DRINKING WATER SOURCE PROTECTION PLAN

for the

VILLAGE OF BARNESVILLE

October, 2016

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Executive Summary

Barnesville operates a community public water system directly serving a population of approximately 6,500 people. The Barnesville water system also serves two satellite systems with finished water: Switzerland of Ohio (population ~2,500) and Quaker City (population ~875). The current combined population served by the Barnesville water system is approximately 9,875. The surface waters used by the Barnesville system include Barnesville Reservoir #1, Barnesville Reservoir #2, and Barnesville Reservoir #3 (also known as the Slope Creek Reservoir). The treatment capacity of the Village of Barnesville water plant is approximately 2.5 million gallons per day. Normal production and average usage is about 800,000 gallons per day. Estimated raw water storage is approximately 885 million gallons; possibly 840 million gallons of that total storage can be withdrawn by the water system for public use. This storage capacity will allow for 976 days (2.67 years) of un-interrupted use by Barnesville customers prior to depletion. Estimated "treated" water storage is 1.3 million gallons (based on storage tank capacities of 770,000 gallons and 550,000 gallons). The storage alone allows for 1.2 days of normal consumption by the system.

The Village of Barnesville believes the rapidly developing oil and gas industry in the area increases the potential for accidental spills of petroleum or production related products to the environment. This plan includes a number of protective strategies which anticipate spillage. Once a release occurs, there are steps the community will take to minimize impacts to the local water supply. In order to reduce the potential for spillage or releases to the environment, this plan also commits to monitor and track the locations of any active oil and gas wells that may be sited within the village reservoir watersheds, their ancillary pipelines, and truck transportation routes to and from oil/gas infrastructure. There are procedures to ensure that when/if a release occurs within the three reservoir watersheds, emergency responders will notify village administration and water plant staff immediately. Prior to the completion of this source water protection plan, water plant staff initiated baseline sampling for the kinds of chemical constituents associated with the production of local oil and gas. This will allow for future assessments of the impact of oil and gas activity on the drinking water quality of the village's reservoirs.

The Barnesville drinking water source is a valued public investment and a widely distributed utility and, as such, needs to be managed by best management practices to reduce risks to the drinking water users. Given the high value of Barnesville's water source for present and future generations, the gas extraction industry is being asked in this Source Water Protection Plan to avoid siting shale well pads within 500' of the village's water supply reservoirs. If well pads, pipelines or facility structures are located within the reservoir watersheds, but beyond 500' from the water supply reservoirs, additional protective measures are being requested.

The Village of Barnesville also recognizes that other human activities can impact the quality of the village's water supply, such as agricultural development or wastewater treatment discharges. Runoff from these activities can promote hazardous algal blooms

(HABs), which are becoming a growing concern throughout Ohio. The best way to prevent HABs is to lower the levels of nutrients (primarily nitrate and phosphate) in the drinking water reservoirs. This involves promoting the efforts of staff with the Belmont County Soil and Water Conservation District, the Belmont County Health Department, the Farm Service Agency, the Ohio State University Extension, and the Natural Resources Conservation Service. These staff can work with local homeowners and agricultural producers in the watershed to avoid over-application of fertilizers and avoiding releases of inadequately treated septage from household septic systems and small wastewater treatment plants.

The Implementation Plan provided in the following five pages (for quick reference) summarizes the protection activities that will be ongoing in the village's source water protection areas.

Implementation Plan

Activity	***Responsible Party***	***When Implemented***	***Comments***
SOURCE MANAGEMENT ACTIVITIES			
Manage risk associated with oil and gas exploration - Current			
Maintain up to date inventory of well permits issued within the village drinking water reservoir watersheds, through ODNR. Maintain up to date maps of existing and proposed oil & gas pipelines in Barnesville area. Update contact information with Emergency Responders.	Fire Department Staff (or, delegate from the Village Administrator).	ODNR contact or website checked at least quarterly, beginning in January 2017.	See page 22 for details
Request the ODNR Dam Safety Program increase the frequency of dam inspections for the village's reservoirs based on density of shale-gas development and/or seismic activity in/near reservoir watersheds.	Village Administrator +/or PWS Operator (via letter or email from the village of Barnesville to ODNR).	By the first Quarter of 2017. Annual check.	May require communication +/or coordination with ODNR.
Request the ODNR Oil and Gas Division increase frequency of above ground oil and gas storage tank inspections within reservoir watershed areas.	Village Administrator +/or PWS Operator (via letter or email from the village of Barnesville to ODNR).	By the first Quarter of 2017. Annual check.	May require communication +/or coordination with ODNR.
Manage risk associated with oil and gas exploration – Future			
Request that ODNR: 1) post or inform communities (Barnesville) when oil and gas infrastructure projects are submitted for permitting within water supply reservoir watersheds (before ODNR approval/denial). This will give Barnesville a chance to study +/or comment on proposed projects; 2) deny permits for well pads within the Emergency Management Zone for the reservoirs; 3) deny permits within 500' of the reservoirs at normal water elevations, and preferably within 1,000' of said reservoirs.	Village Administrator or delegate (via letter or email from the village of Barnesville to ODNR).	Once SWP Plan is finalized & endorsed by OEPA.	Barnesville is requesting the use of federal BLM rules - https://www.gpo.gov/fdsys/pkg/FR-2015-03-26/pdf/2015-06658.pdf. This may require internal discussion in ODNR & Ohio EPA because the rules are different that state of Ohio rules.

Activity	*Responsible Party*	*When Implemented*	*Comments*
4) for distances greater than 500' from the reservoirs, if/when pads/infrastructure are permitted, request ground water monitoring of these facilities and additional safeguards as specified in the 2015 Bureau of Land Management rules and/or equivalent ODNR permit restrictions or BMP engineering safe-guards to well pads; 5) require operators to notify the village 90 days prior to well pad construction, for pads in the reservoir watersheds.			
If midstream pipeline(s) for liquid petroleum product and/or brine are proposed within the watershed of the PWS reservoirs, request additional engineering safe-guards for the pipeline. Modify Source Water Protection Plan.	Village Administrator +/or PWS Operator +/or delegate (via letter or email from the village of Barnesville to pipeline company).	When proposal becomes known.	May require participation by ODNR, PUCO +/or FERC.
Upon siting of oil/gas well pads within the reservoir's watershed, request oil/gas company and ODNR meeting. Request well pad design & communication modifications equivalent to or superior to AEP-Utica St. Clairsville well pad design.	Village Administrator, PWS Operator and source water protection team members (via letter or email from the village of Barnesville to ODNR and oil and gas company)	As soon as possible after permit request is published.	Will require ODNR & oil and gas company participation. See Appendix D for AEP-Utica well pad design specifications & permit restrictions.
Upon siting of oil/gas well pad within the reservoir's watershed, evaluate ground water monitoring potential for these installations.	Village Administrator, PWS Operator and source water protection team members.	As soon as possible after permit request is published.	May require ODNR +/or oil & gas company participation. Can also use network of private water well monitoring stations.
Upon siting of oil/gas well pad within the reservoir's watershed, confirm and request copies of MSDS sheets for materials used/stored @ oil/gas facility.	Barnesville Fire Dept. and/or Village Administrator (via letter or email from the village of Barnesville)	As soon as possible after construction of the well pad is completed.	May require ODNR +/or oil & gas company notification.

Activity	***Responsible Party***	***When Implemented***	***Comments***
Reduce impacts to Barnesville Reservoirs from agricultural activities			
Request agriculture specialists to visit agricultural producers within the village's reservoir watersheds to discuss / encourage the use of BMPs. Meet to discuss progress.	Village Administrator & PWS Operator -> SWCD, OSU Extension +/or USDA Cons. Service staff (via letter or email).	Repeat annually, starting in 2017.	See page 23
Review / oversee herbicide spraying practices along utility right of ways within watershed boundaries and/or pesticide spraying on farms.	Village Administrator & PWS Operator -> SWCD, OSU Extension +/or USDA Cons. Service staff (via letter or email).	Routinely, when notified by utilities of clearing / spraying activities or by farmers within reservoir watersheds.	May request advice from Ohio Department of Agriculture.
Reduce impacts to Reservoirs from septic system discharges			
Request Belmont County Health Department prioritization of septic system inspections within the reservoir watersheds.	Village Administrator to Belmont County Health Department, via letter or email.	Request in 2017. Set up inspection schedule every **3** years.	Schedule can be modified based on village judgement.
EDUCATION AND OUTREACH			
Road Signs: Post Source Water Protection signs on public roads within reservoir watershed areas.	Village Council Member Scott Gallagher +/or county DOT official, township trustees.	Complete by the end of 2017.	2 free signs can be obtained from ODOT. Additional signs may be required for more coverage @ the village's expense.
Consumer Confidence Report: Include info on Source Water Protection Plan in CCR.	Village Administrator +/or PWS operator and staff.	Annually	CCR is updated annually and made available on village web site.
Plant tours: Continue to offer tours upon request.	PWS Operator/staff	Ongoing – as requested.	
Web Page: Post information about source water protection strategies on the Village's web page.	Village Administrator (or family member)	By 2017, and ongoing as needed thereafter.	

Activity	***Responsible Party***	***When Implemented***	***Comments***
School Outreach: Bring project WET activities into public school classrooms. Include SW Protection information with activities for Science Day, Earth Day, Environmental Awareness Programs in local schools.	Belmont Co. SWCD	Annually.	Belmont Co. SWCD already doing this. Ohio EPA participates in these outreach activities (by request) in communities with endorsed SWP Plans.
Agronomy Day: Include SW Protection topics.	OSU Ext. Service.	Annually.	As above.
Brochure: OEPA created a draft brochure.	Village Administrator +/or PWS operator and staff.	Following completion and endorsement of SWP Plan.	Distribute @ discretion of village. Make available via website - distribution by other local entities.
Festivals: Barnesville Pumpkin Festival & Captina Creek Celebration.	Belmont Co. SWCD, Olney School & Captina Conservancy.	Annually, in September.	May use Enviroscape and GW Sand Tank Flow Model.
Newspaper: Submit info on the SWP Plan & its implementation so the public can be kept informed of progress / work.	Village Administrator or delegate in consultation with the Barnesville Enterprise +/or other media outlets.	When plan goes draft-final; After plan is endorsed; When key development projects occur in the reservoir watersheds.	At the discretion of the Village.
Information Outreach: Communicate with Somerset and Warren Twp. residents to inform & recruit as "monitoring eyes & ears."	Village Administrator in consultation with participants. Face to Face, email, telephone calls or letters.	After each major project installation. Annual contact at a minimum.	At the discretion of the Village.
CONTINGENCY PLANNING			
Institute table-top spill exercises within reservoir watershed to test emergency response capability. Include SR 800 spill catchment basin location in these exercises.	Village Administrator, fire chief and county EMA coordinator.	Test by the end of 2017. Repeat every **3** years.	See Appendix C for SR 800 Spill Response Plan.
PWS staff will notify EMA, LEPC and Fire Dept. of changes in contact staff on at least an annual basis.	PWS operator	As part of annual contingency plan review/update.	

Activity	***Responsible Party***	***When Implemented***	***Comments***
Maintain road guard rails along public roads near the PWS reservoirs. Pursue alternate route designation with the township to reduce reservoir traffic.	Mayor, Village Administrator or delegate.	Include inspection criteria within road maintenance plans by end of 2017.	
Review Spill Response and Short/Long Term Water Shortage Plans.	PWS operator & Village Administrator.	Documented in plant's contingency plan, which is reviewed and updated annually.	See pages 23-24
SOURCE WATER MONITORING			
Implement tier 1, 2 and 3 Background Sampling Program for oil and gas indicator parameters in each reservoir. Maintain analytical records with former Ohio EPA analysis of reservoirs in 2009.	Village Administrator Barnesville PWS Operator / staff.	Ongoing. Reduction in frequency of sampling included in the Sampling Plan.	See Background Sampling Plan on page 28.
Invite local schools to partner or assist in the gathering / storage / analysis of source water quality data.	Barnesville PWS Operator/staff. Olney Friends School. Could partner with other local schools.	ASAP	Area HS. OU Main & Belmont Campus, Zane State, KSU, Muskingum University, Marietta College, OSU.
Contact Ohio Lake Management Society's Lake Keepers to explore their participation in monitoring the Barnesville Reservoirs	Village Administrator Barnesville PWS Operator / staff or delegate.	2017	
Improve, then maintain local monitoring of Hazardous Algal Blooms (HABs) in all 3 village reservoirs.	Barnesville PWS Operator/staff.	2016	

Source Water Protection Plan - Village of Barnesville

Purpose

The goal of this document is to summarize strategies that are ongoing and/or will be pursued in the future to minimize the threats of contamination or water shortage to all three of Barnesville's Reservoirs. The reservoirs are the source of drinking water for the communities of Barnesville, Quaker City and Switzerland of Ohio. Although the Barnesville water treatment plant 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 Protection Plan, the Village of Barnesville acknowledges that implementing measures to prevent spills and releases into Barnesville's Reservoirs (and contributing tributaries) can be a relatively economical way to help ensure the safety of the communities' drinking water, while also improving stream and lake 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, to washing, to cooling for industry and power stations, to moving wastewater away from populated areas and above all, to drinking. In addition to being a basic necessity of life, clean, affordable water can be an important economic driver. Many manufacturing plants use significant amounts of water and can even decide plant locations based on the availability of quality water. Clean water, provided at a reasonable cost, can attract new business and residents, which helps 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 entire financial reserves can be wiped out. Contamination also disrupts lives and businesses, creating a negative economic effect for the local community. Most importantly, when drinking water is contaminated, the health of families and fellow citizens is put at risk.

Because it only takes one major event to drastically change the quality of your water source, it is critical to plan ahead. Protection planning can prevent a future 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 Barnesville 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 created by the 1986 amendments to the federal Safe Drinking Water Act. These amendments required states to administer a source water protection program for their systems using ground water.

In 1996, the Safe Drinking Water Act was amended again. Section 1453 was added, providing states with the necessary federal funding to complete source water assessments for their public water systems. At that time, 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.

This plan was drafted by Ohio EPA and the Barnesville Village Administrator, in consultation with the mayor and village council. It documents commitments by the Village of Barnesville to implement ongoing efforts to protect the village's sources of drinking water. These commitments were developed from 2014-2016 by a 'source water protection planning team' working closely with various agency and industry consultants (listed below):

Name	***Organization***
Bob Smith	Barnesville Fire Dept.
Dave Ivan	Belmont Co. EMA
Rich Sidwell	Captina Conservancy
John Morgan	Concerned Barnesville Area Residents
Roger Deal	Village Administrator
Becky Horne	Belmont Co. EMA
Les Tickhill	Barnesville Council
Tim McKelvey	Barnesville Council
Ron Preston	Captina Conservancy
Scott Gallagher	Barnesville Council
Daniel Lima	OSU Extension Office, Belmont Co.
Michael Freeman	BC Health Dept
Tim Hall	BC Health Dept.
Kimberly Brewster	Belmont Co. Soil & Water Cons. District
Gary Billman	Barnesville Water
Kirt Sloan	Antero Resources
Amanda Fernley	Antero Resources

Aaron Goddard	Antero Resources
Jason Schmidle	Antero Resources
Cody Chestnut	Antero Resources
Mike Wise	Gulfport Energy
Doug Schrantz	Gulfport Energy
Marc Mathes	Gulfport Energy
Peter Dombroski	Gulfport Energy
Ryan Dean	American Energy Partners
Doug Prodoahl	American Energy Partners
Anthony Carson	ODNR – Div. OGRM
Trevor Irwin	Ohio EPA, DERR-ER
Taylor Carpenter	Ohio EPA, DDAGW
Steve Saines	Ohio EPA, SW Protection Program
Barb Lubberger	Ohio EPA, SW Protection Program

Public Water System Description

The Village of Barnesville operates a community public water system directly serving a population of approximately 6,500 people. The Barnesville water system also serves two satellite systems with finished water: Switzerland of Ohio (population ~ 2,500) and Quaker City (population ~ 875). The current combined population served by the Barnesville water system is approximately 9,875. The surface waters used by the Barnesville system include Barnesville Reservoir #1, Barnesville Reservoir #2, and Barnesville Reservoir #3 (also known as the Slope Creek Reservoir). The treatment capacity of the Village of Barnesville water plant is approximately 2.5 million gallons per day. Normal production and average usage is about 1.1 million gallons per day. Estimated raw water storage is approximately 885 million gallons; possibly 840 million gallons of that total storage can be withdrawn by the water system for public use. This storage capacity will allow for 976 days (2.67 years) of un-interrupted use by Barnesville customers prior to depletion. Estimated “treated” water storage is 1.3 million gallons (based on storage tank capacities of 770,000 gallons and 550,000 gallons). The storage alone allows for 1.2 days of normal consumption by the system.

Reservoir #1 is the village’s primary water source and holds approximately 90 million gallons, of which 85 million gallons are useable, and covers 24.7 acres. Reservoir #1 has 7,880 feet of shoreline, part of which is on the water plant property. It was constructed in the 1960s and is created by an earthen dam approximately 480 feet long and 42 feet high. It has a standard concrete spillway. Barnesville maintains two intakes at Reservoir #1, one located six feet below the surface under normal pool conditions, and one fifteen feet below the normal pool conditions. Each intake has its own valve, but under normal conditions both intakes are typically open simultaneously. The reservoir is fed by drainage of the surrounding area and unnamed tributaries that are

headwaters to the branches of the North Fork of Captina Creek. The drainage area for the reservoir is approximately 518 acres. The Village of Barnesville owns approximately 110 acres around Reservoir #1, and the nearest private property boundary is approximately 300 feet from the lake.

Reservoir #2 has an earthen dam and was constructed in the early 1900s. The dam is approximately 430 feet in length and 48 feet high. It has a standard concrete spillway. The reservoir covers approximately 12.8 acres and contains approximately 45 million gallons of water, of which approximately 30 million gallons are useable. The shoreline of Reservoir #2 is approximately 5,300 feet in total length. There is one intake structure located 90 feet from shore. It is concrete with three draw ports, located at depths of approximately 12 feet, 24 feet, and 36 feet below the lake surface. All ports are operational, but typically only the upper two ports are open. The reservoir is fed by drainage of the surrounding area and unnamed tributaries that are headwaters to the branches of the North Fork of Captina Creek. The drainage area for the reservoir is approximately 322 acres. The Village owns approximately 50 acres around Reservoir #2, and the nearest private property boundary is approximately 100 feet from the lake.

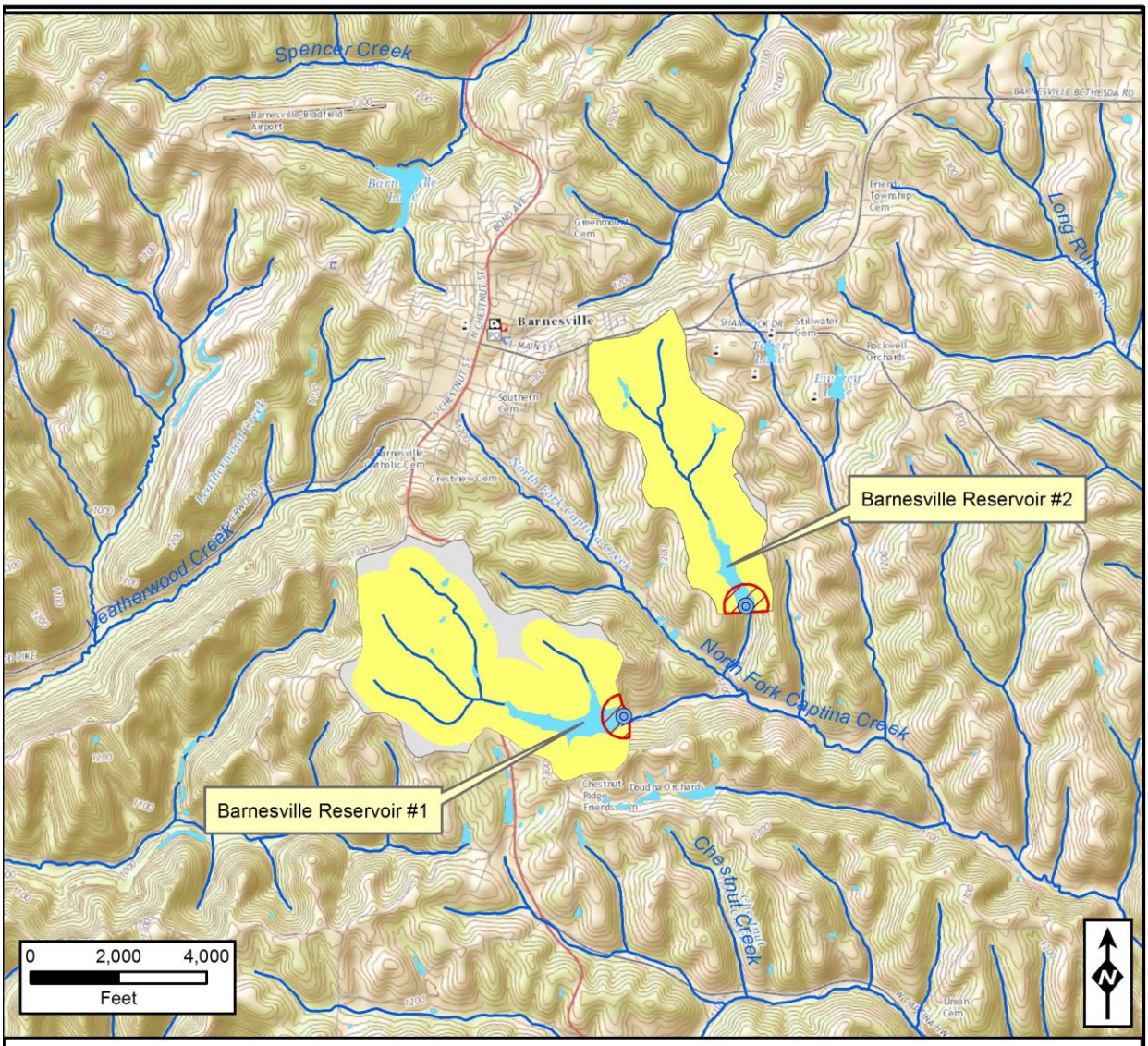
Reservoir #3 (also known as Slope Creek Reservoir) is the secondary source of drinking water for the Village. Slope Creek Reservoir was created in 1964 for flood control and water storage for Barnesville by damming Slope Creek north of Miller Run. Reservoir #3 is used directly by the treatment plant 40 percent of the time and feeds Reservoir #1 the remainder of the time. This reservoir covers approximately 93.2 acres and contains roughly 750 million gallons restrained by an earthen dam approximately 525 feet long by 77 feet high, with a morning glory spillway. The useable volume is estimated at 650 to 700 million gallons. The reservoir is fed by drainage of the surrounding area and unnamed tributaries that are headwaters to the branches of Slope Creek, a tributary in the South Fork Captina Creek watershed. The drainage area for the reservoir is approximately 3,657 acres. Reservoir #3 has approximately 27,100 feet of shoreline. There is one intake structure located 75 feet from shore and is concrete with five draw ports. The ports are located at eight to ten foot intervals from five feet below the surface to approximately twelve feet from the bottom. They are exercised yearly and all ports are operational. It takes approximately one half to three quarters of an hour for water to be transferred from the Slope Creek water intake to the treatment plant. Water can also be pumped from Slope Creek reservoir to Reservoir #1. The Village owns approximately 650 acres around Reservoir #3, and the nearest private property is approximately 90 feet from the lake.

Description of Source Water Area

Barnesville's reservoirs lie within the Western Allegheny Plateau ecoregion. This ecoregion is described as rolling glacial plateau underlain predominantly by sandstone and siltstone, with some shale and limestone. The land use in the area is primarily agricultural or woodland. Barnesville Reservoirs #1 and #2 lie within the North Fork Captina Creek watershed, while Reservoir #3 lies within the South Fork Captina Creek watershed.

The soils surrounding the area are predominantly Westmoreland-Dekalb-Lowell and Westmoreland-Culleoka-Zanesville associations. They are described as gently sloping to moderately steep, well-drained, deep to moderately deep soils. The areas surrounding the reservoirs are principally Lowell-Westmoreland silt loam soils, brown to yellowish-brown, with slow to moderate permeability. Organic matter ranges from one to four percent. Clay content may range from 27 to 55%, and shrink swell potential is low to moderate. Soil pH ranges from 4.5 to 7.8, but tends to be more acidic on average. Sandstone bedrock is typically encountered at approximately 46-50 inches in depth. The soils are well suited to trees and pasture land, as well as agricultural uses in the form of grasses and grain.

The topography ranges from gentle hills to steep slopes throughout the protection areas. The average annual precipitation for the area is 40 to 41 inches, of which 16 to 17 inches becomes surface runoff, and 23 inches have the potential to infiltrate and recharge local aquifers. The average annual temperature of the area is 50 to 52 degrees Fahrenheit.



Legend

- Drinking Water Intake
- Corridor Management Zone
- Emergency Management Zone
- Source Water Protection Area

Drinking Water Source Protection Areas, Reservoirs #1 and #2	Village of Barnesville, PWSID#700011 Belmont County, Somerset/Warren Townships	Ohio Environmental Protection Agency January 29, 2016

Figure 1. Source Protection Areas for Barnesville Reservoirs #1 and #2

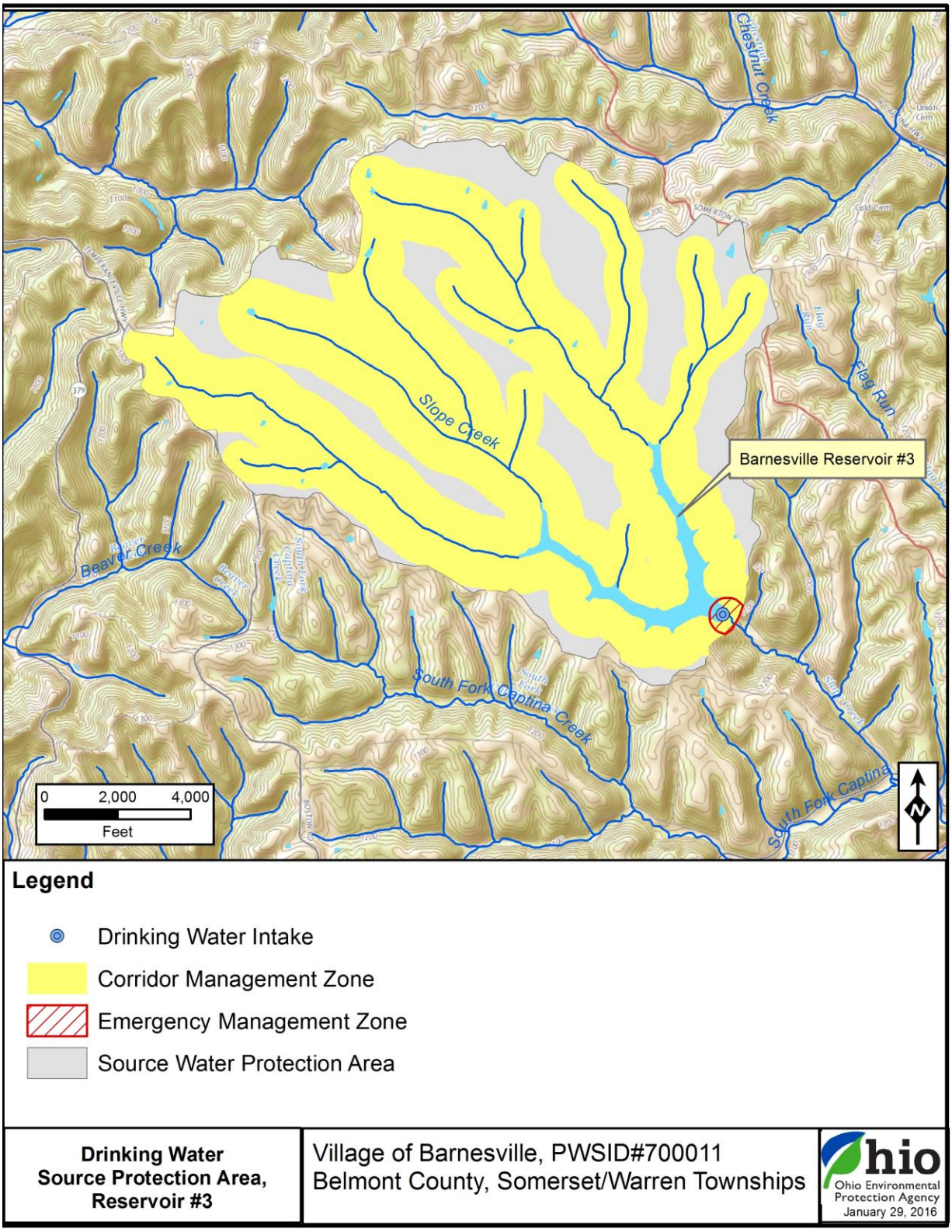


Figure 2. Source Protection Areas for Barnesville Reservoir #3

Source Water Quality

The raw and finished water is analyzed at the Barnesville water treatment plant in compliance with their water treatment permit. For the purposes of the source water assessment program, a water quality impact is defined as a sampling result that exceeds an established concentration of concern. For synthetic organic compounds (SOCs) and volatile organic compounds (VOCs), a concentration of concern is defined as any value at or above the level of detection, since the presence of these compounds usually indicates an anthropogenic source. The primary drinking water standard, or the Maximum Contaminant Level (MCL) for nitrates is 10 mg/l. However, a statewide concentration of concern has been set for the Ohio EPA SWAP program as being 2.0 mg/l. For metals and contaminants other than SOCs, VOCs or nitrates, the concentration of concern is 50 percent of the MCL or Secondary MCL (SMCL) for the contaminant.

The Village of Barnesville water plant samples the raw water from its reservoirs daily for turbidity, pH, alkalinity, and hardness, so that it can optimize the treatment process for current water quality. As required by Ohio EPA, the treatment plant also conducts regular sampling of its treated water and submits the data to Ohio EPA. This includes:

- Inorganics (Every year): Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cyanide, Fluoride, Mercury, Nickel, Selenium, Thallium.
- Synthetic Organic Chemicals (Every year): Alachlor (Lasso), Atrazine, Simazine,.
- Volatile Organic Chemicals (Every year)
- Nitrate (Monthly); Nitrite (not required)
- Lead & Copper (20/3 years)
- HaloAcetic Acids & Trihalomethanes (Quarterly)
- Total Carbon & Alkalinity (not required)
- Total Coliform (7/Month)
- Total Chlorine (7/Month)

Table 1 includes a summary of the sample results from 2000 to 2016 for finished water as reported by the Village of Barnesville to the Ohio EPA, and the drinking water standards for the contaminants of concern sampled (not all contaminants tested have established MCLs, or SMCLs). The table lists only the contaminants where at least one result was above the level of detection.

Table 1. Barnesville Water Plant Monitoring Results 2000-2016 (Finished/Treated Water)

Contaminant (units)	Levels Found	Primary MCL	Exceeds MCL[1]
Inorganic Contaminants			
Arsenic (ug/l)	<3 - 5	10	No
Fluoride (ug/l)	0.792 – 1.22	4	No
Nitrate (mg/l)	<0.1 – 2.48	10	No
Copper (ug/l)[2]	<10 - 286	1300	No
Lead (ug/l)[2]	<2 - 26	15	Yes
Radioactive Contaminants			
Gross Beta (pCi/l)	<4 – 7.83	4 mrem/yr	No
Volatile Organic Contaminants			
TTHMs(Total Trihalomethanes)(ug/l)	15.8 – 96.4	80	Yes
Bromodichloromethane (ug/l)	2.4 – 11.5	None	NA
Chloroform (ug/l)	9.4 – 83.7	None	NA
Dibromochloromethane (ug/l)	<0.5 – 2.51	None	NA
Dichloroacetic acid (ug/l)	1.0 – 33.2	None	NA
Trichloroacetic acid (ug/l)	<1 - 27	None	NA
Monochloroacetic acid (ug/l)	<2 - 4	None	NA

[1] MCL = Maximum Contaminant Level, set by federal or state drinking water standards. Note, 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, and in the case of copper and lead, must be exceeded by 10% or more of samples for each sampling event.

[2] Copper and lead results are from 2012 and 2015.

Cyanobacteria/Hazardous Algal Blooms

Cyanobacteria (also known as blue-green algae) are algae-like microscopic organisms found naturally in surface water. They form colonies in still waters, such as ponds, lakes and reservoirs, especially in the warm summer months. Under favorable conditions, cyanobacteria can sometimes overproduce to form harmful algal blooms (HABs), which can potentially produce toxins capable of causing illness or irritation -- sometimes even death -- in pets, livestock, and humans. In addition to producing toxins, cyanobacteria can pose other treatment challenges for public water systems, including taste and odor issues and shortened filter run times. Moreover, chemicals that are utilized to prevent the formation of HABs, such as copper sulfate and potassium permanganate, can cause an existing bloom to die off rapidly, releasing high concentrations of toxins into the water.

HABs formation is exacerbated by (1) calm water, (2) abundant sunlight, (3) warm water, and, (4) nutrients such as nitrate and dissolved phosphorus, which are present in fertilizers, septic discharges and manure. The best treatment methods for removing HAB-produced toxins are still under investigation. Currently, powdered activated carbon is commonly used to remove toxins, but this is expensive. The standard nonchemical methods for preventing HABs formation include agitating the water and preventing runoff containing fertilizers from entering the surface water—which is a main goal of source water protection.

On various dates in October and November 2015, samples were collected from various locations at the surface of each of the three Barnesville reservoirs, as well as from finished water at the water treatment plant. Only one sample showed a detection of HAB-produced toxins: microcystin was detected at 12 ug/l in a sample from Reservoir #1 on October 8, 2015. All other samples were non-detect for toxins. Finished water at the water treatment plant has never had a detection of HAB-produced toxins. Raw water HAB sampling has continued into calendar year 2016 as per new OEPA rules.

Biological and Chemical Monitoring

In 2008 and 2009, twelve streams in the Captina Creek watershed, located in Southern Belmont and northern Monroe counties, were evaluated for aquatic life and recreation use potential. Water quality throughout the watershed has been consistently good despite historic and active coal mining. The limestone geology of the area has buffered acidic contributions and has kept the pH levels in the range acceptable for supporting aquatic life. The Captina Creek mainstem sites sampled during 2008 and 2009 attained the Exceptional Warmwater Habitat (EWH) biocriterion at all 11 sites evaluated. The exceptional biological integrity of the fish and macroinvertebrate community in Captina Creek is comparable to several of the best streams in Ohio, including Big Darby Creek and the Kokosing River. The only sampling site showing impairment in the vicinity of Barnesville's reservoirs was located in the North Fork Captina Creek, downstream from the Barnesville WWTP. Elevated nutrients were found at this location. However, the fish and macroinvertebrate communities in the stream still met Warm Water Habitat (WWH) conditions, and could potentially meet Exceptional Warmwater Habitat (EWH) if nutrient loads were significantly reduced.

Summary

All the available data indicate that water quality in the Barnesville Reservoirs is good for all drinking water uses.

Identification of Local Source Water Concerns

Area of Focus

The formal area of focus for the Barnesville source water protection plan is the Corridor Management Zone (CMZ), delineated for the three Barnesville reservoirs by Ohio EPA. However, since there is little difference in area between the delineated CMZ and each reservoir's watershed boundaries, reference to the watershed boundaries will be used interchangeably with the CMZ in this Protection Plan as the "protection area".

Potential Contaminant Source Inventory

In 2003, while developing a source water assessment report for the Village of Barnesville, Ohio EPA staff identified several minor potential sources of contamination within the reservoir watersheds. These were agricultural fields, rural septic systems and local roads. The inventory of contaminant sources at that time did not include the growing number of oil and gas wells and related infrastructure, which are becoming a more numerous type of potential contaminant source.

Prioritization of Potential Contaminant Sources

Oil and Gas Production: The potential threats posed by oil and gas development in and around the village's watersheds are primarily those caused by industrial scale handling of harmful/hazardous materials and the risk of leakage from well bore / pipeline integrity. Most of the oil and gas companies active in the Barnesville area are targeting the Utica Shale / Point Pleasant Formation for production. This petroleum bearing unit is approximately 8500 feet below ground surface and is accessed via horizontal extraction lines within the formation. These wells are most often constructed on flat, lined, well pad surfaces (~ 5 acres), with perimeter berms. Accidents, spills or blowouts rarely occur, but when they do, the well pad is designed to capture the liquid releases.

As of May, 2016, no shale gas well pads have been located within the Barnesville Reservoir watersheds. However, several well pads are located near the watersheds, and 7 horizontal legs from 4 different well pads penetrate the protection area in the subsurface near Reservoir #3 (see Figure 3). Belmont County has approximately 530 active oil/gas wells as of February, 2016. Although the growth in the number of new shale gas wells slowed in 2015/2016, the Utica play is expected to continue to grow and produce petroleum product for at least two decades. Regional gas and oil production may bring new transportation routes, pipelines, railways, cracker plants and basic industries to the region, all of which increase the probability of accidents and/or spills within the reservoir watersheds.

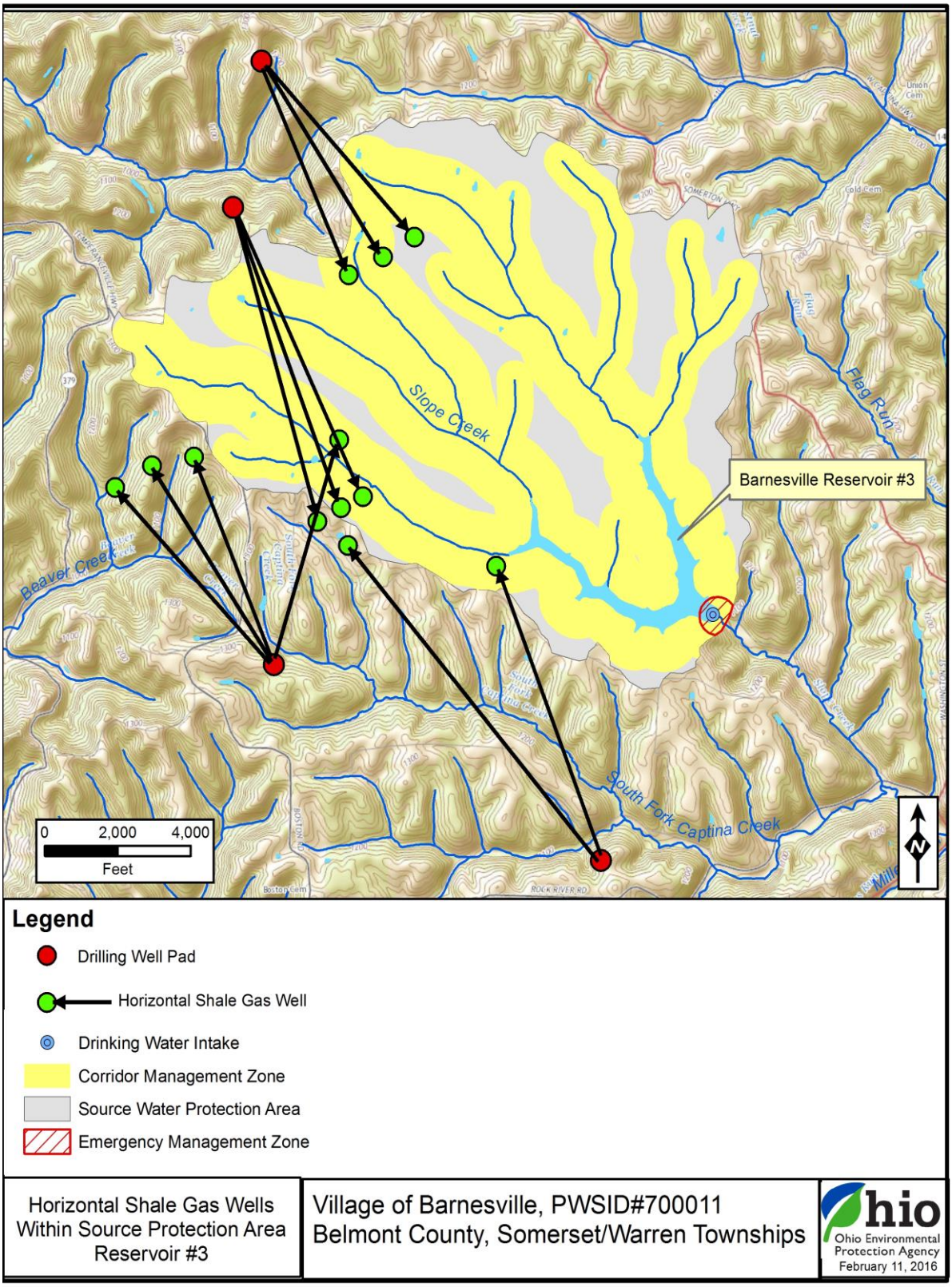


Figure 3. Horizontal Shale Gas Wells Within Source Protection Area, Reservoir #3

Oil/Gas Pipelines: It is expected that additional oil/gas pipelines will be completed in Belmont County in the future, although none are currently proposed within the reservoir watersheds. Ruptures of these pipelines are possibly a greater concern than accidents at well pads, because a great deal of product can be released before the problem is recognized and located. Major failures of pipelines are often due to corrosion related to age, which should not be a problem for newly installed pipelines, but could become a problem for the more distant future. The main cause of breaks in newly installed pipelines is accidental damage from earth-moving equipment (contractors installing other types of infrastructure, farmers installing drainage tiles, etc.) and from naturally-occurring earth movement such as landslides or slumps. If any pipelines are proposed in the future, Barnesville will consider modifying this protection plan to address construction and operational concerns related to the new pipeline.

Oil/Gas Wastewater. In addition to oil and gas products, the industry will need to transport wastes, including the brines that are often extracted following the hydraulic fracturing operation of horizontal (and older vertical) wells. The amount of brine produced during horizontal fracturing is substantial, because 2 to 5 million gallons of water is typically pumped down into the well during the “frack”; of this amount, about 25% returns to the surface laden with extremely high dissolved solids, entrained hydrocarbons, low level radioactivity and metals. According to Ohio rules, this wastewater may be stored for no more than a week at the site in tankers. Then, it must be transported to an injection well for disposal. Pipeline transport and/or truck traffic of the (frack waste) brine is a common activity. These activities pose a threat to all water in the area of Barnesville’s Reservoirs in the event of an accidental release.

State Route 800: The potential for contamination of the village's Reservoir #1 from traffic accidents along Rte. 800 (which is heavily used by oil and gas truck traffic in Belmont and Monroe Counties) is significant. As a case in point, in March 2016 a tanker carrying brine fluids overturned along Rte. 800 and released the fluids into a stream that flows into Reservoir #1 (See Figure 4). The incident continues to be evaluated for water quality impacts to the village’s water supply. The village had already taken protective engineering actions to prepare for such an eventuality near the location of the incident, a hilly curve 1-2 miles south of Barnesville, but the brine truck overturned on the west side of the road, instead of the east, where the emergency impoundment was constructed. By the time emergency management arrived on the scene, the excess brine spilled from the truck had traveled to Reservoir #1. Brine contaminated soil was removed from the scene to prevent further contamination to the reservoir.

Agricultural Activities: Threats posed by agriculture in the watersheds include agricultural runoff, manure handling, and agricultural chemicals. It appears that a change in nutrient influx to Reservoir #1 may have been responsible for the brief flare-up of HABs in this reservoir in late 2015. The low percentage of acreage used for agriculture within the reservoir watersheds lowers the chance of water quality impacts from this activity.

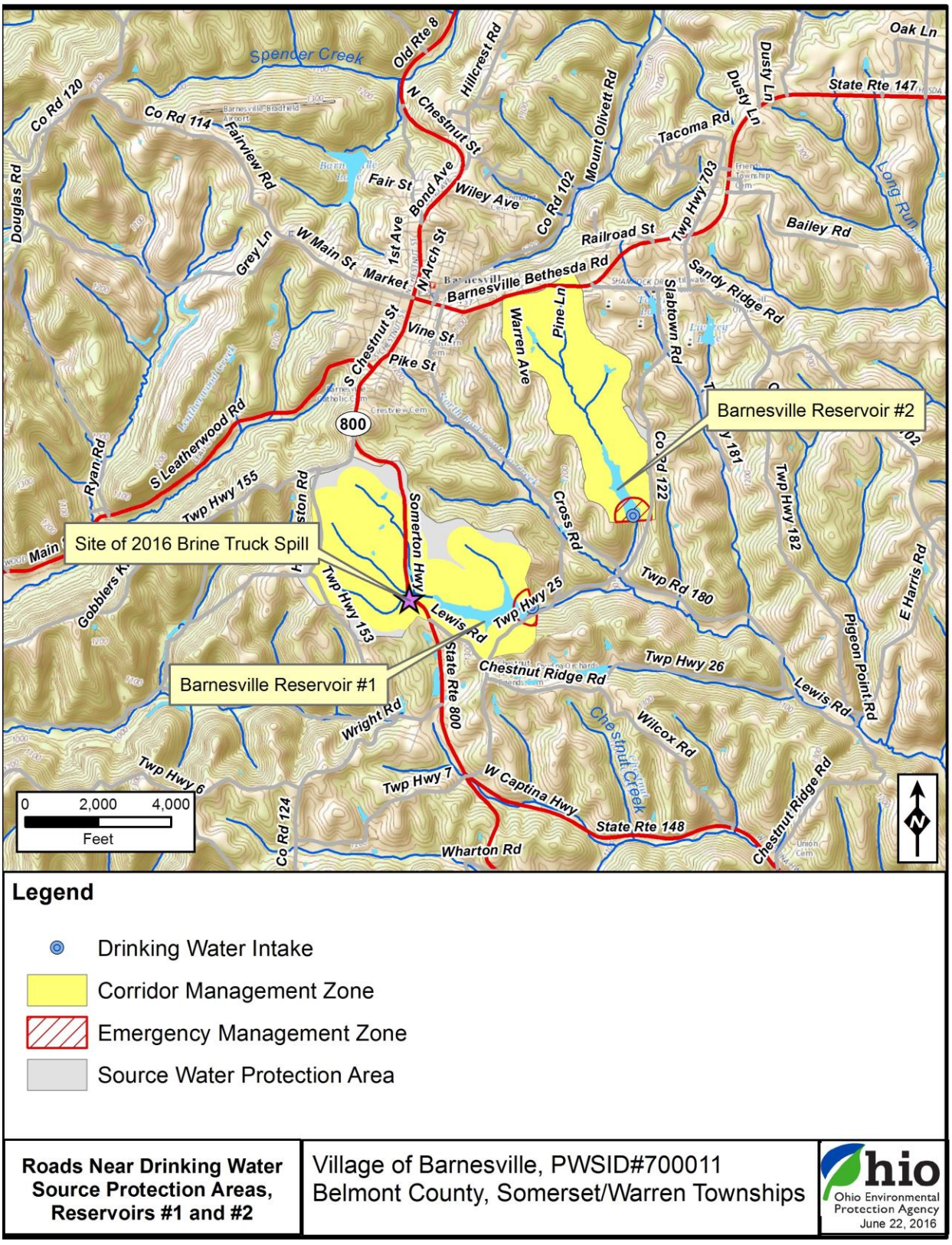


Figure 4. Location of brine spill near Barnesville Reservoirs #1 and #2, March 2016

Septic System Discharges: Discharges from septic systems within the reservoir watersheds have a potential to negatively impact the local water quality, particularly in the introduction of fecal coliform bacteria. Based on the relatively low population density in the reservoir watershed area, this is considered to be a lower priority threat.

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

Source water protection efforts for the Village of Barnesville will focus on mitigating the potential for contamination associated with oil and gas development, transportation accidents, agricultural runoff and septic system discharges.

Oil and Gas Production: The potential threats posed by oil and gas development in and around the village's drinking water reservoirs are primarily those caused by industrial scale materials handling. Knowledge about location and early warning are vital to mitigating the impact from a spill or accident. The village will maintain a simple database of the locations of active drill sites within or directly adjacent to their reservoir watershed areas. This database will be easily accessible to village administrative and water department personnel. The village will also maintain a map of the locations of any proposed pipelines within the reservoir watersheds, to the extent that it is possible to do so. The database and map should be updated quarterly using ODNR, FracTracker or other reputable resources. Above all, the Village will maintain current contact information with those who would respond to any emergencies involving oil and gas releases or traffic accidents within the reservoir watersheds. The contact information is kept in the Facility Contingency Plan, which is updated annually.

Transportation Routes: To mitigate the threats to water quality posed by traffic accidents, particularly along Route 800, the village will exercise its emergency response plan on a regular basis with the LEPC and other interested organizations. The village will also contact ODOT to secure source water protection signage, and permission to post signage along State Route 800, south of town. In addition to state route signage, the village will determine if additional local routes could benefit from source water protection signage. These areas will be posted by the village in consultation with local township authorities.

The village will regularly request that all local and county first responders report any spills within the reservoir watersheds to the village administration and water department immediately, so that mitigation efforts can begin as soon as possible.

Agricultural Activities: The Belmont County Soil and Water Conservation District (SWCD) staff, OSU Extension staff, and Natural Resources Conservation District staff will be providing education to local farmers on the use of best management practices to reduce agricultural and/or animal feedlot runoff, the use of proper manure handling facilities, proper handling and road safety with agricultural chemicals, and other methods to control or reduce impacts to surface waters. Specifically, farmers will be encouraged to:

- optimize application of fertilizers (that is, apply no more than the crops can use at any given time);
- fence livestock away from streams;
- leave riparian buffers around streams—identified as the greatest need; and
- cultivate cover crops such as winter wheat and rye during the winter months. These crops reduce runoff from fields that would otherwise be barren during the winter months; also, their roots hold nutrients in the soil that otherwise would tend to leach into shallow ground water, which generally flows into the nearest surface water bodies (streams that feed the Barnesville Reservoirs)

In addition, any program to spray herbicides or pesticides within the reservoir watersheds, whether for foliage control along utility right of ways or crops, will be reviewed by the village and or these local agriculture consultants (listed above). The Ohio Department of Agriculture can assist, if necessary.

Septic System Discharges: The Belmont County Health Department will be providing education and inspection services targeted at residents within the watersheds of the Barnesville Reservoirs. Residents will also be informed about the risks posed by malfunctioning septic systems via a customized Barnesville brochure identifying the location of the village's reservoir watersheds. The brochure can be made available on the village's website. It can also be sent out with the annual CCR, and/or made available at local community events.

Drinking Water Shortage/Emergency Response

Drinking Water Shortage – Short-Term Loss of Source

It is uncertain what might cause a short term loss of water for the Barnesville system in the future. If one of the reservoirs is contaminated by a spill of a potentially toxic material, Barnesville can isolate that reservoir and draw raw water from the two remaining reservoirs while cleanup or spill mitigation occurs at the impacted reservoir. This was what occurred during the March 2016 truck brine spill along SR 800, which forced the village to isolate reservoir 1 while environmental sampling took place. If one of the reservoirs experiences an influx of nutrients, and algae growth becomes problematic, again, this impacted reservoir can be isolated while Barnesville draws from its two remaining reservoirs while cleanup or algae mitigation occurs. Drought is also a possibility, reducing recharge to the reservoirs substantially.

In the event that any of the above scenarios occur, Barnesville has the ability to draw some water from the Belmont County system through its connection with the village of

Bethesda. Although the volume and pressure needed by Barnesville would probably be substandard if all the reservoirs were contaminated, the connection would none-the-less ease short term source water loss that may occur within the Barnesville system.

Drinking Water Shortage – Long-Term Loss of Source
In the unlikely event of a long-term loss (many months or years) of the use of Barnesville's three reservoirs, the village would most likely:

- Establish a direct, permanent connection with the county water system. Although this system does not currently have sufficient capacity to expand into Barnesville, additional sources along the Ohio River could be developed over the long term.

Other, less satisfactory, options would be:

- Re-build, rehabilitate or site additional reservoirs in the area.
- Construct ground water production wells, if sufficient quantity and acceptable quality could be located from the area's subsurface bedrock units.

Funding for Water Emergencies

The Village of Barnesville budget allows funding for water supply emergencies. The Village Administrator is authorized to spend up to $25,000 after which the Village Council must authorize funding for emergency expenditures.

Planning for the Future

A. Current average finished water use = 800,000 gallons per day (2016)
B. Current daily rated system design capacity = 2.5 million gallons per day (2014)
C. Capacity of all Barnesville Reservoirs far exceeds the system design capacity.

Barnesville is currently using only 32% of its rated design capacity, and the capacity available from Barnesville's Reservoirs far exceeds the system's design capacity.

Census figures indicate that the village has maintained a population between 4,000 and 5,000, with a slight downward trend over the past 30 years. However, the village and surrounding area is experiencing some recent growth in population due to shale gas development in the area. This may result in a modest population increase for the village and surrounding area for an unknown duration of time. For the village of Barnesville, water usage has tripled over the past 50 years. Some of this increase was due to an expansion of the village's service area (to Quaker City, Bethesda and Switzerland of Ohio). However, based on the size of Barnesville's reservoirs, capacity is not considered to be a limiting issue for meeting customer needs. Recent sales of raw water to oil and gas companies (for use when hydraulically fracturing new horizontal wells) has introduced the possibility of expanding Barnesville's raw water capacity to meet this temporal oil and gas demand.

Emergency Response - Contamination of one of Barnesville's Reservoirs

The primary threat to Barnesville's reservoirs is a release or spill from truck traffic driving through the reservoir watersheds. Heavy truck traffic has increased considerably over the past several years as oil and gas development has accelerated in the area. Area roads (especially SR 800) are hilly and sinuous, and not designed for heavy truck use. If a chemical spill or release occurs, notify your local emergency responders immediately. Then, follow the directions below:

Accidental Chemical Spill/Release within Protection Area / Reservoir Watershed

1. Determine the following information:
   a. Who made the first observation? What is their phone number and location?
   b. When did it happen?
   c. What was spilled?
   d. Where is it? (How long before it would reach the intake?)
   e. Has the spill been reported to Ohio EPA? (1-800-282-9378)
   f. Has the fire department or hazardous materials response team been notified?

2. If no notifications have been made, immediately contact emergency personnel and Agencies (i.e., fire department, Ohio EPA, etc.).

3. Contact the following personnel and village officials:

   - Roger Deal, Village Administrator, (W) 740-425-1880 (c) 740-238-1198
   - Doug Frye, Water Superintendent, (W) 740-425-1681 (c) 740-238-9535
   - Dale Bunting, Mayor, (W) 740-619-0279 (c) 740-238-1283
   - Bob Smith, Fire Chief, (W) 740-425-3054 (c) 740-238-0895

4. If it is safe to do so, visit the scene to make contact with on-scene personnel and agencies.

5. Complete the following as soon as possible.
   a. Perform a physical check on the pumping stations and their structural integrity.
   b. If it is determined that contamination did occur, immediately shut down all raw water pumping.
   c. Proper precautions must be taken during sampling to prevent exposure to the contaminant.
   d. If the system needs to be temporarily shut down as a result of the spill, the procedures can be found in the treatment plant's contingency plan.

6. Once raw water pumping has been turned off, obtain the following information:
   a. Who is responsible for the cleanup? Get phone numbers and other contact information

b. What contractors or consultants have been sent by the responsible party?
c. What actions have they taken?
d. How long is clean-up expected to take?

7. Follow up with the on-scene responders and contractors to determine if additional long-term actions (such as additional raw water monitoring) are required or recommended. If so, determine
a. What kind of monitoring is needed, at what frequency?
b. What levels will trigger return to normal operations?
c. What kind of additional treatment may be needed?

Public Education and Outreach

Brochure: The village will produce a brochure based on OEPA templates. The brochure will be posted on the village website, made available at village and water department offices, and taken to village sponsored events. It may be mailed to customers at their request, similar to the village's annual CCR policy.

SWEET Team. Belmont County has a Source Water Environmental Education Team (SWEET), consisting of members of the SWCD who are trained to use a "sand-tank model" and an Enviro-scape model (Figure 5) as visual tools for training audiences about ground water flow and surface water flow, respectively. Barnesville will contact Nick Paliswast at Belmont County SWCD (740-526-0027) who has agreed to assign staff to give presentations at various community events / festivals (see below).

Festivals. Brochures with information about Barnesville' source water protection program will be made available at Village sponsored community events. Also, the Source Water Environmental Education Teams (SWEETs) at Belmont County will be invited to conduct presentations with their educational displays, the ground water flow sand tank and the Enviro-scape models.

Agronomy Day. OSU Extension holds irregularly scheduled "Agronomy Days", organized similar to its pesticide application workshops, to provide education on how to reduce the need for fertilizers. The Village plans to participate when it is held.

Figure 5. An Enviro-scape model (shown above) is an engaging tool that illustrates how surface water can become contaminated by human activities.

Water Quality Monitoring

The Village of Barnesville water plant samples the raw water from its reservoirs daily for pH, alkalinity, turbidity, etc., so that it can optimize the treatment process for its current water quality. However, above and beyond Barnesville's required sampling program, in 2014, the Barnesville public water system initiated a new, Background Surface Water Monitoring Plan (SWMP) to assess the baseline (background) geochemistry of its three reservoirs. This Background SWMP will add chemical parameters to the list the Barnesville PWS currently samples as part of its requirements as a public water supplier under state law. The new Background SWMP will increase the frequency of sampling for many of the new parameters for the first few years of the program, as shown in Table 2. After the first 2 years, a gradual decrease in sampling frequency is recommended for the long term. This allows Barnesville to obtain a statistically valid database of background parameters in the short term. In the event that a spill or release occurs after this database obtains at least 8 background samples, a statistically valid comparison between pre-spill and post spill water can be calculated in order to assess the impact of the release on the raw water.

Table 2. Barnesville Background Surface Water Monitoring Plan

Parameter	Frequency	Methodology
Field Parameters: Conductivity & pH	Monthly for years 1 & 2; Quarterly for years 2-5.	In-house lab & Private Laboratory
Water Quality Indicator: Alkalinity, Radiologicals & E. Coli	Monthly for years 1 & 2; Quarterly for years 2-5.	In-house lab & Private Laboratory
Inorganic Parameters: Chloride, Total Dissolved Solids (TDS), Sulfate, Calcium, Magnesium, Sodium, Potassium, Barium, Strontium, Nitrates, Phosphorous.	Monthly for years 1 & 2; Quarterly for years 2-5.	Private Laboratory
Organic Parameters: BTEX *BTEX (Benzene, Toluene, Ethyl benzene & Xylene) & Methane (dissolved)*	Monthly for year 1 & 2; Annually for years 2-5.	Private Laboratory

As per the recommendations of the Water Quality Monitoring Subcommittee, the monitoring instructions are as follows:

Sample Locations: Collect one representative sample, each, from Reservoirs #1 and #2. Three samples should be collected for the Slope Creek Reservoir #3 – one from the main body of the reservoir and one each from the headwaters of each finger/tributary that enters the reservoir.

Ground Water Monitoring: Working with Belmont County Health Department, determine how many drinking water wells exist within each reservoir's watershed boundaries. Obtain permission to sample a private water supply well within each reservoir's watershed, quarterly, for two years, for the parameters listed above. However, for the Slope Creek Reservoir, select two private wells (one in each sub-watershed [finger] of the main watershed).

Also, conduct a one-time analysis of 2-3 wells within each reservoir's watershed. This analysis will be comprehensive, including Tier 1, Tier 2 and Tier 3 parameters, as well as all those for which Barnesville must sample for Ohio EPA.

Data Analysis: The data collected from this sampling effort should be stored by the village. If possible, a village employee, volunteer or consultant can enter the analytical results into a database (or spreadsheet) and calculate the baseline statistics for each monitoring location. Future measurements can then be compared to statistical triggers, allowing Barnesville to be a front line monitor of its reservoir's drinking water quality.

Other Monitoring Programs

In addition to the monitoring of chemical parameters conducted by Barnesville, it is possible that a number of other agencies could collect water quality data from one or more of Barnesville's reservoirs. Contacting the Ohio Lake Management Society's Lake Keepers group to see if they might collect data on turbidity, water color, water temperature, and dissolved oxygen may be done. This group might also collect less frequent data on chlorophyll, nitrogen and phosphorus, and more recently, they have begun collecting information on cyanotoxins related to hazardous algal blooms. Ohio EPA's Division of Surface Water routinely collects water quality data from the tributaries of Ohio Lakes at least once every 15 years. Please contact the Southeast District Office in Logan (740-385-8501) to find out when/if these tributaries / reservoirs are on a future sampling schedule.

Updating the Plan

A Source Water 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 anticipate and incorporate these and other events.

The Village of Barnesville commits to reviewing the Drinking Water Source Protection Plan every year until 2020, when it may reduce its reviewing frequency to be every other year.

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 flow into each of the reservoirs?

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, Barnesville will update the inventory or conduct a new inventory. Barnesville may contact Ohio EPA's Source Water Protection staff in the district office for guidance or assistance in conducting the inventory.

Other
Is the list of Protection Team members and contact numbers current?

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, Barnesville 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 ordinance?

Pollution Source Control Strategies

- Have we followed our own schedule of implementation/timeline (Implementation Plan, pages 3 to 7) 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, Barnesville will contact Ohio EPA's Southeast District office for guidance. Also, if the local planning team makes any substantial changes to Barnesville'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.

Appendices

APPENDIX A

Barnesville Source Water Assessment Report

(Revised, June 2016)

APPENDIX B

Village Council Authorizing Resolution

APPENDIX C

SR 800 Catchment Basin Infrastructure
&
Emergency Management Plan

APPENDIX D

American Energy Partners – Utica

St. Clairsville Well Pad Design

APPENDIX E

Barnesville Source Water Protection Brochure

APPENDIX F

Raw Water Sampling Results @

Barnesville Reservoirs 1, 2 & 3

(Collected by Ohio EPA in 2009)

APPENDIX G

Captina Creek Watershed Action Plan

(2014)

Executive Summary and Key Components