

Template for Ohio River System Source Water Protection Plans

To Source Water Protection Planners ...

This document is designed to serve as a template for drafting a source water protection plan for your community's public water system. However, you are not required to use this template. Your state environmental protection agency may accept other formats and presentations.

For detailed information on how to organize your planning efforts, please refer to Ohio EPA's *Developing Source Water Protection Plans for Public Drinking Water Systems Using Inland Surface Waters* (November 2006), which is available on-line at http://www.epa.state.oh.us/ddagw/Documents/swap_sw_protplan_FINAL.pdf

The audience for this document is:

- The individuals who will be held responsible for implementing any protective strategies your planning team commits to;
- The general public, who may want to know what their community is doing to protect the source of drinking water.

How to use this template:

The information in nonitalicized black font is standard language that should be applicable to all Ohio River system protection plans.

*Text included as **red font** is system-specific information. This text should be deleted and replaced with information pertinent to your public water system.*

*Text included as **blue font** is state-specific instructions. Each state program should modify this text to reflect the state's program before making the template available to its public water systems.*

Text shown in italics is instructions to the user of this template, which should be deleted from your final Protection Plan.

An example of a completed template (for the City of Portsmouth, in Ohio) is included as Appendix A, for your reference.

Source Water Protection Plan for the **City of** _____

Purpose

The intent of this document is to describe what the **City of** _____ has done, is currently doing, and plans to do to protect its source of drinking water—the Ohio River. Although the **City of** _____ treats the water to meet federal and state drinking water standards, conventional treatment does not fully eradicate all potential contaminants, and beyond-conventional treatment is often very expensive. By completing this plan, the **City of** _____ acknowledges that implementing measures to prevent spills and releases into the Ohio River can be a relatively economical way to help ensure the safety of the City's drinking water, while also improving river quality for other uses.

Background

Source Water Protection

Since 1974 the federal Safe Drinking Water Act (SDWA) has set minimum standards on the construction, operation, and quality of water provided by public water systems. In 1986, Congress amended the SDWA. A portion of those amendments were designed to protect the source water contribution areas around ground water supply wells. This program eventually became known as the Wellhead Protection Program (WHPP). The purpose of the WHPP was to prevent pollution of the source water supplying the wells.

The Safe Drinking Water Act Amendments of 1996 expanded the concept of wellhead protection to include surface water sources under the umbrella term of Source Water Protection. The amendments encourage states to establish source water assessment and protection (SWAP) programs to protect all public drinking water supplies. As part of this initiative states must explain how protection areas for each public water system will be delineated and inventoried for potential contaminant sources, and given a susceptibility rating.

In May 1999, the Ohio Environmental Protection Agency (OEPA) published the State of Ohio's Source Water Assessment and Protection Program, which was endorsed by the United States Environmental Protection Agency. Over the next few years, Ohio EPA staff completed an assessment (i.e., delineation, inventory and susceptibility analysis) for all of Ohio's public water systems. Each public water system was sent a copy of its assessment report. **The City of** _____ **received its Source Water Protection Assessment report in [date].**

Unique Challenges for Ohio River Systems

Withdrawing water from, or near, the Ohio River presents many challenges for a water utility. Not only does the Ohio River pose all of the typical treatment concerns of a surface water source, the location, size, and uses of the Ohio River pose additional source water protection concerns.

The Ohio River borders or flows through six different states. [For utilities in Ohio, bordering and upstream states include Kentucky, West Virginia, and Pennsylvania.](#) This is important when considering potential pollution flowing from upstream, as protection efforts may need to be coordinated with these other states. In addition to multiple state jurisdictions, additional jurisdictions on the county, township or local levels also need to be considered.

The Ohio River is also a very valuable resource for many, sometimes competing, uses. In addition to being the direct drinking water source for several million people, many other nearby ground water utilities depend on the river as a source of natural recharge to their aquifer. Over 230 million tons of cargo are transported on the Ohio River each year, and 49 power generating stations are located along the river, making up in excess of 6 percent of the nation's power supply. Additionally, the entire Ohio River is the receiving stream (either directly or indirectly through tributaries) for industrial and sanitary waste produced by over 25 million people. The entire watershed exceeds 200,000 square miles and the river itself is 981 miles long.

Role of ORSANCO

Due to these wide-ranging interstate concerns the Ohio River Valley Water Sanitation Commission (ORSANCO) was formed in 1948. ORSANCO is an interstate water pollution control agency that manages and operates programs for water quality monitoring and assessment, assists in emergency response management, has established pollution control standards for the Ohio River, and facilitates interstate cooperation and coordination. The [City of _____](#) recognizes ORSANCO's unique position in promoting source water protection along the Ohio River and this plan reflects the City's commitment to utilize ORSANCO's knowledge, authority and resources to protect our water source.

Ohio River Delineations

Due to the size and complex nature of the Ohio River, in 1997 ORSANCO agreed to develop the source water assessment strategy for the Ohio River. This would provide a uniform approach to delineating the source water protection areas utilities would protect. A workgroup was formed, composed of regulatory agencies for the six border states and the United States Environmental Protection Agency (USEPA) Regions 3, 4, and 5. This workgroup developed the Source Water Assessment Strategy for the Ohio River, dated October 1998.

Within the strategy, ORSANCO recommends using a tiered-delineation system consisting of three protection zones (Figure 1). The purpose of this tiered-approach is to define the level of source inventory within the Ohio River Basin, and serve as a guide

for management and other activities to allow water suppliers to most effectively apply their source water protection resources. [Ohio's Source Water Assessment and Protection Program \(May 1999\)](#) incorporates this strategy for surface water systems drawing from the Ohio River.

Figure 1. Source Water Protection Zones for Ohio River Public Water Systems

Zone 1 - Zone of Critical Concern. The Zone of Critical Concern (ZOCC) extends ¼ mile below a water intake to 25 miles upstream the Ohio River and major tributaries identified in U.S. EPA Reach File 1. The lateral extent includes ¼ mile on both sides of the riverbank and major tributaries. The 25 miles upstream is based upon a 5 hour time-of-travel estimate using maximum Ohio River velocities. This is considered the area “within which a contamination event would quickly affect the water supply.”

Zone 2 – Zone of High Concern. The Zone of High Concern (ZOHC) extends ¼ mile below a surface water intake, upstream, to ¼ mile below the next Ohio River intake. Major tributaries are incorporated within a 25-mile distance upstream from the intake. The lateral extent includes all 14-digit hydrologic units adjacent to the banks of the Ohio River and major tributaries. The only difference between the ZOHC and the ZOCC is a wider buffer, incorporating the small watersheds adjacent to the river instead of just a ¼ mile buffer.

Zone 3 – Upstream Watershed. Zone 3 is the entire portion of the Ohio River Basin upstream from a surface water intake. It is within this zone that cooperation with ORSANCO will be most valuable.

Introduction

The **City of _____** ... *describe your community's location, service area and population. Describe the treatment system and its capacity. Provide maps of the source water protection area. You may be able to copy much of this information from the source water assessment report provided to you by your state environmental protection agency.*

Identification of Local Source Water Concerns

Critical Areas

Your system's Zone 1 is labeled Zone of Critical Concern, but your community may not realistically be able to focus its protective efforts on the entire zone. In other cases, you may find that the area that most concerns you lies outside that zone. In either case, you may want to identify more discrete critical areas to focus protective strategies on. At a minimum, you should include the area around the intake where, if there was a release or spill into the Ohio River, it would be impossible to respond quickly enough to avoid drawing the contaminant into the intake. This will depend on the plant design and operational procedures, so the plant manager may be the best person to make this determination.

If you decide to delineate additional critical areas, describe them and why they are critical (e.g., proximity to intake, water quality results, historical spills or releases, land

use, high development pressure, etc.) and indicate their boundaries on a map. Maps provided in your Source Water Assessment report may be used as a base map, if applicable and accurate. Any needed changes to the map should be reported to your state environmental protection agency.

Potential Contaminant Source Inventory

Describe how the potential contaminant sources were originally inventoried for your city. The relevant text from your Source Water Assessment Report (provided by your State Agency) may be pasted in here, along with any additional inventory information you want your planning team and any future users to be aware of. If your community has subsequently conducted an update of the inventory, describe it here. Again, needed changes to the map should be reported to your state environmental protection agency.

Prioritization of Potential Contaminant Sources

Provide a list of the contaminant sources that your team truly believes could impact the quality of your drinking water. (You may have many or just a few). For each one, explain why it was prioritized; for example, location of the contaminant source relative to the river and the intake, size of facility, type of chemicals stored (if known), capabilities of your treatment plant, and history: what type of source water contamination has been your greatest concern in the past, and where did it come from?

The specific methodology you use to prioritize the PCS is up to you. However, the highest priority should be given to sources of contaminants that are actually detected—or have been detected—in your raw and/or treated water.

One prioritization method is to categorize the PCS into general categories and then rank those categories as low, medium or high risk. More complex rigorous scoring systems can also be developed based on distance of PCS from the river, land surface slope, type and quantity of chemicals stored at PCS, and other factors. This type of complex scoring generally requires a lot of information and will require more data gathering.

It is worth noting that, historically, pipeline breaks, releases from large chemical plants and refineries, and shipping accidents on the river—typically around dams and locks during periods of high flow—have been responsible for the most serious spills into the Ohio River, particularly in its upper reaches where heavy industry is concentrated.

[Figure 2: Maps of your system's Zones 1, 2 and 3. These should be available in the Source Water Assessment report that was provided by your State Agency]

[Figure(s) XX: Maps of your system's potential contaminant source inventory. These should be provided in your system's Source Water Assessment Report, but you may want to add or delete potential contaminant sources, and indicate any discrete "critical areas" that your team has identified.]

Protective Strategies

Source Management Strategies

Source management strategies are any action taken to protect the source water from a specific potential contaminant source or type of source. For example, prohibitions, design standards, operating standards, and reporting requirements are typical source management strategies. Land purchases, conservation easements, and purchase of development rights are also included in the category of source management strategies. For more description of source management strategies, see Chapter Six of Ohio EPA's Developing Source Water Protection Plans for Public Drinking Water Systems Using Inland Surface Waters (November 2006), which is available on-line at http://www.epa.state.oh.us/ddagw/Documents/swap_sw_protplan_FINAL.pdf.

It is advisable to focus source management strategies on high-priority potential contaminant sources, and especially any that are within the city's jurisdiction. However, a city can protect against contaminant sources outside its jurisdiction by working with the officials of the township or county in which the sources are located. Also, if watershed groups are active in the area of concern, the city may be able to partner with them. See <http://ohiowatersheds.osu.edu/groups/>

In this section, the city should list any strategies it has implemented, is implementing, or intends to implement to reduce the threat of specific high-priority potential contaminant sources. It should describe the strategy in detail, date(s) of implementation, and the entities responsible for implementation. For examples, see the Appendix to this template.

In addition, several ORSANCO programs support source management for source water protection plans. First, and foremost, the ORSANCO Pollution Control Standards for Wastewater Discharges to the Ohio River assure the development and adoption of appropriate stream criteria for the Ohio River. These criteria form the basis for Ohio River wastewater discharge permit limits.

ORSANCO's Urban Wet Weather, Combined Sewer Overflow tracking program, Watershed Pollutant Reduction, TMDL and Source Identification program all characterize and promote an understanding of non-point sources of pollutants.

Education and Outreach

In this section the city should list any efforts it is making to educate its citizens about source water protection, and to involve them in the planning and implementation of protective strategies. For each strategy you should identify the target audience, timeline for implementation, and who is responsible for implementation. Target audiences may include, for example, customers, general public, students, employees of a certain facility, etc.

At the very least, community public water systems are required to provide information about the drinking water source and its susceptibility to contamination in their annual Consumer Confidence Report (CCR). The city can also include in the CCR details on drinking water source protection efforts or tips on what customers can do to help in these efforts. For example, customers may be provided information on proper disposal of prescription drugs (see http://www.whitehousedrugpolicy.gov/drugfact/factsht/proper_disposal.html) to reduce the quantities of controlled substances and hormone disruptors entering the Ohio River in treated and untreated wastewater.

For more ideas about source water education and outreach strategies, see [Chapter Four of Ohio EPA's Developing Source Water Protection Plans for Public Drinking Water Systems Using Inland Surface Waters \(November 2006\)](http://www.epa.state.oh.us/ddagw/Documents/swap_sw_protplan_FINAL.pdf), which is available on-line at http://www.epa.state.oh.us/ddagw/Documents/swap_sw_protplan_FINAL.pdf.

ORSANCO's Basinwide Education. In addition, ORSANCO provides basinwide opportunities for outreach and public education through a variety of public meetings, which include:

- the triannual meetings of Commissioners;
- public workshops and hearings during the triennial review of the Commission's Pollution Control Standards;
- project-specific workshops (such as the CSO workshop); and
- programs provided by the Commission public information section, such as the mobile aquarium, school-based volunteer monitoring and the ORSANCO Ohio River Education Foundation's floating classroom.

The ORSANCO Educational Foundation (OEF) is a 501c(3) non-profit organization that was founded by ORSANCO in 2003 to design, manage, and raise funds for educational programs in the Ohio River Basin. OEF's flagship program is the PA Denny River Education Center, a floating classroom that travels the Ohio River. OEF has developed a curriculum for high schools that includes activities focused on watersheds, point and non-point pollution, and water monitoring. OEF has developed additional programming for elementary schools, community groups, and the general public. OEF also partners with agencies and organizations throughout the Ohio River Watershed to offer training opportunities for teachers, scientists, and environmental educators. **The City of _____'s citizens participate in these ORSANCO-sponsored programs on a regular basis (describe).**

Contingency Planning

ORSANCO's early-warning program is the foundation of the **City of _____'s** source water contingency planning. When a spill or release is reported on the Ohio River, ORSANCO notifies public water systems downstream and conducts time-of-travel calculations to give the systems an approximate timeline for the arrival of the plume. ORSANCO also samples the plume and reports its findings to the potentially affected systems until the emergency is over. This process is also put into action when a contaminant is detected during daily sampling, where the source of contamination may or may not be known.

Also, because the _____ [wastewater system]'s outlet and/or Combined Sewer Outlets (CSOs) lies within Zone 1 of the City of _____'s drinking water intake, Ohio EPA instructed _____ [wastewater system] in its _____ [date] NPDES permit to notify the City of CSOs and SSOs. By mutual agreement, the City of _____ will be notified within _____ hours of any SSOs or CSOs that [describe conditions—for example, amount of spill or release, if known, or any other metric used to determine when notification will be made.]

When notified of an impending plume, the City of _____ ...describe what will be done in this circumstance—the chain of command, and what each person in the chain is expected to do. At a minimum, most systems prepare to shut down the intake at some point, until the plume has passed. Describe how you will determine when to shut down the intake and when to resume pumping. Describe other measures you might take, such as filling tanks and reservoirs to capacity, preparing to provide specialized treatment, and readying any emergency backup systems (such as standby wells or emergency connections with other public water systems). Describe the circumstances under which the city itself would get involved in control and clean-up of the plume, and how this process would be implemented. Describe how the city would finance such a clean-up.

Source Water Monitoring

The City of _____ collects raw water samples at its intake on a _____ [indicate frequency] basis. These samples are analyzed for [list constituents]. Describe what action may be taken, based on these results. For example, if turbidity is especially high, the system may run the water through carbon filters to keep trihalomethane levels down, or mix with ground water (if available).

The City also conducts compliance monitoring, as required under the Safe Drinking Water Act and regulated by Ohio EPA. Describe this program and indicate what measures are taken if a regulated contaminant is found at levels exceeding MCLs. In such an event, does your system have a procedure to notify ORSANCO, so that it can warn downstream systems?

Basinwide Sampling. ORSANCO operates several water quality monitoring programs that support Source Water Program initiatives. ORSANCO's Organics Detection System collects water samples on a daily basis from 13 locations on the Ohio River and major tributaries and screens for volatile organic compounds. Detections from this program are reported to ORSANCO offices where they are evaluated. As necessary, notification is then provided to downstream utilities and reported to the National Response Center. Sample collection for other water quality monitoring programs ranges from weekly (bacteria) to quarterly (metals). The City of _____ is prepared to respond to such notifications as it does for detections in its own raw water and compliance sampling, depending on the type and concentration of the contaminant, and where it was detected.

Implementation

Summarize how the City's source water protection initiatives will be implemented. A chart (see Portsmouth Example, pages 14-15) may be helpful in laying this out. List the individuals, agencies and groups with significant responsibilities for implementing the plan. Also describe any intergovernmental agreements, memoranda or ordinances that set forth procedures or responsibilities related to drinking water protection. Identify potential funding sources for any planned strategies.

Evaluating Effectiveness

Indicate the proposed method for evaluating the effectiveness of the program, how frequently this will be done, and by whom. The most direct indicator of program effectiveness is a measurable improvement in source water quality measured over several years. A reduction in treatment costs could be another indicator. Effectiveness of a contingency plan can be demonstrated when new procedures put into place for source water protection prevent a spill from reaching the intake. Effectiveness of source control strategies can be demonstrated when an event that would have resulted in a release is avoided because of the new strategy. Effectiveness of educational strategies can be demonstrated when a citizen reports an incipient or actual contamination event.

The effectiveness of source water protection can also be presented as costs of the program vs. the costs of a spill not prevented. [Costs of some surface water spills are discussed in Appendix C of Ohio EPA's Developing Source Water Protection Plans for Public Drinking Water Systems Using Inland Surface Waters \(November 2006\), which is available on-line at http://www.epa.state.oh.us/ddagw/Documents/swap_sw_protplan_FINAL.pdf.](http://www.epa.state.oh.us/ddagw/Documents/swap_sw_protplan_FINAL.pdf)

Effectiveness of Basinwide Source Water Protection Efforts. ORSANCO is in a unique position to measure the effectiveness of its efforts, because every year there are hundreds of spills on the Ohio River. Whenever its notification efforts enable a utility to avoid drawing contamination into a drinking water intake, both ORSANCO and the affected communities have scored a source water protection success. ORSANCO annual reports documenting the year's spill events are available at <http://www.orsanco.org/rivinfo/pubs/orsa.asp>.

Updating the Plan

The City of _____ commits to updating this Protection Plan every __ years or whenever [*list any other conditions that would trigger an update, such as major staff changes at the city, major changes in the potential contaminant sources near the intake, major changes in water quality, etc.*]