Program to include all public water systems, including those using surface waters. The processes, guidance, and documents produced for and under the Wellhead Protection Program form the core of this program.

susceptibility - the likelihood for the source water(s) of a public water system to be contaminated at significant concentrations.

time-of-travel - the distance that a particle will move through an aquifer and/or surface water body in a specified amount of time.

wellfield - an area containing two or more wells that supply water to a public water system.

Wellhead Protection Program - Ohio EPA’s program is based on the Safe Drinking Water Act as amended in 1986 and was approved by U.S. EPA in November 1992. The processes, guidance, and documents produced for this program form the core of the Source Water Assessment and Protection Program. Reports and other documents developed and endorsed under this program are also considered to meet the requirements of the Source Water Assessment and Protection Program.

Appendix A

City of New Carlisle Brochure

Did You Know...

- Less than one gallon of gasoline can pollute one million gallons of ground water.
- One person uses 29,200 gallons of water a year.
- Only 3 percent of the water on earth is drinkable.
- Several Ohio communities have spent millions of dollars cleaning up contaminated ground water.

The following chemicals are potential sources of ground water contamination:

Cleaning products, Automotive products, Fuel oil, Furniture strippers, Lawn & garden products, & Oil based paints.

What YOU can do to HELP

PROTECT

Your Drinking Water

By disposing of chemicals properly, you can avoid contaminating your source of drinking water. IMPROPER disposal methods include:

1. Chemical spills as well as overapplication of fertilizers and pesticides.
2. Pouring leftover chemicals down a sink or toilet.
3. Pouring wastes down a storm drain. Storm drains transmit water directly to the ground or a stream and should not be used to dispose of chemicals or waste.

Read the inside poster to learn more about proper chemical disposal & protection of your drinking water!

A-1

CONTACTS IN NEW CARLISLE

For questions concerning New Carlisle's Municipal Water Supply, contact:

New Carlisle Water Office
phone: (937) 845-9492

For questions concerning New Carlisle's Drinking Water Protection Area, contact:

New Carlisle Department of Planning
phone: (937) 845-9493

CONTACTS AT THE OHIO ENVIRONMENTAL PROTECTION AGENCY

Ohio Environmental Protection Agency
Lazarus Government Center
P.O. Box 1049
Columbus, Ohio 43215-1049
www.epa.state.oh.us

For questions concerning Drinking Water Protection, contact:

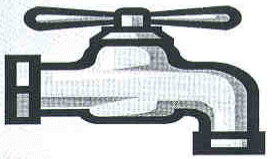
The Division of Drinking and Ground Waters
phone: (614) 644-2752

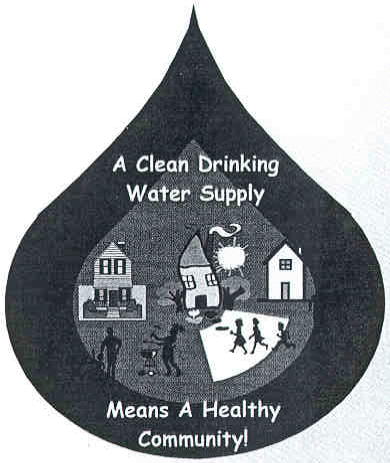
For questions concerning Pollution Prevention, contact:

The Office of Pollution Prevention
phone: (614) 644-3469

This publication was financed in part through a grant from the Ohio Environmental Protection Agency under provisions of Section 319 (h) of the Clean Water Act as amended in 1987.

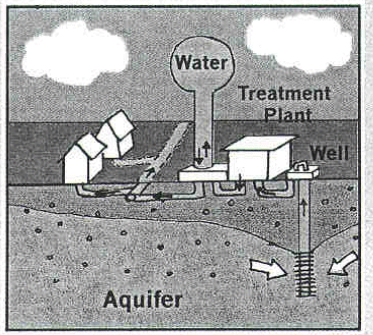
New Carlisle's Drinking Water Protection Area





A Community Awareness Announcement for New Carlisle, Ohio

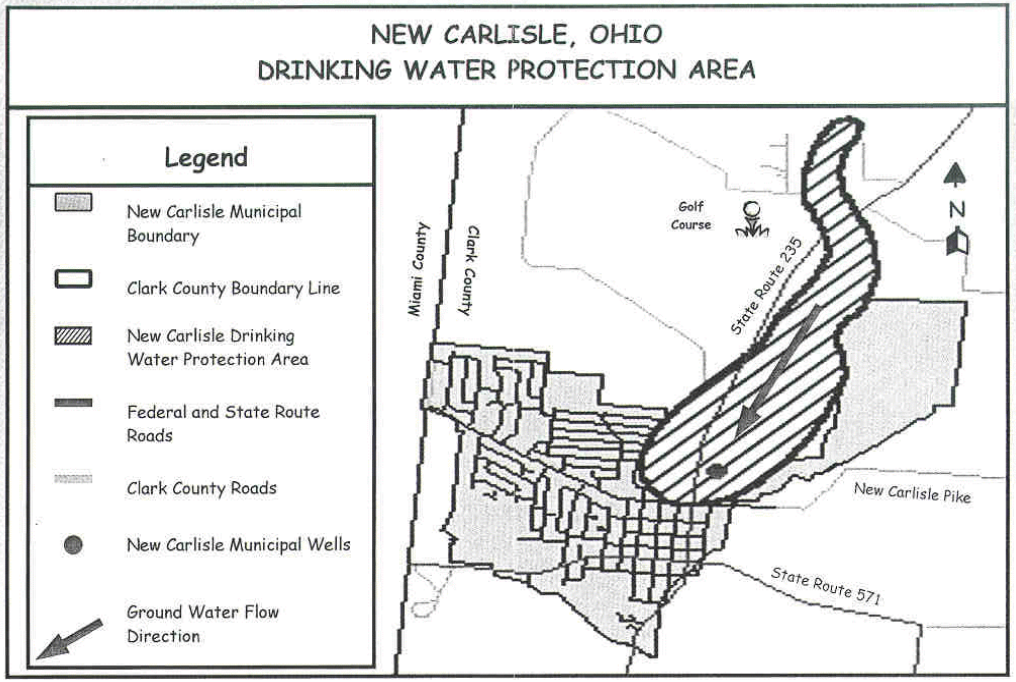
From where does New Carlisle's drinking water come?



New Carlisle's drinking water is pumped out of the ground by wells located in the ball field on the north side of town. This ground water is pumped to the water treatment plant where chlorine is added to kill harmful bacteria in it. From there, it is pumped through an underground network of pipes to New Carlisle's homes and businesses.

From where does the ground water come? All ground water originally comes from rain or melted snow that has seeped into the ground. Water is stored in spaces between sand and gravel and within fractures in rocks. Where underground water is abundant enough to provide an adequate source of drinking water, the water-rich sediments or rocks are called an *aquifer*. New Carlisle's drinking water supply comes from a portion of a sand and gravel aquifer.

Ground water does not stay in one place. The ground water supplying New Carlisle's wells seeps very slowly from north to south. This means that if pollutants are spilled on the ground anywhere near the wells, or north of the wells, they may eventually enter the ground water that you are drinking. And although the water treatment plant removes bacteria, it would be very expensive to purchase treatment systems for every type of possible pollutant. That is why everyone in New Carlisle should know about "Drinking Water Protection."



What is Drinking Water Protection?

Drinking Water Protection is a plan of action for protecting the water you drink from contamination. (It is also called "Wellhead Protection.") Your community's Drinking Water Protection Plan was developed by City staff and community volunteers, with guidance from the Ohio Environmental Protection Agency.

First, the City hired an environmental consulting firm to help it determine your community's "Drinking Water Protection Area" (shown on the above map in blue cross hatches). Ground water within this area will reach the City's municipal wells within five years.

Then the City made a list of the activities that were taking place in the Drinking Water Protection Area that involved the use of chemicals. More information was gathered about the types of chemicals present and the way they are used, disposed of, and stored.

Once the City had this information, it was easier to think of ways to help prevent chemical spills or accidental leaks from happening. Ideas that are especially useful for Drinking Water Protection are shown in the foldout poster.

The City has worked very hard to educate its community members about their Drinking Water Protection Area and the importance of avoiding chemical spills within this area. However, Drinking Water Protection is an ongoing concern. Activities come and go. The need for various types of protective actions may change over time. And residents who are very aware of Drinking Water Protection are eventually replaced by new generations who need the same education. One thing, however, remains true: unpolluted drinking water is one of a community's most precious and essential resources. Through active, ongoing Drinking Water Protection, it can be preserved for all community residents--today and into the future.

Potential Impacts on YOUR Source of Drinking Water

Agriculture

Agriculture practices, such as fertilizing or herbicide and pesticide storage and handling, can impact ground water sources. Additionally, livestock yards with their associated wastes and agricultural drainage wells also can contribute to ground water contamination if not properly managed.

What you can do:
For more information, call your Ohio State University County Extension Office or see its website at http://ohioline.ag.ohio-state.edu/county/index.html.

Septic Systems

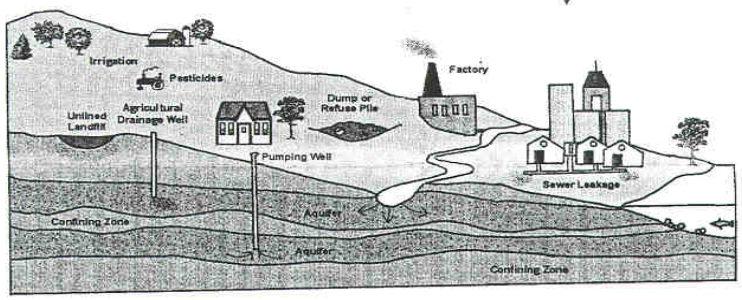
This includes septic tanks and leach fields. Ground water may become contaminated when the septic systems are poorly designed or improperly constructed, used, located, or abandoned.

What you can do:
If you own a septic system, make sure it is inspected regularly. For more information, call your local health department.

Landfills

Abandoned landfills and dumps are two of the most significant sources of ground water contamination--typically because of where they are located and because they were not lined.

What you can do:
Report illegal dumping to your local health department.



Underground Storage Tanks

Underground storage tanks are used to hold petroleum products such as gasoline, diesel fuel, and fuel oil. Because they are buried underground, leaks can go undetected for a long time.

In the United States, over 60 percent of the more than 300,000 known releases of petroleum products from underground storage tanks have affected ground water quality.

What you can do:
If you own an underground storage tank, make sure it meets all the necessary requirements. For more information, contact the Bureau of Underground Storage Tank Regulations at (614) 752-7938.

Other Potential Contaminant Sources

If not managed properly, all of the following could be considered Potential Contaminant Sources.

* Underground Injection Wells.
* Businesses and Industries using chemicals or petroleum products.
* Disposal of household, agricultural, or industrial chemicals.
* Floor and storm water drains.
* Aboveground storage tanks.

For More Information about Source Water Protection, call:
The Ohio Environmental Protection Agency (614) 644-2752

Appendix B

Ohio Administrative Code 3745-85-01

3745-85-01 Contingency plans.

(A) Except as otherwise noted, the definitions in rule 3745-81-01 of the Administrative Code shall apply to this chapter.
(B) Contingency plan required. Each community water system shall prepare and maintain a written contingency plan for providing safe drinking water to its service area under emergency conditions.
(C) Location of copies.
(1) One copy of the contingency plan shall be kept at the water treatment plant, if there is a plant, and another shall be kept in the water system administrator's office.
(2) Public water systems serving a population of more than two hundred fifty shall keep three additional copies of the plan at various accessible, secure locations in the service area.
(3) A copy of the contingency plan shall be available for inspection by representatives of the director.
(4) A copy of the contingency plan for community water systems shall be made available to the county emergency management agency (EMA) upon its request.
(D) Contents of contingency plan.
The contingency plan shall contain:
(1) A map of the distribution system, detailed locations for each valve in the system, including references that will aid in location of valves, and a map of the well field and surface water intakes as applicable;
(2) A statement of amounts budgeted for emergency use, along with a statement showing who can authorize expenditures for such purpose, and under what conditions such authorization and expenditure can occur;
(3) A determination of not less than ten of the most likely emergencies that will affect the water system and a description of the procedures to be followed and actions necessary to provide service during the emergencies. For systems serving fewer than one thousand five hundred people, the following emergency circumstances shall be included in such outline;
(a) Short term power failure (time of interruption less than two hours);
(b) Extended power failure (two hours or more);
(c) Pump or motor failure;
(d) Loss of water from a well or other water source;
(e) Major water main break;
(f) Unplanned absence of operator; and
(g) Contamination of source water including, but not limited to, releases of oil and hazardous substances.
(4) A description of the method that will be used to obtain and transport water from an alternate source should such procedure become necessary (including connecting to another water system), and a description of at least three possible alternate sources of water and the method of disinfection that will be used for each source;
(5) A list of water users having critical needs for a continuous supply of water;
(6) The methods of notification of users that an emergency exists;

(7) If depressurization of the water system has occurred, the procedure that will be used to return the system to normal service;
(8) Twenty-four hour telephone numbers for:
(a) The Ohio environmental protection agency, division of drinking and ground water;
(b) Police;
(c) Fire;
(d) The county EMA director;
(e) All water supply personnel;
(f) Municipal administrative personnel;
(g) Contractors for line breaks, "first call" and "second call";
(h) Electric power supplier;
(i) Electricians, "first call" and "second call";
(j) Well drilling and pump service contractors, "first call" and "second call";
(k) Plant mechanical contractors, "first call" and "second call";
(l) All suppliers of equipment and chemicals normally used;
(m) Hospital, emergency squad, medical assistance; and
(n) Critical water users who have requested notification.
(E) Revision required.
(1) The contingency plan required by this chapter of the administrative code shall be revised and updated as necessary, but at least annually;
(2) Copies of the revised pages of the plan shall be promptly distributed to holders of the plan, as described in paragraph (C) of this rule.
(3) Community water systems that have identified hazardous chemical contamination as one of their most likely emergencies under paragraph (D) (3) of this rule shall consult with the county EMA regarding participation in a hazardous spill exercise.

Replaces: Part of 3745-85-01, former 3745-85-02, former 3745-85-03, Part of 3745-85-04, former 3745-85-05
Effective: April 21, 2001
Promulgated under: RC Chapter 119
Rule authorized by: RC Section 6109.01, 6109.03, 6109.04
Rule amplifies: RC Section 6109.01, 6109.03, 6109.04
RC 119.032 review dates: 3/30/06
Prior effective dates: 11/26/80

Appendix C

Drinking Water Source Area Protection Plan Checklist

Appendix C
Drinking Water Source Area Protection Plan Checklist

The following checklist is designed to help public water systems address all items required for Ohio EPA endorsement of a drinking water source area protection plan. Ohio EPA may ask for additional information about any items to endorse the plan. A copy of the checklist **does not** need to be included with the plan. Ohio EPA staff are available to assist in the development of the plan or understanding the endorsement requirements.

When preparing the protection plan, try to incorporate enough information to create a standalone document. Anyone interested in protecting a drinking water source area should understand how and why the activities are to be done. The public water system may include a copy of the summary report as the introduction.

An asterisk (*) indicates information required for Ohio EPA endorsement.

Introduction / Executive Summary

- ☐ A brief summary of the drinking water source assessment report including:
  - ☐ A description of the wellfield.
  - ☐ A description of the physical and hydrogeologic setting.
  - ☐ A description of the aquifer.
  - ☐ A summary of the potential contaminant sources.
  - ☐ The susceptibility of the aquifer to contamination.
- ☐ A summary of how the sources will be addressed.
- ☐ An explanation of how the selected strategies will reduce the risk of ground water contamination.
- ☐ A description of how the protective strategies will be evaluated to make sure they are producing the intended results.

Education and Outreach

- ☐ The membership of the Drinking Water Source Protection Team.
- ☐ How input was collected from individuals, businesses, and other groups in the community.
- ☐ A summary of the input the Team received.
- ☐ How this input was incorporated into the plan.
- ☐ * A description of how the local community will be informed about source water and how to prevent contamination.
  - ☐ * The activities that are planned.
  - ☐ * The target audiences for each activity.
  - ☐ A time line for conducting these activities (for both one-time and on-going activities).
- ☐ * A description of the process for ensuring continuity of the education activities.
- ☐ * How the effectiveness of the program will be evaluated.

Drinking Water Shortage/Emergency Response

- ☐ * Drinking water shortage.
  - ☐ * The short- and long-term alternative sources of drinking water that may be available.
  - ☐ * A discussion of the financial mechanisms that could be used to implement those alternatives.
  - ☐ * A brief discussion of any water supply planning for future needs.
- ☐ * Emergency planning.
  - ☐ * Identify plans for emergency responses in the drinking water source protection area.
  - ☐ * The method for coordinating with the local emergency responders.
  - ☐ * Identify the chain of command, telephone numbers, and back-up staff that will address releases in or near the drinking water source protection area.
- ☐ * A copy of the drinking water contingency plan (as an attachment or appendix).

Potential Contaminant Source Control Strategies

- ☐ * For each type of potential pollution source in the drinking water source area:
  - ☐ * The strategies that will be used for that type of source.
  - ☐ * How these strategies will be implemented.
  - ☐ * Include strategies based on education or contingency planning focused on a specific type of source.
  - ☐ * A time line for implementing the strategies.
  - ☐ * The names of those involved in the implementation of the strategies.
- ☐ * The rationale for determining a particular type of source is already adequately addressed.

Ground Water Monitoring

- ☐ * An assessment of the need for ground water monitoring.

If a public water system decides that ground water monitoring is NOT needed:

- ☐ * A discussion of the reasons ground water monitoring in not needed.

If a public water system decides that ground water monitoring is needed:

- ☐ * An explanation why ground water monitoring is needed.
- ☐ * A map of the area showing:
  - ☐ * The locations of the proposed monitoring wells.
  - ☐ * The public water supply wells.
  - ☐ * The drinking water source protection area.
  - ☐ * The contaminant sources.
- ☐ * A description of the pollution source and contaminants each well is intended to monitor.
- ☐ * The construction details of the planned well(s) including:
  - ☐ * Total depth.
  - ☐ * Screened intervals.
- ☐ * The sampling schedule and frequency of monitoring.
- ☐ * A list of parameters that will be monitored.

Appendix D

Summary of Wellhead Protection Tools

Summary of Drinking Water Source Protection Tools

	Applicability to Drinking Water Source Protection	Land Use Practice	Legal Considerations	Administrative Considerations
Regulatory: Zoning				
Overlay GW Protection Districts	Used to map drinking water source protection areas. Provides for identification of sensitive areas for protection. Used in conjunction with other tools that follow.	Community identifies drinking water source protection areas on practical base/zoning map.	Well-accepted method of identifying sensitive areas. May face legal challenges if drinking water source protection area boundaries are based solely on arbitrary delineation.	Requires staff to develop overlay map. Inherent nature of zoning provides "grandfather" protection to pre-existing uses and structures.
Prohibition of Various Land Uses	Used within mapped drinking water source protection areas to prohibit ground-water contaminants and uses that generate contaminants.	Community adopts prohibited uses list within their zoning ordinance.	Well-organized function of zoning. Appropriate techniques to protect natural resources from contamination.	Requires amendment to zoning ordinance. Requires enforcement by both visual inspection and onsite investigations.
Special Permitting	Used to restrict uses within drinking water source protection areas that may cause ground water contamination if left unregulated.	Community adopts special permit "thresholds" for various uses and structures within drinking water source protection areas. Community grants special permits for "threshold" uses only if ground water quality will not be compromised.	Well-organized method of segregating land uses within critical resource areas such as drinking water source protection areas. Requires case-by-case analysis to ensure equal treatment of applicants.	Requires detailed understanding of drinking water source protection area sensitivity by local permit granting authority. Requires enforcement of special permit requirements and onsite investigations.

Summary of Drinking Water Source Protection Tools

	Applicability to Drinking Water Source Protection	Land Use Practice	Legal Considerations	Administrative Considerations
Regulatory: Zoning (Continued)				
Large-Lot Zoning	Used to reduce impacts of residential development by limiting number of units within drinking water source protection areas.	Community "down zones" to increase minimum acreage needed for residential development.	Well-recognized prerogative of local government. Requires rational connection between minimum lot size selected and resource protection goals. Arbitrary large lot zones have been struck down without logical connection to Master Plan or drinking water source protection program.	Requires amendment to zoning ordinance.
Transfer of Development Rights	Used to transfer development from drinking water source protection areas to locations outside protection areas.	Community offers transfer option within zoning ordinance. Community identifies areas where development is to be transferred "from" and "to."	Accepted land use planning tool.	Cumbersome administrative requirements. Not well suited for small communities without significant administrative resources.

Summary of Drinking Water Source Protection Tools

	Applicability to Drinking Water Source Protection	Land Use Practice	Legal Considerations	Administrative Considerations
Regulatory: Zoning (Continued)				
Cluster/PUD Design	Used to guide residential development outside of drinking water source protection areas. Allows for "point source" discharges that are more easily monitored.	Community offers cluster/PUD as development option within zoning ordinance. Community identifies areas where cluster/PUD is allowed (i.e., within drinking water source protection areas).	Well-accepted option for residential land development.	Slightly more complicated to administrator than traditional "grid" subdivision. Enforcement/inspection requirements are similar to "grid" subdivision.
Growth Controls/Timing	Used to time the occurrence of development within drinking water source protection areas. Allows communities the opportunity to plan for wellhead delineation and protection.	Community imposes growth controls in the form of building caps, subdivision phasing, or other limitation tied to planning concerns.	Well-accepted option for communities facing development pressures within sensitive resource areas. Growth controls may be challenged if they are imposed without a rational connection to the resource being protected.	Generally complicated administrative process. Requires administrative staff to issue permits and enforcement growth control ordinances.

Summary of Drinking Water Source Protection Tools

	Applicability to Drinking Water Source Protection	Land Use Practice	Legal Considerations	Administrative Considerations
Regulatory: Zoning (Continued)				
Performance Standards	Used to regulate development within drinking water source protection areas by enforcing predetermined standards for water quality. Allows for aggressive protection of drinking water source protection areas by limiting development within drinking water source protection areas to an accepted level.	Community identifies drinking water source protection areas and established "thresholds" for water quality.	Adoption of specific drinking water source protection area performance standards requires sound technical support. Performance standards must be enforced on a case-by-case basis	Complex administrative requirements to evaluate impacts of land development with drinking water source protection areas.
Regulatory: Subdivision Control				
Drainage Requirements	Used to ensure that subdivision road drainage is directed outside of drinking water source protection areas. Used to employ advanced engineering designs of subdivision roads within drinking water source protection areas.	Community adopts stringent subdivision rules and regulations to regulate road drainage/runoff in subdivisions within drinking water source protection areas.	Well-accepted purpose of subdivision control.	Requires moderate level of inspection and enforcement by administrative staff.

Summary of Drinking Water Source Protection Tools

	Applicability to Drinking Water Source Protection	Land Use Practice	Legal Considerations	Administrative Considerations
Regulatory: Health Regulations				
Underground Fuel Storage Systems	Used to prohibit underground fuel storage systems (USTs) within drinking water source protection areas. Used to regulate USTs within drinking water source protection areas.	Community adopts health/zoning ordinance prohibiting USTs within drinking water source protection areas. Community adopts special permit or performance standards for use of USTs within drinking water source protection areas.	Well-accepted regulatory option for local government.	Prohibition of USTs require little administrative support. Regulating USTs requires moderate amounts of administrative support for inspection follow-up and enforcement.
Privately Owned Wastewater Treatment Plants. (Small Sewage Treatment Plants)	Used to prohibit small sewage treatment plants (SSTP) within drinking water source protection areas.	Community adopts health/zoning ordinance prohibiting the use of septic cleaners containing 1,1,1-trichloroethane or other solvent compounds within drinking water source protection areas.	Well-accepted regulatory option for local government.	Prohibition of SSTPs require little administrative support. Regulating SSTPs requires moderate amount of administrative support of inspection follow-up and enforcement.
Septic Cleaner Ban	Used to prohibit the application of certain solvent septic cleaners, a known ground water contaminant, within drinking water source protection areas.	Community adopts health/zoning ordinance prohibiting the use of septic cleaners containing 1,1,1-trichloroethane or other solvent compounds within drinking water source protection areas.	Well-accepted method of protecting ground water quality.	Difficult to enforce even with sufficient administrative support.

Summary of Drinking Water Source Protection Tools

	Applicability to Drinking Water Source Protection	Land Use Practice	Legal Considerations	Administrative Considerations
Regulatory: Health Regulations (Continued)				
Septic System Upgrades	Used to require periodic inspection and upgrading of septic systems.	Community adopts health/zoning ordinance requiring inspection and, if necessary, upgrading of septic systems on a time basis (e.g., every 2 years) or upon title/property transfer.	Well-accepted purview of government to ensure protection of ground water.	Significant administrative resources required for this option.
Toxic and Hazardous Materials Handling Regulations	Used to ensure proper handling and disposal of toxic materials/waste.	Community adopts health/zoning ordinance requiring registration and inspection of all businesses within drinking water source protection area using toxic/hazardous materials above certain quantities.	Well accepted as within purview of government to ensure protection of ground water.	Requires administrative support and onsite inspections.
Private Well Protection	Used to protect private onsite water supply wells.	Community adopts health/zoning ordinance to require permits for new private wells and to ensure appropriate well-to-septic-system setbacks. Also requires pump and water quality testing.	Well accepted as within purview of government to ensure protection of ground water.	Requires administrative support and review of applications.

Summary of Drinking Water Source Protection Tools

	Applicability to Drinking Water Source Protection	Land Use Practice	Legal Considerations	Administrative Considerations
Non-regulatory: Land Transfer and Voluntary Restrictions				
State/Donation	Land acquired by a community with drinking water source protection areas, either by purchase or donation. Provides broad protection to the ground-water supply.	As non-regulatory technique, communities generally work in partnership with non-profit land conservation organizations.	There are many legal consequences of accepting land for donation or sale from the private sector, mostly involving liability.	There are few administrative requirements involved in accepting donations or sales of land from the private sector. Administrative requirements for maintenance of land accepted or purchased may be substantial, particularly if the community does not have a program for open space management.
Conservation Easements	Can be used to limit development within drinking water source protection areas.	Similar to sales/donations, conservation easements are generally obtained with the assistance of nonprofit land conservation organization.	There are many legal consequences of accepting land for donation or sale from the private sector, mostly involving liability.	There are few administrative requirements involved in accepting donations or sales of land from the private sector. Administrative requirements for maintenance of land accepted or purchased may be substantial, particularly if the community does not have a program for open space management.

Summary of Drinking Water Source Protection Tools

	Applicability to Drinking Water Source Protection	Land Use Practice	Legal Considerations	Administrative Considerations
Non-regulatory: Land Transfer and Voluntary Restrictions (Continued)				
Limited Development	As the title implies, this technique limits development to portions of a land parcel outside of drinking water source protection areas.	Land developers work with community as part of a cluster/PUD to develop limited portions of a site and restrict other portions, particularly those within drinking water source protection areas.	Similar to those noted in cluster/PUD under zoning.	Similar to those noted in cluster/PUD under zoning.
Non-regulatory: Other				
Monitoring	Used to monitor ground water quality within drinking water source protection areas.	Communities establish ground water monitoring program within drinking water source protection area. Communities require developers within drinking water source protection areas to monitor ground water quality downgradient from their development.	Accepted method of ensuring ground water quality.	Requires moderate administrative staffing to ensure routine sampling and response if sampling indicates contamination.
Contingency Plans	Used to ensure appropriate response in cases of contaminant release or other emergencies within drinking water source protection areas.	Community prepares a contingency plan involving wide range of municipal/county officials	None.	Requires significant up-front planning to anticipate and be prepared for emergencies.

Summary of Drinking Water Source Protection Tools

	Applicability to Drinking Water Source Protection	Land Use Practice	Legal Considerations	Administrative Considerations
Non-regulatory: Other (Continued)				
Hazardous Waste Collection	Used to reduce accumulation of hazardous materials within drinking water source protection areas and the community at large.	Communities, in cooperation with the state, regional planning commission, or other entity, sponsor a "hazardous waste collection day" several times per year.	There are several legal issues, raised by the collection, transport, and disposal of hazardous waste.	Hazardous waste collection programs are generally sponsored by government agencies, but administered by a private contractor.
Public Education	Used to inform community residents of the connection between land use within drinking water source protection areas and drinking water quality.	Communities can employ a variety of public education techniques ranging from brochures detailing their drinking water source protection program, to seminars, to involvement in events such as hazardous waste collection days.	No outstanding legal considerations.	Requiring some degree of administrative support for programs such as brochure mailing to more intensive support for seminars and hazardous waste collection days.

Summary of Drinking Water Source Protection Tools

	Applicability to Drinking Water Source Protection	Land Use Practice	Legal Considerations	Administrative Considerations
Legislative				
Regional Drinking Water Source Protection Districts	Used to protect regional aquifer systems by establishing new legislative districts that often transcend existing corporate boundaries.	Requires state legislative action to create a new legislative authority.	Well-accepted method of protecting regional ground water resources.	Administrative requirements will vary depending on the goal of the regional district. Mapping of the regional drinking water source protection areas requires moderate administrative support, while creating land use controls within the drinking water source protection area will require significant administrative personnel and support.
Land Banking	Used to acquire and protect land within drinking water source protection areas.	Land banks are usually accomplished with a transfer tax established by state government empowering local government to impose a tax on the transfer of land from one party to another	Land banks can be subject to legal challenge as an unjust tax, but have been accepted as a legitimate method of raising revenue for resource protection.	Land banks require significant administrative support if they are to function effectively.

Source - Modified from *Wellhead Protection: Guide for Small Communities.* (U.S. EPA., February 1993).

Appendix E

Sources of Additional Information

SOURCES OF ADDITIONAL INFORMATION

The documents and other resources listed here are in no way a complete list of the materials available to help a public water system or protection team develop a protection plan.

OHIO EPA SOURCE WATER PROTECTION DOCUMENTS

Wellhead Protection Program. 1992.

Wellhead Protection Area Delineation Guidance. 1994.

Guidance for Conducting Potential Pollution Source Inventories in Wellhead Protection Areas 1997.

Source Water Assessment and Protection Program. 1999.

Potential Contaminant Source Inventory Process Manual. 2009

A Guide to Developing Local Watershed Action Plans in Ohio. 1997.

U.S. EPA SOURCE WATER PROTECTION DOCUMENTS

Citizen's Guide to Ground-Water Protection. EPA 440-6-90-004. April 1990.

Community Involvement in Drinking Water Source Assessments. EPA-816-F-00-025. May 2000

It's YOUR Drinking Water: Get to Know it and Protect it! EPA 810-K-99-002. 1999.

Illegal Dumping Prevention Guidebook. EPA 905-B-97-001. March 1998

Federal Funding Sources for Watershed Protection. *(Second Edition)* EPA 841-B-99-003. December 1999.

Source Water Protection Practices Bulletin -- Managing Storm Water Runoff to Prevent Contamination of Drinking Water. EPA 816-F-01-021. July 2001.

Source Water Protection Practices Bulletin -- Managing Septic Systems to Prevent Contamination of Drinking Water. EPA 816-F-01-020. July 2001.

Source Water Protection Practices Bulletin -- Managing Above Ground Storage Tanks to Prevent Contamination of Drinking Water. EPA 816-F-01-022. July 2001.

Source Water Protection Practices Bulletin -- Managing Underground Storage Tanks to Prevent Contamination of Drinking Water. EPA 816-F-01-023. July 2001.

Source Water Protection Practices Bulletin -- Managing Vehicle Washing to Prevent Contamination of Drinking Water. EPA 816-F-01-024. July 2001.

Source Water Protection Practices Bulletin -- Managing Livestock, Poultry, and Horse Waste to Prevent Contamination of Drinking Water. EPA 816-F-01-026. July 2001.

Source Water Protection Practices Bulletin -- Managing Pet and Wildlife Waste to Prevent Contamination of Drinking Water. EPA 816-F-01-027. July 2001.

Source Water Protection Practices Bulletin -- Managing Agricultural Fertilizer Application to Prevent Contamination of Drinking Water. EPA 816-F-01-028. July 2001.

Source Water Protection Practices Bulletin -- Managing Turfgrass and Garden Fertilizer Application to Prevent Contamination of Drinking Water. EPA 816-F-01-029. July 2001.

Source Water Protection Practices Bulletin -- Managing Large-Scale Application of Pesticides to Prevent Contamination of Drinking Water. EPA 816-F-01-030. July 2001.

Source Water Protection Practices Bulletin -- Managing Small-Scale Application of Pesticides to Prevent Contamination of Drinking Water. EPA 816-F-01-031. July 2001.

Source Water Protection Practices Bulletin -- Managing Sanitary Sewer Overflows and Combined Sewer Overflows to Prevent Contamination of Drinking Water. EPA 816-F-01-032. July 2001.

DOCUMENTS FROM OTHER SOURCES

Guidance to Utilities on Building Alliances With Watershed Stakeholders. 2001.

AWWA Research Foundation.

Drinking Water Source Awareness – Media Campaign Guidelines. 2000.

International City County Management Association.

From Assessment to Action: Protecting Small Town and Rural County Public Water Sources. 2000. National Center for Small Communities.

A Small Town Source Water Primer: Building Support for Protection Programs. 2000.

National Center for Small Communities.

Source Water 2000: Funding and Assistance Programs to Protect Small Town and Rural Drinking Water. 1998. National Center for Small Communities.

Action Guide for Source Water Funding: Small Town and Rural Strategies for Protecting Critical Water Supplies. 1997.

National Center for Small Communities.

The Local Decision-Makers' Guide to Groundwater and Wellhead Protection. Undated. Rural Community Assistance Program, Inc.

Source Water Protection – A Guidebook for Local Governments. 2000. Kundell, James E., and DeMeo, Terry A.

Protecting Drinking Water - County Partnerships That Work. June 2000. National Association of Counties

INTERNET RESOURCES

U.S. Environmental Protection Agency (http://www.epa.gov/)

U.S. EPA, Office of Water, Ground Water and Drinking Water Programs (http://www.epa.gov/OGWDW/)

(This site contains information about U.S. EPA's Source Water Protection Program, fact sheets, and other materials that public water systems and protection teams will find helpful in developing a protection plan.)

U.S. EPA, Region 5 Water Programs (http://www.epa.gov/r5water)

(This web site holds information about source water protection in the Great Lakes Region.)

Ohio Environmental Protection Agency (http://www.epa.ohio.gov)

Division of Drinking and Ground Waters, Source Water Assessment and Protection Program (http://www.epa.ohio.gov/ddagw/swap.aspx)

(These pages contain information about Ohio's Source Water Assessment and Protection Program, fact sheets, and other materials that public water systems and protection teams will find helpful in developing a protection plan. This site also provides links to other Web sites with additional drinking water source assessment and protection information.)

Office of Pollution Prevention (http://www.epa.ohio.gov/opp)

(This web site contains information, fact sheets, links, and other materials about pollution prevention and best management practices.)

The Ohio State University Extension (http://www.ag.ohio-state.edu)

(These pages contain fact sheets and other educational materials that public water systems and protection teams will find helpful in developing a protection plan.)

Ohio Department of Natural Resources (http://www.dnr.state.oh.us)

(This web site Contains information, fact sheets, and other materials that public water systems and protection teams may find helpful in developing a protection plan. Some grants available from the Department of Natural Resources may be useful for developing greenspace in protection areas.)

Hamilton to New Baltimore Groundwater Consortium (http://www.gwconsortium.org)

(The Consortium's web site contains information about the Hamilton to New Baltimore Groundwater Consortium protection areas.)

Purdue Extension, Forming the Wellhead Protection Planning Team
(http://www.ecn.purdue.edu/SafeWater/wellhead/team1.htm)

(This site contains information about protection teams, the protection planning process, team membership, and conducting planning meetings.)

Ground Water Protection Council (http://www.gwpc.org/)

(This site contains information about ground water issues, including underground injection wells and source water protection.)

The Groundwater Foundation (http://www.groundwater.org)

(The Groundwater Foundation's web site contains information on groundwater and the risks that threaten groundwater quality.)

OHIO EPA PROGRAMS

Division of Air Pollution Control (http://epa.ohio.gov/dapc)	(614) 644-2270
Division of Drinking and Ground Waters (http://epa.ohio.gov/ddagw)	(614) 644-2752
Division of Emergency and Remedial Response (http://epa.ohio.gov/derr)	(614) 644-2924
Division of Hazardous Waste Management (http://epa.ohio.gov/dhwm)	(614) 644-2917
Division of Solid and Infectious Waste Mgt (http://epa.ohio.gov/dsiwm)	(614) 644-2621
Division of Surface Water (http://epa.ohio.gov/dsw)	(614) 644-2001
Office of Pollution Prevention (http://epa.ohio.gov/opp)	(614) 644-3469
Office of Environmental Education (http://epa.ohio.gov/oee)	(614) 644-2873

OHIO EPA CONTACTS

Central District Office
50 West Town Street
Columbus, OH 43215
(614) 728-3778
1-800-686-2330
michael.bondoc@epa.state.oh.us

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347 North Dunbridge Road
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(419)-352-8461
1-800-686-6930
richard.kroeger@epa.state.oh.us

Southwest District Office
401 East Fifth Street
Dayton, OH 45402-2911
(937) 285-6357
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Northeast District Office
2110 E. Aurora Road
Twinsburg, OH 44087
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