

**DRINKING WATER SOURCE  
PROTECTION PLAN**  
for the  
**CITY OF RAVENNA**

**September 2013**

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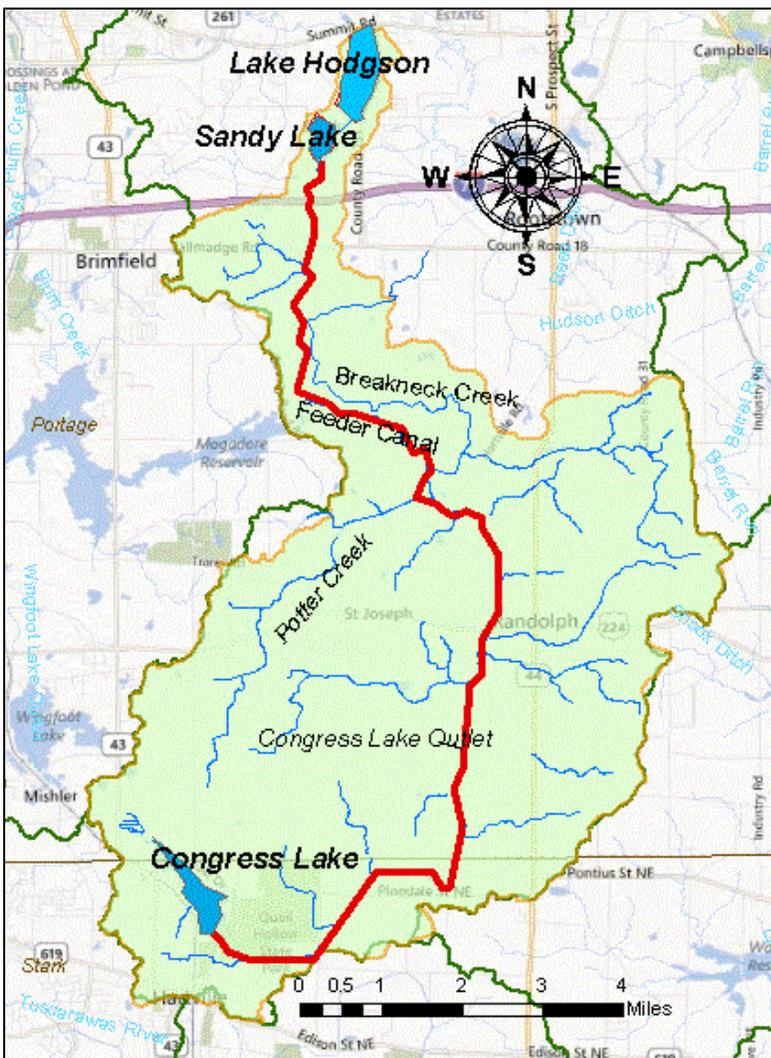
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# Executive Summary

The City of Ravenna operates a water treatment plant that draws raw water from Lake Hodgson and Sandy Lake. During summer months, this is supplemented by water from Congress Lake via Congress Lake Outlet (Figure 1). Water quality in Lake Hodgson and Sandy Lake is generally good and is well protected from most sources of contamination because it is surrounded by undeveloped and fully fenced parkland. Source water quality is impacted primarily by growth of algae during the warm months and by turnover of the lakes, which is a natural phenomenon that usually occurs in October. The main concerns related to human activities are septic systems serving the homes that surround the lakes; all septic systems need to be maintained and even well maintained systems need to be replaced after 30-50 years.



**Figure 1.** Watershed (green-shaded) for the City of Ravenna's sources of drinking water: Lake Hodgson, Sandy Lake, Congress Lake and drainage to Congress Lake Outlet (shown in red).

Source water arriving at the lakes via Congress Lake Outlet is more susceptible to contamination because the water travels through 18 miles of largely agricultural land, crossing under numerous bridges and crossed by several pipelines. Most of the strategies described in this Source Water Protection Plan address the kinds of potential contaminant sources within the larger watershed. They include activities described in the Middle Cuyahoga Watershed Action Plan for the entire watershed, such as installing green infrastructure (rain gardens, green roofs, etc.) to regulate storm water, agricultural and golf course best management practices, roadside swale improvements, restoring stream channels and riparian areas, correcting failing septic systems, and preservation of wetland/ riparian corridors.

These activities are summarized in the Implementation Plan provided in the following page (for quick reference). They are discussed in greater detail on pages 11 to 16.

# Implementation Plan

*Bolded items indicate new strategies; others are ongoing*

<b>Activity</b>	<b>Responsible Party</b>	<b>When Implemented</b>	<b>Comments</b>
<b>SOURCE MANAGEMENT ACTIVITIES</b>			
Restrict gasoline powered boats on Lake Hodgson	City of Ravenna Water Plant		
Septic System Investigations	Portage County Health Department		
<b>Investigate Septic System Remediation Funding Options</b>	<b>City of Ravenna Engineering Dept.</b>	<b>2013</b>	
Maintain Contact w/ Portage EMA	City of Ravenna Service Director		
Guide Development within Watershed	Portage County Storm Water Task Force & Portage Regional Planning Commission	2003	
Reduce Non-Point Source Pollution within Watershed	City of Ravenna Engineering Dept. and NEFCO	January 2013	Ongoing efforts to implement Middle Cuyahoga Watershed Action Plan
Promote and Utilize OUPS to prevent damage to pipelines that could contaminate the watershed	City of Ravenna Engineering Dept.		
<b>EDUCATION AND OUTREACH</b>			
Produce annual Consumer Confidence Report	City of Ravenna Water Plant	Annual	
Conduct Plant Tours	City of Ravenna Water Plant		
Maintain Partnership with PSWCD to Provide Stormwater and Watershed Education	City of Ravenna Engineering Dept. & Portage Soil and Water Conservation District	2003	
<b>Provide Educational Signage at Lake Hodgson Recreation Center</b>	<b>City of Ravenna Engineering Dept.</b>	<b>2014</b>	
<b>Provide Emergency Contact Signage along Sandy Lake Rd</b>	<b>City of Ravenna Engineering Dept.</b>	<b>2014</b>	
<b>CONTINGENCY PLANNING</b>			
Annually Evaluate Plant Contingency Plan	City of Ravenna Water Plant	Annual	
<b>SOURCE WATER MONITORING</b>			
Daily raw water monitoring	City of Ravenna Water Plant	Daily	
Produce annual Consumer Confidence Report	City of Ravenna Water Plant	Annual	

# Source Water Protection Plan for the City of Ravenna

## Purpose

This document summarizes drinking water source protection strategies that are occurring and will be pursued in the future to minimize the threats of contamination or water shortage to the City of Ravenna's source of drinking water—Lake Hodgson. Although the City of Ravenna treats the water to meet federal and state drinking water standards, conventional treatment does not remove all contaminants, and beyond-conventional treatment is often very expensive. By completing this plan, the City of Ravenna acknowledges that implementing measures to prevent spills and releases into Lake Hodgson can be a relatively economical way to help ensure the safety of the Village's drinking water, while also improving river quality for other uses.

**Why should a community have a source water protection plan?** Water is a vital part of all facets of our communities. It is essential to agriculture, sanitation, industry and for drinking. In addition to being a necessity of life, clean, affordable water is an important economic driver. Some manufacturing plants use significant amounts of water and may decide plant locations based on the availability of high-quality water. Clean water, provided at a reasonable cost, can attract new business and residents which help fuel economic growth and prosperity.

Governments invest a significant amount of money and time in their water treatment and distribution; *keeping the water source clean keeps costs as low as possible*. When contamination occurs, it can have a huge financial impact on communities and financial reserves can be wiped out. Contamination disrupts lives and businesses, creating a negative economic effect for the local community. Most importantly, when drinking water is contaminated, the health of our families and fellow citizens is put at risk.

It only takes one major event to drastically change the quality of your water source; planning ahead is crucial. Protection planning can help prevent an event entirely, minimize a potential threat, or simply prepare the community for when something does happen to the water supply. A source water protection plan can also be used when evaluating potential development opportunities that may affect drinking water supplies in the future.

- ✓ It helps the city provide the safest and highest quality drinking water to its customers at the lowest possible cost.
- ✓ It establishes activities to minimize the threats to the source of drinking water.
- ✓ It helps to plan for expansion, development, zoning, and emergency response issues.
- ✓ It can provide more opportunities for funding to improve infrastructure, purchase land in the protection area, and other improvements to the water system.

# Background

## Source Water Protection

Source water assessment and protection (SWAP) is a non-regulatory state program administered by the Ohio Environmental Protection Agency. The program started as the Wellhead Protection Program, which was part of the 1986 amendments to the federal Safe Drinking Water Act. The wellhead protection program provided guidance and technical assistance to public water systems, who were encouraged to complete assessments and protection plans using their own resources. Ohio EPA staff reviewed the assessments and formally endorsed them, when complete. In 1996 the program was extended to include surface water systems and was renamed "Source Water Protection." It was the intent of Congress that public water systems use the information in their source water assessment to develop a drinking water source protection plan.

The background information presented here includes information from the City of Ravenna source water assessment report completed by Ohio EPA in 2002, but expands on it considerably, using data collected by the City of Ravenna public water system staff and the city engineering department.

This plan was drafted by Patrick Jeffers, the City of Ravenna Assistant City Engineer, with assistance from Ohio EPA and in consultation with many state and local officials. Meetings were held with Ohio EPA staff and other city and county officials on February 6<sup>th</sup>, February 28<sup>th</sup>, and April 4<sup>th</sup>, 2013, to discuss the development of this plan. A source water protection team was formed to assist with implementation of strategies, especially the outreach efforts.

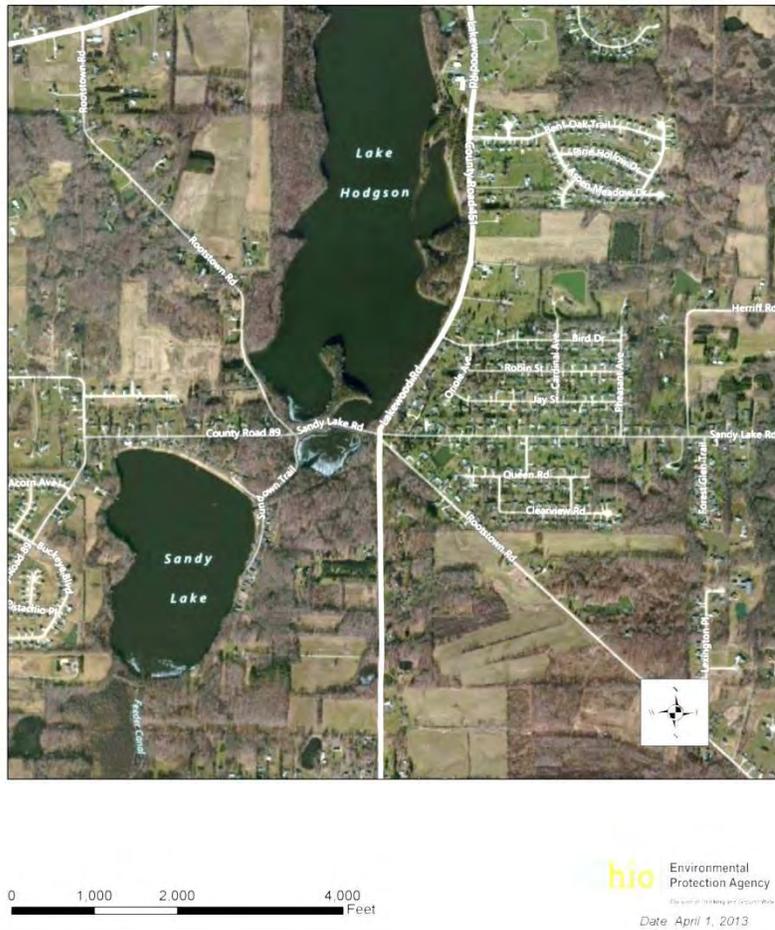
This team consists of:

Bob Finney, City Engineer  
Patrick Jeffers, Assistant City Engineer  
Tim Stephens, Water Treatment Plant Superintendent  
Bill Bregant, Waste Water Treatment Plant Superintendent  
Cindy Mullins, Waste Water Treatment Plant Chief Operator/Chemist  
Todd Peetz, Portage County Regional Planning Commission  
Eric Long, Portage Soil and Water Conservation District  
Maia Peck, Middle Cuyahoga River Watershed Coordinator, Northeast Ohio Four County Regional Planning and Development Organization (NEFCO)

## Public Water System Description

The City of Ravenna in Portage County is a community of 11,739 (2011 census data) and has 5,103 service connections. The city provides drinking water directly to approximately 16,000 people, including customers in Rootstown and Shalersville. Shalersville also sells water to customers in Streetsboro and Aurora, bringing the total population served directly and indirectly by Ravenna to 36,559. The primary water source for the City of Ravenna is Lake Hodgson. Lake Hodgson receives flow from Sandy Lake via a gate that water plant personnel can open and close from the plant (Figure 2).

Drinking Water Source for City of Ravenna  
PWSID# 6703211, Portage County



**Figure 2.** Aerial photo of Lake Hodgson and Sandy Lake, the main sources of drinking water for the City of Ravenna.

This water can be supplemented by water from Congress Lake, which is located about 18 miles south of Sandy Lake via “Congress Lake Outlet”, a former stream that was channelized during the 1800s (see map on page 1). Diversions from Congress Lake Outlet are performed typically for a limited time period during the summer months, to maintain the water level in Lake Hodgson; otherwise Congress Lake Outlet flows to Breakneck Creek, which joins the Middle Cuyahoga River northwest of Ravenna. The water treatment plant is a Class IV plant with an EPA rated design capacity of 6.0 million gallons per day (MGD). Currently, the plant is treating an average of 2.25 MGD. The water intake was constructed in the early 1900's to serve an industrial mill and was modified in the middle of the last century to its present condition. The water intake is located approximately 360 feet offshore and the lake at the point of intake is about 50 feet deep. One horizontal centrifugal pump is used at a time (of three) to pump raw water to the water treatment plant, with a capacity of 3,000 gpm. The lake has a capacity of approximately 1.1 billion gallons.

Two aeration devices are in use at the reservoir to prevent the water from becoming anoxic (low in oxygen). Maintaining oxygen levels reduces the formation of trihalomethanes (THMs), hydrogen sulfide (H<sub>2</sub>S), etc., and reduces the treatment necessary for safe drinking water.

Source water is treated by the chemical addition of chlorine dioxide and secondary setting for disinfection by-product control, oxidation and taste and odors. Lime is added for corrosion control and pH adjustment. The water treatment plant adds ferric chloride as a coagulant, and carbon for taste and odor control. Caustic soda ash is added in place of lime when needed. Cationic polymer is added as a flocculation aid, gaseous chlorination is used for disinfection and fluoride is added prior to distribution.

### **Description of Source Water Area**

The watershed for Lake Hodgson, which is contiguous with the protection area, is approximately 29,601 acres in size with a drainage area of 15.15 square miles. Lake Hodgson is a kettle lake, created by continental glaciers during the Ice Age, with a surface area of approximately 190 acres. The lake empties into Breakneck Creek prior to flowing into the Cuyahoga River (Figure 4). The protection area contains over 55 miles of perennial streams. The average fall of Breakneck Creek and the feeder canal from headwaters to Lake Hodgson is 4 feet per mile.

Annual average precipitation in the protection area is approximately 38 inches, of which 15 inches become surface runoff; the remainder infiltrates the soil or evaporates. In general, soils in the protection area are moderately well drained.

### **Source Water Quality**

The primary water quality impacts in Lake Hodgson at the City of Ravenna intake are runoff from agricultural fields, failing home septic systems, oil and gas wells, construction sites, roadways and storm water runoff from urban areas.

The recent Middle Cuyahoga River Watershed Plan (2012) summarizes existing conditions in Breakneck and Potter Creeks, which are connected to Congress Lake Outlet. Concerns in the Breakneck Creek subwatershed include addressing the impacts of the urbanized landscape, including the extensively altered Wahoo Ditch. The watershed plan also discussed: addressing nutrient enrichment and the resulting algal blooms in Lake Hodgson; addressing nutrient enrichment in Breakneck Creek; reducing agricultural sources of non-point source pollution; addressing failing septic systems; minimizing impacts from development; and improving hydrology, stream morphology and habitat along the channelized streams. Concerns in the Potter Creek subwatershed include reducing non-point source pollution from agricultural land, addressing failing septic systems, protecting remaining large wetland complexes, and improving hydrology and riparian conditions along channelized streams.

### **Treated Water Quality**

The Ravenna public water system has historically been successful in treating water to meet state and federal drinking water quality standards. Table 1 shows the water quality results for all constituents that are required to be monitored and that have been detected in the treated water at least once since 1999.

**Table 1. Water Quality Monitoring Summary of Treated Water  
City of Ravenna Public Water System**

*Ohio EPA Public Water System Compliance Monitoring Database (January, 1999 – March, 2013)*

NOTES: Primary Maximum Contaminant Limits (MCLs) are health-based standards. Some constituents only have Secondary MCLs, which refer to taste, odor or appearance (staining of fixtures or clothing), not related to health. Action Levels apply to lead, copper, and some radioactive contaminants, which typically originate in individual homes and must be tested in the homes.

Contaminant (units)	Levels Found	Primary MCL	Secondary MCL	Action Level	MCL Violation? <sup>a</sup>	Typical Sources Related to Human Activities <sup>b</sup>
Barium (mg/l)	0.013 – 0.022	2	*	*	<b>NO</b>	Runoff from mining and metal refineries wastes
Copper (mg/l)	0.053 – 0.318	*	*	1.3	*	Corrosion of household plumbing systems.
Fluoride (mg/l)	0.78 – 1.11	4	2	*	<b>NO</b>	Additive promoting strong teeth. Discharge from fertilizer and aluminum factories
Lead (µg/l)	8.0 – 24.1	*	*	15	*	Corrosion of household plumbing systems
Nitrate (mg/l)	0.03 – 0.88	10	*	*	<b>NO</b>	Runoff from fertilizer use, leaching from septic systems, sewage
<b>Radioactive Constituents</b>						
Beta/photo emitters (pCi/L)	4.44 – 10.9	*	*	50	<b>NO</b>	Discharge from production of luminous dials and smoke detectors, hospital wastes, nuclear power plants
<b>Volatile Organic Contaminants</b>						
Carbon tetrachloride (µg/l)	0.9	5	*	*	<b>NO</b>	Discharge from chemical plants and other industrial activities
Xylenes (µg/l)	0.5	10,000	*	*	<b>NO</b>	Discharge from petroleum factories; Discharge from chemical factories
<b>Disinfection By-Products (DBP's)</b>						
<b>TTHMs [Total Trihalomethanes] (µg/l)</b>	16.9 – 106.8	80	*	*	<b>NO</b>	By-product of drinking water chlorination
Bromodichloromethane (µg/l)	0.5 – 20.9	Primary MCL = 80 µg/l for the SUM of these four constituents, which are products of chlorinating the drinking water				
Chloroform (µg/l)	7.8 – 79.3					
Bromoform (µg/l)	0.8 – 1.6					
Dibromochloromethane (µg/l)	1.5 – 7.3					
<b>HAA5s [Total Haloacetic Acids] (µg/l)</b>	10.3 – 85.1	80	*	*	<b>NO</b>	By-product of drinking water chlorination
Dibromoacetic Acid (µg/l)	1.0 – 2.5	Primary MCL = 80 µg/l for the SUM of these five haloacetic acids, which are products of chlorinating the drinking water.				
Dichloroacetic Acid (µg/l)	5.0 – 41.4					
Trichloroacetic Acid (µg/l)	3.1 – 35.9					
Monobromoacetic Acid (µg/l)	1.1 – 2.1					
Monochloroacetic Acid (µg/l)	2 - 22					

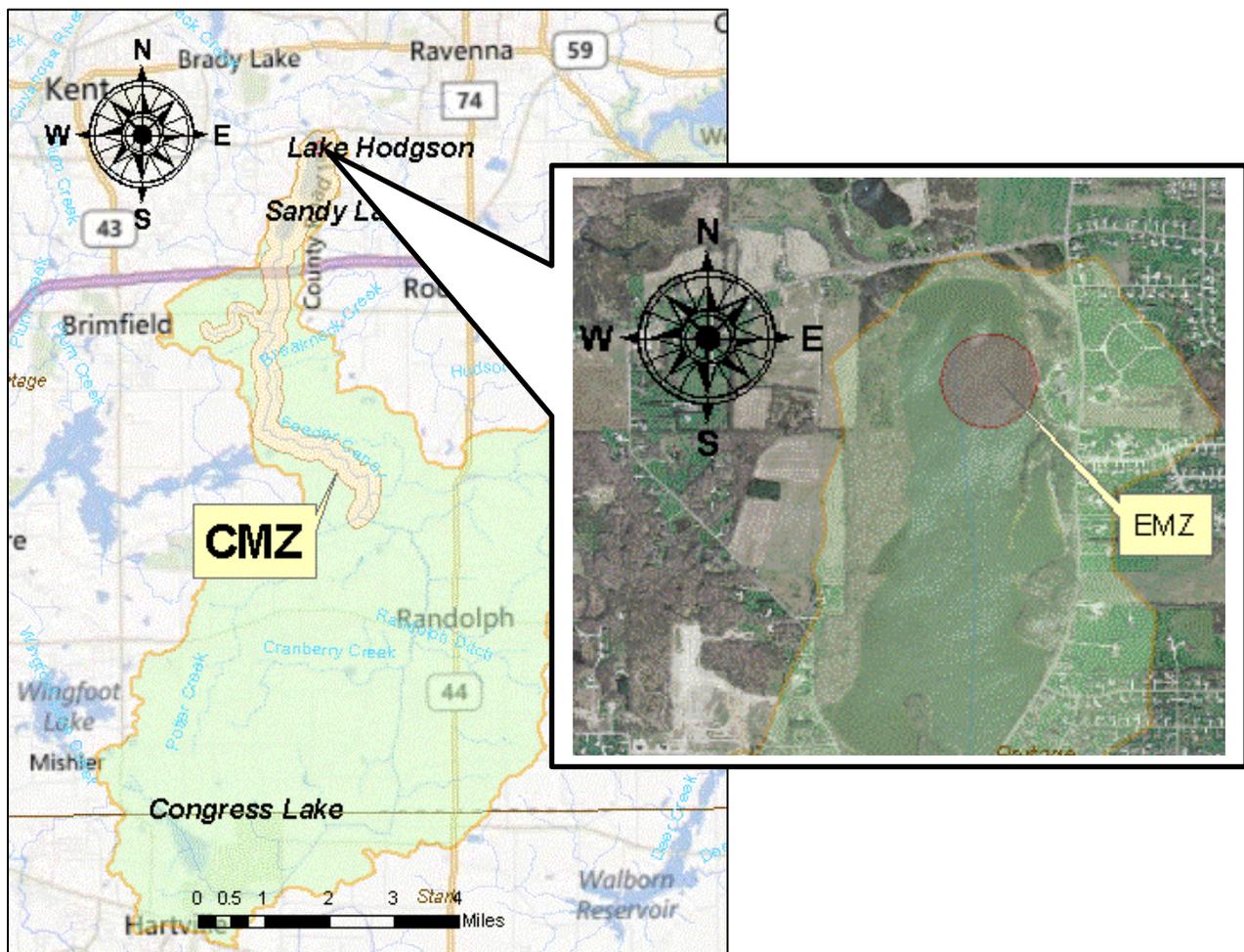
<sup>a</sup>A sampling result that exceeds the MCL value does not necessarily indicate a violation by the public water system. MCL violations for many contaminants are based on a running annual average instead of a single exceedance.

<sup>b</sup>All inorganic and radioactive constituents listed here are also naturally-occurring in the environment at some level.

## Identification of Local Source Water Concerns

### Area of Focus

While the entire source water area contributes to Ravenna's water supply, it is impractical to focus equally on such a large area. Instead, Ohio EPA encourages a community to focus its efforts on the 'corridor management zone' (CMZ), which is defined as a zone that extends upstream ten miles from the intake and that is 1,000 feet wide on each side of the main stem and 500 feet wide on each side of the tributaries (Figure 3). This area includes the emergency management zone (EMZ), which is defined as a semi-circle that extends 500 feet upstream and 100 feet down stream of the intake. It is especially important that potential contaminant sources be minimized within the EMZ, as a spill at this location could easily result in contaminants entering the intake before the public water supplier even becomes aware of the accident.



**Figure 3.** The Corridor Management Zone (CMZ – shown in beige) for Ravenna's source water area (green). Inset shows the Emergency Management Zone (EMZ) at intake.

## Potential Contaminant Source Inventory

The area of greatest concern is a narrow strip of land draining directly into Lake Hodgson and Sandy Lake. It is mostly wooded and surrounded by fencing. Aging **septic systems** in the residential portions of this drainage area pose the greatest concern, due to their proximity and they drain into the two lakes year-round.

**Recreational use** of the lake during the summer months also provides a potential for spills or releases at the shoreline.

The transportation network is a potential source of contamination through vehicular accidents that release hazardous materials. **Interstate 76** crosses the CMZ about a half mile south of Sandy Lake. An additional 121 miles of roads and 2.3 miles of rail lines cross the source water protection area. Where Lakewood Road follows the southeastern bank of Lake Hodgson, a spill would be particularly concerning, as the bank is very narrow there and relatively steep.

Extensive **petroleum and natural gas production** within the protection area and the corridor management zone is also considered a potential source of contamination to surface and ground waters. Permits for a total of 402 oil/gas wells located in the Ravenna protection area can be found in ODNR's permit database; 25 of these are located within the corridor management zone. However, some of these permits may never have been acted upon and others may be for wells that are now inactive. Development of natural gas supplies in the Utica Shale has led to a recent influx of petroleum companies seeking permits to drill in Portage County, and this activity is projected to increase in the near future. Oil and gas activities typically involve increased truck traffic, and thus an increased potential for spills. Twenty-one spills in the Ravenna protection area were reported to Ohio EPA between 1989 and 1998, most of them petroleum related.

Seventeen miles of oil/gas **pipelines** transverse the protection area. A BP Oil pipeline carries liquid petroleum products east-west across the CMZ between Tallmadge and Old Forge Roads. Farther south, within the protection area but outside the CMZ, a Sunoco Pipeline also carries petroleum products east-west across the area. The main concern for these pipelines is accidental punctures by earth-moving equipment—which can be prevented by consulting with Ohio Utilities Protection Service (OUPS) before digging—or ruptures like the recent Enbridge pipeline rupture in Michigan (Figure 4) and the Exxon pipeline rupture in Mayflower, Arkansas (Figure 5). The potential for such accidents increases with the age of the pipeline.



**Figure 4.** The July 2010 Enbridge pipeline rupture in southwest Michigan spilled over 800,000 gallons of oil into a creek that carried it to the Kalamazoo River. As of 2013, tar-like residue reportedly remains in the streambed.  
*Photo Source:*  
[http://www.huffingtonpost.com/2012/08/06/us-pipeline-spills\\_n\\_1747277.html#slide=1255349](http://www.huffingtonpost.com/2012/08/06/us-pipeline-spills_n_1747277.html#slide=1255349)



**Figure 5.** The March 2013 Mayflower, Arkansas pipeline rupture released thousands of barrels of oil in a residential neighborhood.  
*Photo Source:*  
<http://www.nbcnews.com/business/arkansas-opens-investigation-exxon-oil-spill-1C9184290#>

Portage County is authorized to discharge under the National Pollutant Discharge Elimination System (NPDES) system from the Randolph wastewater treatment works located at 2053 SR 44, Randolph, Ohio, to Congress Lake Outlet (a tributary of Breakneck Creek).

### **Prioritization of Potential Contaminant Sources**

Failing septic systems in the vicinity of Lake Hodgson and Sandy Lake are among the top concerns for source water protection in the City of Ravenna. These aging systems are among the potential contaminant sources closest to the intake and could be significant sources of nutrients to the lakes.

Transportation corridors are also significant sources of contaminants to the Lake Hodgson watershed. Several local roads traverse in very close proximity to Lake Hodgson and Sandy Lake. Interstate 76 also crosses the watershed in close proximity to Sandy Lake. These are potential sources of pollutants such as heavy metals, chloride, and oils. They also pose a threat through the possibility of spills from trucks carrying various products.

To a lesser extent, contamination from oil/gas wells and pipelines pose a threat to the City's source water. These sites are located further upstream in the watershed and would provide longer response times should a spill occur. The likelihood and frequency of contamination are also less than the other priorities identified. These do, however, still provide a threat to the City's drinking water quality and should be considered and addressed.

## Protective Strategies

Protective strategies for source water protection areas are presented in four categories: strategies targeted to specific types of activities or facilities; contingency planning; public education, and source water monitoring.

### Specific Contaminant Source Strategies

**Recreational Spills on Lake Hodgson:** Lake Hodgson is open to recreation (fishing and boating) during the summer season. In order to prevent spills from occurring on the lake, the use of gasoline powered motors is not permitted on the lake. Outside the summer season, the general public is prevented from approaching the lake by a chain-link fence that encircles the lake, with access through a locked gate. This has been an effective policy for the City in preventing spills on Lake Hodgson.

**Home Sewage Treatment Systems (HSTS):** A number of HSTS's exist around Sandy Lake and Lake Hodgson. These pose a threat to the water quality of Lake Hodgson by providing opportunities for contaminants such as pathogens (viruses and bacteria), phosphorus, and nitrogen to enter the Lake. The Portage County Health Department permits and inspects new septic systems, certifies septic system cleaners, and responds to reports of septic nuisances. The City plans to investigate funding opportunities to correct failing HSTS's around the Lake. Routine inspections will also be discussed with the Health Department, to identify failing systems before the systems become a nuisance. This should reduce the likelihood that significant amounts of untreated septage will enter Lake Hodgson.

**Highways:** Traffic incidents that would result in a potential discharge of pollutants to the watershed will be responded to by the Portage County Emergency Management Agency (EMA). The EMA is aware of drinking water supply areas for the City and would notify the City in the case of an event. To encourage the public to report spills that could pollute the City's drinking water sources, spill response signage will be provided on Sandy Lake Road where it crosses between Lake Hodgson and Sandy Lake. This signage would inform motorists that they are in a drinking water source area and to call 911 to report any spills.

**Watershed Development:** Portions of the source water protection area for the City of Ravenna are undergoing commercial development, notably portions of Rootstown Township. In order to promote development practices that protect water resources, the City has partnered with the Portage County Storm Water Task Force. This Task Force works with representatives from county and local governments to cooperatively meet state stormwater management regulations, including regulations regarding implementation of best management practices to control runoff during and post-construction of commercial developments.

Another item intended to help guide environmentally protective development in the Lake Hodgson watershed is an update to the Portage County subdivision ordinance. The Portage County Regional Planning Commission is currently in the process of developing a riparian setback requirement for the subdivision ordinance, which will limit development and potential contamination sources adjacent to streams within the watershed.

**Non-Point Source Pollution:** Nonpoint source pollution from eroding streambanks, urban and agricultural runoff, and altered wetlands/channels/riparian areas results in excess pollutants such as sediment, nitrogen, and phosphorus being delivered to Lake Hodgson.

In order to combat these sources of pollutants, the City partnered with NEFCO (Northeast Ohio Four County Regional Planning and Development Organization) as well as a number of other interested parties to create the Middle Cuyahoga Watershed Action Plan. This plan is an inventory of identified problems and opportunities, goals, and actions the partners wish to take to protect and improve the Middle Cuyahoga River, its tributaries, and watershed. Action items listed in the state-endorsed plan are more eligible for some types of funding.

Action items endorsed by the Watershed Action Plan include green infrastructure, agricultural and golf course BMP's, roadside swale improvements, restoring stream channels and riparian areas, correcting failing septic systems, and preservation of wetland/riparian corridors.

**Pipelines:** Oil and gas pipelines traversing the watershed are privately owned and operated. Maintenance, repair, and replacement are handled by the companies that own the pipelines. Should the City become aware of any maintenance issues regarding the pipelines, the City will contact the respective owner to address the issue. Furthermore, the City will continue to utilize the Ohio Utilities Protection Service (OUPS) for the marking of underground utilities including oil and gas pipelines for City projects, as well as encourage their use for private projects.

### **Drinking Water Shortage/Emergency Response**

A well-formulated plan enables a utility to prepare for, respond to, and recover from crisis conditions without wasting time on futile or unnecessary efforts or spending funds unnecessarily. The plan defines duties, responsibilities, and functions of all water system personnel with respect to each specific emergency condition. The City of Ravenna has developed procedures to address specific situations that can be expected to arise, and these are documented in the Plant Contingency Plan, which is updated annually. Copies are kept at the water treatment plant.

The following are issues that are specific to drinking water source protection. This information has been included in the water plant contingency plan.

**Chemical Spill Threatening Water Supply:** In the event of a chemical or oil spill the local fire chief is to be in responsible charge of coordinating all aspects relating to public health, traffic and crowd control, evacuation, spill containment, and spill cleanup. These functions are expected to be performed with the knowledge and assistance of the Ohio EPA and the Portage County Health Department.

In the first stages of a spill gathering pertinent information in a timely manner is essential in aiding the authorities in taking appropriate and expedient actions. The following procedures should be followed:

1. Collect Information. Staff should obtain information concerning:
  - The time the spill occurred, or was first observed.
  - The location of the spill.
  - The material released.
  - The source or probable source of the release.
  - The volume of the spill, or the size of the leak occurring.
  - Present and anticipated movement of the spill; expected amount of time before it could reach the intake
  - Weather conditions.
  - Personnel on the scene.
  
2. Determine If The Spill Is In The Watershed. Determine if the spill is within the Lake Hodgson watershed. Refer to the area topographic maps in the file behind the MCP panel; on these maps the watershed is outlined.
  
3. Contact Fire Department. Contact the Ravenna Fire Department with as much of the preceding list of information as possible. Notify the Ohio EPA, N.E Ohio District.
  
4. Place Containment Booms. Organize spill control efforts around assisting the fire chief who is to be the authority in responsible charge. Refer to the county contingency plan which has detailed instructions on dealing with spill situations. Notify fire chief of our intentions to install booms, and/or the locations where containment booms may be placed and where vacuum trucks and skimmers have access. Refer to the watershed topographic maps for information on locations where containment booms may be placed, where vacuum trucks can be used, and where flows may be dammed or diverted.

***Drinking Water Shortage – Short-Term Loss of Source:*** In the event of a contamination event that requires water curtailment, the following procedures are in place:

1. The supply should be maintained for firefighting and the many varied uses other than consumption.
  
2. Notification priority will be given to schools and hospitals/nursing homes to prepare for water curtailment. Robinson Memorial Hospital has their own well supply and pumping capability, but they need advanced notice to bring it on line.
  
3. Consumers will be provided information on preparing for water curtailment, including:
  - A water boil may be recommended to kill bacteria contamination, however describe clearly what boil means in news releases.
  
  - Water sterilization may also be accomplished with iodine, or chlorine in tablets, or chlorine bleach, but many people have trouble understanding such instructions.
  
  - Water is available in most homes in the rear tank of the toilets and in the water heater tanks, this however should not be considered pure, and sterilization should be recommended.

4. The Portage County Sanitary Engineer is able to provide potable water for tank trucks and for water buffaloes for hauling to distribution points placed at strategic areas throughout the city.
5. Civil Defense should be prepared to put a water supply plan in motion as soon as news of a contaminant is received.
6. Contact area water haulers to be ready to haul water, or to begin hauling as needed. Red Cross should work with the local civil defense authorities.
7. Mutual Aid is available from a connection with the City of Kent. If there is no contamination of the distribution system, this connection can be utilized to serve the Ravenna service area.

***Drinking Water Shortage – Long-Term Loss of Source:*** Should an emergency event cause Lake Hodgson to no longer be a safe source of water, the City of Ravenna could utilize Crystal Lake as a potential source of water. Crystal Lake, located just southeast of the city limits between S Prospect St and State Route 44/5, was the original source of supply for the City.

A well field adjacent to the lake was installed in the 1960's to replace the surface water withdrawals from Crystal Lake. This well field could be used as a future source of water should Lake Hodgson become unusable. Due to the age of the wells, they would either need to be rehabbed or replaced. Water from these wells would need to be treated for iron and could either be pumped to the existing Water Treatment Plant, or a new plant could be constructed adjacent to Crystal Lake.

The possibility of utilizing this water source has been investigated in a 2002 report to the City by CT Consultants. The report outlines the possible issues, options, and costs of developing this source. Depending on the options selected, this undertaking could cost between 2 and 5.5 million dollars.

## **Public Education & Outreach**

***Consumer Confidence Report:*** The City of Ravenna public water system publishes a Consumer Confidence Report (CCR) annually, as required by the Safe Drinking Water Act and Ohio Administrative Code 3745-96. The CCR is sent to all water customers and is available on the City's website at [www.ci.ravenna.oh.us](http://www.ci.ravenna.oh.us). The CCR does contain information regarding the 2002 Source Water Assessment for the City of Ravenna.

***Plant Tours:*** The Ravenna Water Treatment Plant staff conduct plant tours upon request. The City also has a plant Open House Day each spring where the public is invited to come out and tour both the water and wastewater treatment plants.

***Portage County SWCD:*** The Portage County Soil and Water Conservation District is located in Ravenna. The SWCD produces a number of educational materials and events pertaining to source water protection for the county. These range from newsletters, to classroom demonstrations, to field activities, etc. The SWCD

incorporates a “Wonders of Watersheds” program that educates area teachers about watershed protection and provides them with materials to use in their classrooms.

The SWCD also heads a Portage Storm Water Task Force in which the City of Ravenna participates. One agenda item for this Task Force is educating residents of the county on the importance of stormwater management to protect the quality of our rivers and streams. Through this task force, the City distributes watershed and drinking water information (posters, brochures, newsletters, etc.) to the public through public events such as the annual Balloon-A-Fair celebration in Ravenna.

**Educational Signage:** The City of Ravenna has had discussions regarding opportunities to provide educational signage at strategic areas within the watershed. One opportunity would be to provide source water protection posters at the recreation center at Lake Hodgson. This would educate people coming to boat and fish on Lake Hodgson of the importance of protecting the watershed. Another opportunity would be to provide spill response signage on Sandy Lake Road where it crosses between Lake Hodgson and Sandy Lake. This signage would inform motorists that they are in a drinking water source area and to call 911 to report any spills.

## **Water Quality Monitoring**

Source water quality and reservoir safety monitoring is conducted by the City of Ravenna and includes the following:

Daily raw water quality monitoring is conducted at the Water Treatment Plant. Lake water quality sampling at varying depths is conducted periodically during the summer months.

The Middle Cuyahoga Watershed Action Plan outlines a number of chemical water quality results throughout the 2000's from within the Breakneck Creek and Potter's Creek watersheds (including sites within the City's source water protection area). A physical, chemical, and biological analysis was conducted on Lake Hodgson in 1961 as part of a Master of Science thesis by a student at Kent State University.

The lake level, control structure #1, rainfall, and ice conditions are monitored and recorded every day at the Ravenna Water Plant.

Water temperature is monitored and recorded weekly at the Ravenna Water Plant. The spillway and embankments are monitored on a weekly basis. They are checked for excessive brush and litter, movement, erosion and safety hazards. Condition of the spillway is noted and logs and debris are removed from the trash rack.

The Dam Safety Engineering program at the Ohio Department of Natural Resources inspects the dam every five years.

In addition, the City of Ravenna conducts compliance monitoring required by Ohio EPA, which measures the post-treatment quality of the water that enters the distribution system for public consumption. These data are made available to Ravenna's customers and the general public in the annual Consumer Confidence Report, which is posted on Ravenna's website.

# Updating the Plan

A protection plan is not a static document. Over time many issues related to protection planning will change- existing potential contaminant sources will close, new education and outreach opportunities will become available, new partners in protecting the drinking water source will be identified. The protection plan needs to plan for these and other events.

The City of Ravenna commits to reviewing the Drinking Water Source Protection Plan every two years, beginning with January 1, 2015.

## Updating the SWAP Assessment

Each review of this plan will include consideration of the following questions:

### Water Treatment Plant Updates

- Has the water usage increased or decreased since the last review?
- Have any new treatment protocols been added?
- Has a reservoir or intake been added or removed, or will wells be installed?
- Have there been any significant changes in any of the source water lakes?

Changes to the intake or the addition of wells will be reported to Ohio EPA's source water protection program so that the source water assessment can be adjusted (if necessary) to reflect new sources of drinking water.

### Potential Contaminant Source Inventory

- Has the extent of the protection area changed?
- Has the community developed rapidly?
- Have land uses in and around the protection area changed?
- Has management of businesses in the protection area changed?

If the answer to any of the above questions is yes, Ravenna will update the inventory or conduct a new inventory. Ravenna may contact Ohio EPA's Source Water Protection staff in the district office for guidance or assistance in conducting the inventory.

### Evaluating the Effectiveness of the Protective Strategies

In order to evaluate if the protective strategies in this Source Water Protection Plan are achieving the desired outcomes, Ravenna will consider the following types of questions and write any changes into the Protection Plan.

- Do we have reason to be concerned about how the drinking water source protection area may be used in the future?
- Should we consider trying to better protect it through a county resolution or township ordinances?

### Pollution Source Control Strategies

- Have we followed our own schedule of implementation/timeline for each of the pollution source control strategies?

- Are there new potential contaminant sources that need to be addressed with new pollution source control strategies?
- Have we implemented any new protective strategies that are not documented here?
- Did any of our strategies result in removal or elimination of a potential source?
- Did any of our strategies result in individuals modifying practices to decrease the risk of contaminating the drinking water source?
- Did our coordination with other groups (SWCDs, county EMAs, local health dept., local watershed group, etc.) contribute to the implementation of protective strategies?
- Have the partnerships developed during plan implementation been productive?

### ***Education and Outreach***

- Have we followed our own schedule of implementation/timeline for each of the educational strategies?
- Are there any new groups in the population that we need to target with education and outreach strategies?
- Have we implemented any new educational strategies that are not already documented here?
- Has education and outreach targeting any specific group resulted in actions that reduced or could potentially reduce the risk of contaminating the drinking water source (e.g., septic system owners conducting regular maintenance, farmers adopting best management practices)?
- Have we received additional funding to continue any particular education and outreach strategy?
- Have we received any accolades, awards or recognition from outside entities or organizations for our educational efforts?
- Have we had any unsolicited requests for SWAP-related education (such as requests for plant tours, requests for presenters/speakers at events, etc.)?
- Did our coordination with other groups (SWCDs, SWEET Team, local health dept., local watershed group, etc.) contribute to the successful development and dissemination of SWAP-related information?
- Did we have sufficient staff and resources to complete all the planned educational efforts?
- Have educational efforts been cost effective? Efficient? (Consider level of attendance, attentiveness and participation by audience, comments received, etc., vs. the cost to facilitate the event ) Should the frequency of the outreach be increased, decreased, or remain the same?
- Have the partnerships developed during plan implementation been productive?
- Have any of the target groups contacted the public water system for additional information about something they saw or heard about through these activities?

### ***Drinking Water Shortage/Emergency Response***

- Are there any updates to the Drinking Water Shortage/Emergency Response Plan?
- Did our coordination with emergency responders at the local and county level result in better communication and handling of spill incidents that could impact our drinking water?

### ***Raw Water Monitoring***

- Have we followed our raw water monitoring plan (i.e., sampled at the specific frequency, analyzed for the appropriate parameters, etc.)?
- Have there been any significant changes to our water quality?
- Do we have sufficient water quality data or other reasons (e.g., the source was removed) to conclude that ground water monitoring can be cut back or is no longer needed?
- Are there new water quality, potential contaminant source, or land use issues that would influence the need to expand our water quality monitoring network?
- Does our raw water monitoring plan need to be updated for any reason?

### **Revising the Plan**

Upon review, if any revisions of the SWAP Assessment Report are needed, Ravenna will contact Ohio EPA's Northeast District office for guidance. Also, if the local planning team makes any substantial changes to Ravenna's Protection Plan, a copy will be forwarded to Ohio EPA for concurrence. The revision will be documented on the front cover by adding "Revised [date]" beneath the date at the bottom of the page.

## **Primary References**

OEPA, 2002, Drinking Water Source Assessment for the City of Ravenna

OEPA, 2000, Total Maximum Daily Loads for the Middle Cuyahoga River

NEFCO, 2012, Middle Cuyahoga River Watershed Action Plan