Drinking Water Source Assessment for the Village of Wellington

SUMMARY

Source Water Assessment and Protection. The following report for the Village of Wellington was compiled as part of the Source Water Assessment and Protection Program for Ohio. This program is intended to identify drinking water protection areas and provide information on how to reduce the risk of contamination of the waters within those areas. The goal of the program is to ensure the long term availability of abundant and safe drinking water for the present and future citizens of Ohio.

The Safe Drinking Water Act Amendments of 1996 established the national Source Water Assessment and Protection Program, targeting drinking water sources for all public water systems in the United States. A public water system is a facility that provides drinking water to 15 or more service connections or that regularly serves at least 25 people a day for at least 60 days a year, whether from an underground well or spring, or from an above ground stream, lake, or reservoir. The requirement does not address residential wells or cisterns. In Ohio there are approximately 5,800 public water systems.

Background. The Village of Wellington operates a community public water system that serves a population of approximately 4,600 people. The source is surface water taken from the West Branch of Charlemont Creek, a tributary to the West Branch of the Black River. The system's treatment capacity is approximately 1.5 million gallons per day, but current average production is about 0.48 million gallons per day.

Protection Areas. The drinking water source protection area for the surface water source is shown in the following figure. This report includes the results of an inventory of all known or identified potential contaminant sources within the drinking water protection area. The inventory was conducted by Ohio EPA with the assistance of the Mark Rosemark, Superintendent, Village of Wellington Water Plant. Possible threats to the surface water source include agricultural runoff, failing septic systems, oil and gas wells, and numerous road bridges over the streams/rivers.

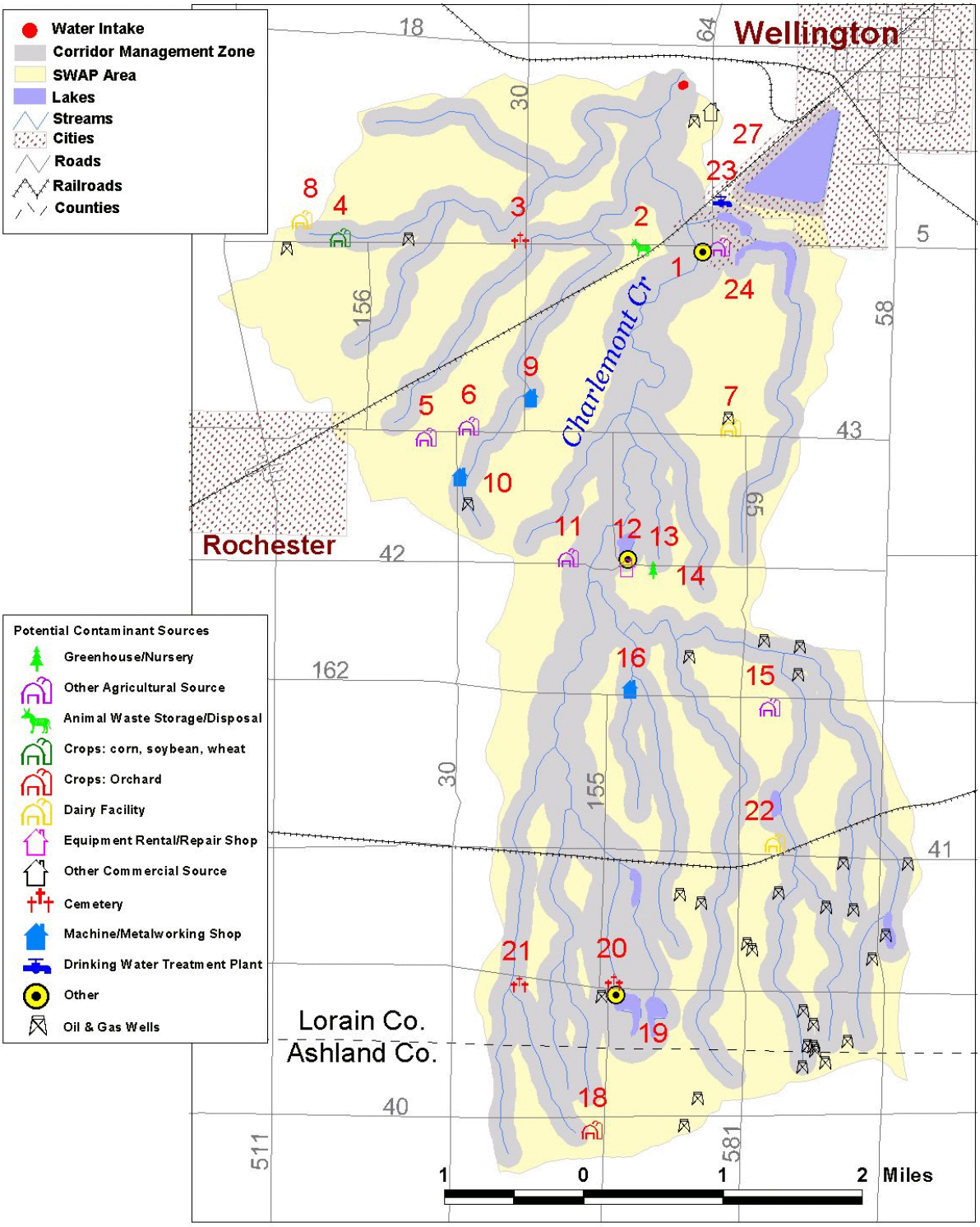
Protective Strategies. The ultimate goal of source water assessment is implementation of protective strategies that will better protect the drinking water source. Strategies for protecting the West Branch of the Charlemont Creek should include controlling home and commercial septic discharges and runoff from agricultural and animal feedlot areas, and coordinating with local emergency response agencies.

The Village of Wellington and other jurisdictions comprising the protection areas are encouraged to develop a local protection plan to protect the source of drinking water or to update current emergency management plans as applicable. Local watershed planning

efforts may also be underway to guide stream restoration and protection activities. These efforts can also serve to benefit the protection of drinking water sources. Guidance on how to form a Drinking Water Protection Team and protection plan is available from Ohio EPA by calling (614) 644-2752.

For More Information. Additional information on protective strategies and how this assessment was completed is included in the detailed Drinking Water Source Assessment Report for the Village of Wellington. For information on how to obtain a copy of this report, please visit Ohio EPA's Source Water Assessment and Protection Program Web page at http://www.epa.state.oh.us/ddagw/pdu/swap.html or contact the Village of Wellington for a copy.

Current information on the quality of the treated water supplied by the Wellington Public Water System is available in the Consumer Confidence Report (CCR) for the Wellington Public Water System. The CCR is distributed annually and reports the most current detected contaminants and any associated health risks from data collected during the past five years. Consumer Confidence Reports are available from the Village of Wellington.



Summary Figure - Drinking Water Source Protection (SWAP) Area for the Village of Wellington

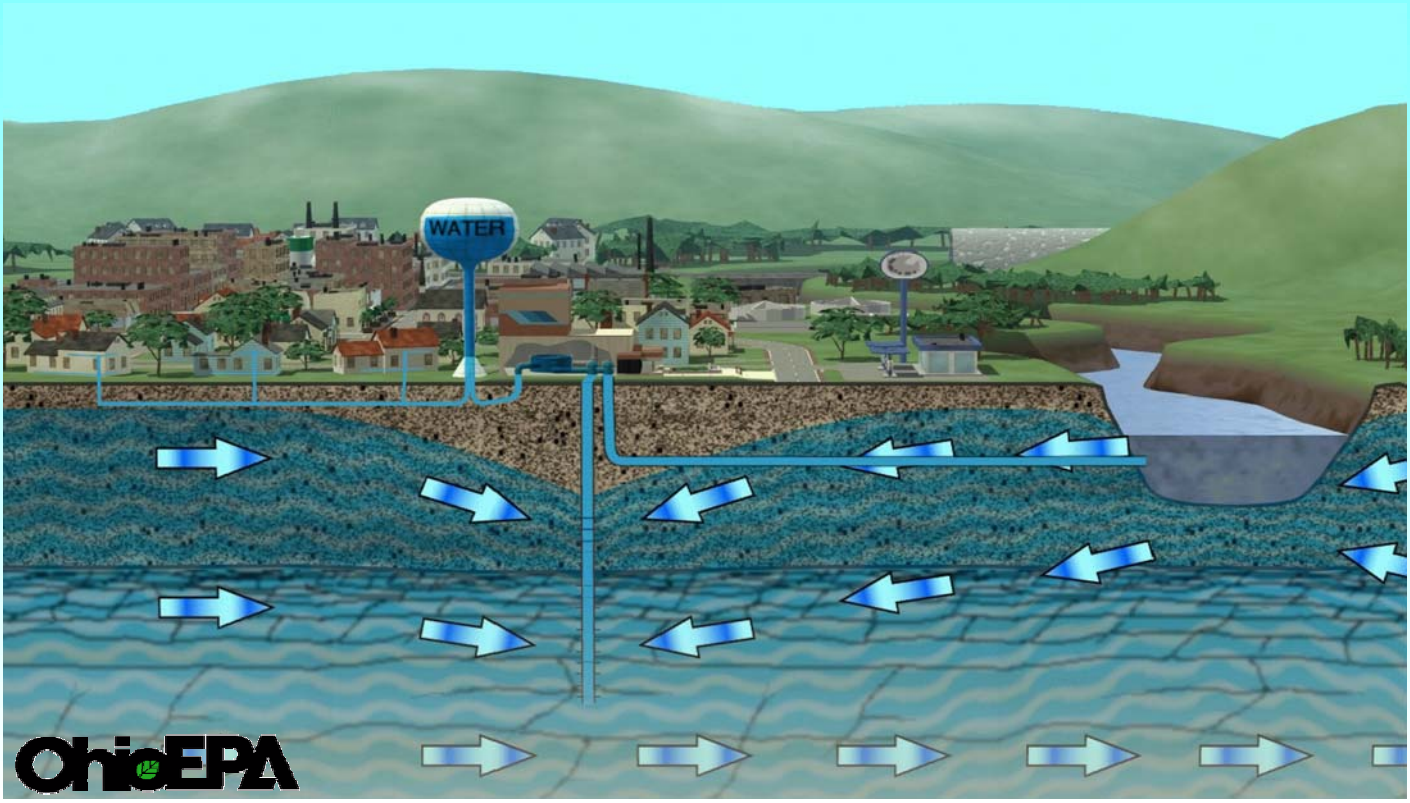
Drinking Water Source Assessment for the Village of Wellington

Public Water System # 4701511

Lorain County

Prepared by:
Ohio Environmental Protection Agency
Division of Surface Water
Division of Drinking and Ground Waters
Northeast District Office

September, 2002



How to Use this Assessment

Clean and safe drinking water is essential to everyone. Protecting the source of drinking water is a wise and cost effective investment. The purpose of this drinking water source assessment is to provide information your community can use to develop a local Drinking Water Protection Program. The Drinking Water Source Assessment benefits your community by providing the following:

A basis for focusing limited resources within the community to protect the drinking water source(s).

The assessment provides your community with information regarding activities within the Drinking Water Source Protection Area that directly affect your water supply source area. It is within this area that a release of contaminants, from a spill or improper usage, may travel through the watershed and reach the surface water intake. By examining where the source waters are most sensitive to contaminants, and where potential contaminants are located, the assessment identifies the potential risks that should be addressed first.

A basis for informed decision-making regarding land use within the community.

The assessment provides your community with a significant amount of information regarding where your drinking water comes from (the source) and what the risks are to the quality of that source. This information allows your community planning authorities to make informed decisions regarding proposed land uses within the protection area that are compatible with both your drinking water resource and the vision of growth embraced by your community.

A start to a comprehensive plan for the watershed and source water area.

This assessment can be the beginning of a comprehensive plan for the water resource, one that addresses all of the uses the water resource provides. An ecologically healthy lake, stream and watershed will provide a stable, high quality resource for drinking water.

For information about developing a local Drinking Water Source Protection Program, please contact the Ohio EPA Division of Drinking and Ground Waters at (614) 644-2752 or visit the Division's web site at http://www.epa.state.oh.us/ddagw/pdu/swap.html**.**

1.0 INTRODUCTION

The 1996 Amendments to the Safe Drinking Water Act established a program for states to assess the drinking water source for all public water systems. The Source Water Assessment and Protection (SWAP) Program is designed to help Ohio's public water systems protect their sources of drinking water from becoming contaminated.

The purpose of this assessment is to identify where and how the Village of Wellington's source waters are at risk of contamination. The report

- identifies the drinking water source protection area,
- examines the characteristics of the watershed and the water quality,
- inventories the potential contaminant sources within that area, and
- discusses the susceptibility of the system to contamination.

Finally, the report suggests actions that the public water supplier and local community may take to reduce the risk of contaminating their source of drinking water and ensure the long term availability of abundant and safe drinking water resources.

Results and recommendations presented in this report are based on the information available at the time of publication. Ohio EPA recognizes that additional information may become available in the future that could be used to more accurately determine the drinking water source protection area. Also, changes in land use may occur after Ohio EPA completes the potential contaminant source inventory. This report should be used as a starting point to develop a plan to protect drinking water resources. Ohio EPA is not responsible or liable for interpretations or decisions based on this report.

This report was prepared by David Stroud, Ohio EPA, Division of Surface Water, Northeast District Office. Steve Tuckerman and Stivo DiFranco provided technical information and assistance.

2.0 PUBLIC WATER SYSTEM DESCRIPTION

The Village of Wellington operates a community public water system that serves a population of approximately 4,600 people through 1,600 service connections. A community public water system is a system that regularly supplies drinking water from its own sources to at least 15 service connections used by year-round residents of the area or regularly serves 25 or more people throughout the entire year. The water treatment plant obtains its water from the West Branch of Charlemont Creek, a tributary to the West Branch of the Black River. The treatment capacity is approximately 1.5 million gallons per day, but current average production is about 0.48 million gallons per day.

The current water treatment plant, a Culligan Multi-Tech Filtration facility, went on line in 1996. Processes include pre-chlorination, coagulation, sedimentation, rapid sand filtration, chemical addition, and post chlorination. The Village maintains an emergency connection with the Rural Lorain County Water Authority and has an emergency

contingency plan in place.

3.0 DRINKING WATER SOURCE PROTECTION AREA

The **Drinking Water Source Protection Area** (protection area) for an inland stream is defined as the drainage area upstream of the point where the water is withdrawn from a surface source such as a stream, lake or reservoir. The protection area is subdivided into corridor and emergency management zones. An illustration of the protection area and corridor management zone for the Village of Wellington Public Water System is shown in Figure 1. The emergency management zone is shown in Figure 2.

The **Corridor Management Zone**, **(CMZ)**, is an area along streams and tributaries within the source water assessment area that warrants delineation, inventory, and management. The Wellington CMZ includes the area within 1,000 feet of each bank of the West Branch of the Charlemont Creek, starting from the intake and extending to the headwaters. The corridor management zone also includes tributaries of the West Branch of the Charlemont Creek. On tributaries the width of the corridor management zone is 500 feet from each bank. The length of the corridor management zone on a tributary is 10 stream miles from the intake. For example, a tributary four miles in length that enters the West Branch of Charlemont Creek six miles upstream of the intake would be completely within the corridor management zone. A tributary stream entering eight miles from the intake would have only two miles of its stream length within the corridor management zone.

The **Emergency Management Zone**, **(EMZ)**, is defined as an area in the immediate vicinity of the surface water intake in which the public water system operator has little or no time to respond to a spill. The boundary of the emergency management zone is delineated in cooperation with the water supplier. Figure 2 shows the boundary of the emergency management zone for the Village of Wellington Public Water System. The corridor and emergency management zones are the focus of field and windshield surveys to inventory potential contaminant sources.

4.0 HYDROLOGIC SETTING

The Black River watershed lies in the Erie/Ontario Lake Plain ecoregion of northeast Ohio. The watershed covers 467 square miles and drains 887 stream miles. The topography of the basin is typical of the ecoregion, being gently rolling and exhibiting local relief of less than 50 feet. Charlemont Creek has a drainage area of 25.19 square miles, an overall length of 11.5 miles, and an average fall of 29.8 feet per mile.

The Village of Wellington obtains its drinking water directly from an upground reservoir that is supplied with water from the West Branch of Charlemont Creek, a tributary to the West Branch of the Black River. Water is pumped from the stream during the winter months (typically January to March) to the 1.5 billion gallon upground reservoir. The drinking water source protection area has a long and narrow shape and a total drainage area of 10.36 square miles (14,325 acres) and has 61.83 miles of perennial streams for

a stream density of 5.96, which is high for this ecoregion. The average annual precipitation for the area is 34.5 inches and the average runoff is 12 inches.

The soils of the Charlemont Creek watershed show the influence of continental glaciation. The soil associations of Mahoning, Trumbull, and Ellsworth silt loams comprise 90% of the soils in the watershed. These glacial till soil associations are classified as somewhat poorly drained to moderately well drained. Soils are categorized according to their runoff potential and rate at which water infiltrates. A runoff potential index (1.0 - 4.0) was determined for soils in the protection area, based on soil classifications and the distribution across the protection area. The high the value (closer to 4.0) the higher the potential for surface runoff. The calculated runoff potential for the Wellington protection area is 3.62.

Figure 3 shows the land use in the protection area. The protection area is comprised of 66% agricultural, 23% wooded, 10% urban and 1% miscellaneous.

Stream flow and time of travel

The quality of the water in a stream can change under different precipitation and flow conditions. Both high flow or low flow conditions can result in water quality problems and impacts to the source water. Typically heavy rains and high flows result in more materials dissolved and suspended in the runoff or re-suspended from the stream bottom and banks. The higher flows result in faster travel times for any contaminant plume, however the greater volume of water results in a lower concentration (given the same amount of material) relative to low flow conditions. Conversely, low flow conditions in a stream result in slow travel times and more concentrated contaminant plumes, and can exacerbate problems such as low dissolved oxygen and algal blooms. In addition, ground water inflow to the stream can introduce contaminants dissolved in the groundwater.

Since there is currently no flow gauge near the intake, the best estimate of flow is the U.S. Geological Survey flow gauge which is located well downstream from the Wellington intake. The stream gauge has been in operation since 1944. The annual mean discharge for the Black River for USGS Water Years 1945-1998 (based on 12 month period from October 1 thru September 30 identified by the calendar year in which it ends) is 339 cubic feet per second (cfs), ranging from a low of 130 cfs to a high of 534 cfs. Estimates for time-of-travel from various locations and under different flow conditions should be developed. Current flow levels for this and other USGS gages can be accessed via the Internet at the following address: http://waterdata.usgs.gov/nwis-w/OH/. Estimates for time-of-travel from various locations in the intake's vicinity and under different flow conditions should be developed.

Drinking Water Quality Monitoring Summary

Available chemical and biological water quality data collected from the streams in the protection area, and sampling results from finished water reported to Ohio EPA by the public water supplier were evaluated to characterize water quality. A review of the Village of Wellington compliance monitoring data from 1991-2002 revealed that the system had no health based or maximum contaminant level (MCLs) violations. Table 1 lists contaminants where at least one result was above the level of detection, and does not include all contaminants tested for by the public water system. The table also includes data from the Village of Wellington's participation in Ohio EPA Pesticide Special Study (1995-1999).

It should be recognized that sampling results presented in this report can only provide information on the quality of the water at the time the sample was collected. Water quality may change over time due to a number of reasons. Therefore, it is recommended that the reader also consult the most recent Consumer Confidence Report (CCR) for the Village of Wellington public water system. All public water systems are required to annually prepare and distribute the CCR to their customers. The report is a good source of information on health effects associated with detected contaminants and contains information on the community's drinking water, including the source of the water, contaminants detected, the likely sources of detected contaminants, and the potential health effects of contaminants at levels exceeding drinking water standards.

Biological and Chemical Monitoring

In 1992, the Ohio EPA conducted biological and chemical water quality monitoring on the lower two miles of Charlemont Creek. All of the monitored stream segment was in partial attainment of the warmwater habitat aquatic life use designation. Charlemont Creek was impacted by agricultural runoff, which was expressed primarily in the fish community results. Chemical water quality samples showed occasional elevated levels of total phosphorus and suspended solids. The water quality monitoring conducted by Ohio EPA in 1992 was the first time that the Charlemont Creek watershed was evaluated by Ohio EPA.

5.0 POTENTIAL CONTAMINANT SOURCES

Windshield surveys of the Village of Wellington's drinking water source protection area were undertaken to identify potential contaminant sources. Photographs showing typical sources and land use were taken and are incorporated in this report (Figures 4 and 5). Information was also collected during interviews with water treatment plant personnel.

The review of the available regulated facility databases and field surveys of the corridor management zone indicates that a total of 27 potential significant contaminant sources exist in the protection area for the Village of Wellington (Table 2). Based on information collected during the inventory there are 20 potential contaminant sources located within the corridor management zone and none within the emergency management zone. A

map of potential sources within the corridor management zone is shown in Figure 1.

It is important to note that this inventory represents *potential* contaminant sources, and includes any source that has the *potential* to release a contaminant to surface or ground waters in the protection area. It is beyond the scope of this study to determine whether any specific potential source is actually releasing a contaminant, or to what extent any potential source(s) may be contributing to the overall pollutant load. The information derived from these databases should be verified and updated before initiating protective efforts for a specific contaminant source.

Potential contaminant sources identified during the detailed inventories of the emergency management and corridor management zones include agricultural activities (corn and soybean production and livestock pasturing), above ground pesticide and fertilizer storage, residential septic tanks, and one small industrial operation (a machine job shop with twelve employees).

The protection area for the Village of Wellington is dissected by road and rail transportation networks. There are 5.06 miles of primary highways that cross the CMZ at nine locations. Likewise, 27.5 miles of secondary highways cross at 38 locations and 18,500 feet of railroad track, including a CSX mainline, cross the CMZ at eleven locations.

6.0 SUSCEPTIBILITY ANALYSIS

For the purposes of source water assessments, all surface waters are considered to be susceptible to contamination. By their nature surface waters are accessible and can be readily contaminated by chemicals and pathogens with relatively short travel times from source to the intake. Based on the information compiled for this assessment, the Village of Wellington drinking water source protection area is susceptible to agricultural runoff from row crop agriculture, manure handling facilities and runoff from animal feedlots, oil and gas wells, failing home and commercial septic systems, new housing and commercial development that could increase runoff from roads and parking lots, and numerous roads over the stream.

The relatively small size of the watershed and the highly erodible soils of the protection area present a situation where materials can be easily transported from the land surface to the stream drainage network. In addition, the large number of road and rail crossings provides the opportunity for an accidental release/spill of material to easily enter the stream drainage network. Present land use practices appear to be having an adverse impact on the ecological health of the Charlemont Creek. This is evidenced by the relative "poor" health of the water resource being caused by excessive loading of nutrients and suspended solids. Charlemont Creek may also be impacted by the small number of oil and gas wells located in its sub-watershed. To reduce susceptibility to contamination, the community uses an upground reservoir and pumps river water to the reservoir during the winter months when suspended solids, herbicides, and agricultural runoff are at their lowest levels.

It is important to note that this assessment is based on available data, and therefore may not reflect current conditions in all cases. Water quality, land uses and other activities that are potential sources of contamination may change with time. While the source water for the Village of Wellington is considered susceptible to contamination, historically, the Wellington water treatment plant has effectively treated this source water to meet drinking water quality standards**.**

7.0 PROTECTIVE STRATEGIES

Source water protection efforts for the Village of Wellington should focus on controlling agricultural runoff and runoff from cattle grazing pastures; with particular attention to sources of pesticides, nitrates, phosphorus, and microorganisms such as fecal coliform bacteria. This can be accomplished via educational efforts. County Extension agents are an excellent resource for assisting the agricultural community with controlling agricultural runoff, and staff from local and County health offices can instruct homeowners in proper maintenance of their septic systems.

Source water protection efforts may also include the following strategies, as appropriate:

Education and Outreach: Informing people who live, work, or own property within your protection area about the benefits of drinking water protection is very important. Although some communities develop their own educational outreach resources, assistance is available at no cost from various agencies. For example, staff from Ohio EPA's Office of Pollution Prevention can visit businesses (free of charge) and provide recommendations on how they can modify their processes, materials and practices to generate less pollution in a cost-effective and technically feasible manner. An effort should be made to educate homeowners and businesses of the potential threat their activities can pose to the water supply.

Coordination with Existing Activities: Many local groups are engaged in programs that complement a public water system's drinking water source protection efforts. Working with groups such as the Natural Resources Conservation Service, the Soil and Water Conservation Service, the Farm Bureau, or a local watershed planning organization ensures coordination of their respective programs. The Village of Wellington and stakeholders within the protection area are encouraged to develop a local program to protect the source waters. A local program is capable of responding to changing conditions within the watershed and can bring together the local governments and stakeholders needed for an effective protection effort. Source water protection efforts could benefit the community by allowing the Village of Wellington to more fully use its surface water resource. Protecting the source water can also benefit those in the protection area who are not using the West Branch of the Charlemont Creek for drinking water. A high quality source water enhances other uses such as fishing, recreation, and water supply for agriculture or industry.

Oil and Gas Production: Provide education (material/meetings) to owners and land

owners on proper operation and maintenance. Develop an early warning system for accidental spills and releases.

Agricultural Activities: Provide education to local farmers on the use of best management practices to reduce agricultural and animal feedlot runoff, 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.

Transportation Routes: There is a potential for spills along roads within the protection area. The Village of Wellington may want to consider contacting the local fire department and local emergency planning agency about the location of the drinking water source protection area, so that strategies can be developed to prevent spilled materials from impacting the West Branch of Charlemont Creek.

Emergency Response Planning: The Village of Wellington should prepare a plan that includes early warning of spills and coordination of response and remediation activities for spills that may enter the West Branch of the Charlemont Creek. This plan should include emergency response actions for the creek, such as the placement of absorbent booms to control oil spills, or the ability to mechanically add oxygen to oxidize chemicals with a high oxygen demand. Different response plans could be developed for different types of contamination. The emergency response plan may also contain strategies for dealing with unexpected levels of runoff containing chemicals such as fertilizers and pesticides from adjacent land uses. Though it may be less catastrophic than a major spill, this kind of contamination is more prevalent and is harder to detect and contain.

Water Quality Monitoring: Monitoring does not directly prevent contamination, but the protection plan will be more effective if the Village of Wellington conducts periodic monitoring of raw water quality and quantity from the West Branch of Charlemont Creek. Since no water resource information is currently available for the upper portions of Charlemont Creek, management efforts should focus on the collection of baseline information for these sub-watersheds. For example, monitoring data can be used to (1) determine optimal conditions or seasons for pumping water to the treatment plant; (2) estimate time-of-travel for a chemical to reach the water treatment intake from various locations in the West Branch of Charlemont Creek; (3) track water quality trends; and (4) evaluate the effectiveness of selected protective strategies. Sampling locations and schedules could be modified on an emergency basis to monitor spills or the runoff of contaminants that may enter the reservoir.

Zoning Ordinances: A water protection zoning ordinance is a regulatory control that typically places some restrictions or standards on activities conducted within a specified zone (such as the corridor management zone and/or the emergency management zone). Such ordinances enable the municipality to require people who live or work in this area to avoid contaminating the source of the municipality's drinking water. Ordinances can help ensure best management practices are being employed at local businesses and can help reduce the volume of contaminants stored within the

protection area. The Village of Wellington may want to consider working with the counties, townships, and municipalities in the protection area to develop zoning overlays that require specific standards for chemical storage, handling of waste materials, and other source control strategies. Several communities in Ohio have enacted very successful drinking water source protection ordinances. Copies can be obtained by contacting Craig Smith at (614) 644-2752.

Ohio EPA encourages the Village of Wellington to incorporate the types of protective strategies listed above into a drinking water source protection plan. For more information on drinking water source protection please contact the Drinking Water Protection staff at (614) 644-2752.

References

Biological and Water Quality Study of the Black River and Selected Tributaries. Division of Surface Water Monitoring and Assessment Section, Ohio Environmental Protection Agency. January 14, 19947. OEPA Technical Report EAS/1993-12-8.

Chow, Ven Te, et al. Handbook of Applied Hydrology, A Compendium of Water-Resources Technology. McGraw-Hill, 1964. Page 21-10.

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Harstine, Leonard J.. 1991. Hydrologic Atlas for Ohio. Water Inventory Report No. 28. State of Ohio Department of Natural Resources. Columbus, Ohio.

Krolczyk, J. C.. 1954. Gazetteer of Ohio Streams. State of Ohio Department of Natural Resources. Columbus, Ohio.

Soil Survey of Lorain County, Ohio. United States Department of Agriculture, Soil Conservation Service. May 1970.

Gazetter of Ohio Streams, Ohio Department of Natural Resources, Division of Water. 1960.

Table 1. Water Quality Monitoring Summary of Treated Water
Village of Wellington Public Water System

Ohio EPA Public Water System Compliance Monitoring Database (1991- 2002)
Ohio EPA Pesticide Special Study (May 1995 - March 1999)

Contaminant (units)	Levels Found	Primary MCL	Exceeds MCL [1]	Typical Source
Inorganic Contaminants				
Barium (mg/l)	0.026	2	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Fluoride (mg/l)	0.83 - 1.42	4	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate (mg/l)	0.15 - 0.77	10	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Nitrite (mg/l)	0.32	none	NA[2]	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Sulfate (mg/l)	79.0 - 86.0	none	NA[2]	Erosion of natural deposits; decomposition product of organic matter; discharge from mining and industrial waters; detergents in sewage; component of precipitation in metropolitan areas
Radioactive Contaminants				
Beta/photon emitters (pCi/L)	4.0 - 7.53	AL=15	No	Decay of natural and man-made deposits
Alpha emitters (pCi/L)	3.41	15	No	Erosion of natural deposits
Synthetic Organic Contaminants including Pesticides and Herbicides				
Alachlor [3] (µg/l)	0.09 - 0.33	2	No	Herbicide runoff
Atrazine [3] (µg/l)	0.05 - 0.06	3	No	Herbicide runoff
Metolachlor [3] (µg/l)	0.03 - 0.84	none	NA	Pesticide runoff
Metribuzin [3] (µg/l)	0.04 - 0.13	none	NA	Pesticide runoff
Volatile Organic Contaminants				
TTHMs [Total Trihalomethanes] (µg/l)	46.6 - 99.8	80	No[4]	By-product of drinking water chlorination
Bromodichloromethane (µg/l)	10.6 - 18.8	none	NA[4]	By-product of drinking water chlorination
Chloroform (µg/l)	28.0 - 76.5	none	NA[4]	By-product of drinking water chlorination
Dibromochloromethane (µg/l)	3.8 - 4.5	none	NA[4]	By-product of drinking water chlorination
Dichloroacetic Acid (µg/l)	19.6 - 25.9	none	NA[4]	By-product of drinking water chlorination
Trichloroacetic Acid (µg/l)	11.7 - 15.7	none	NA[4]	By-product of drinking water chlorination
Monochloroacetic Acid (µg/l)	2.0	none	NA[4]	By-product of drinking water chlorination

MCL = Maximum Contaminant Level (TT = Treatment Technique; AL = Action Level).

VOC data reviewed from 1999-2002.

[1] MCL set by federal or state drinking water standards. 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.

[2] Secondary Maximum Contaminant Level (SMCL) for this parameter. SMCLs are non-health-related limits.

[3] Data includes Ohio EPA Pesticide Special Study results (1995-1999). For the study, samples were analyzed using an immunoassay (IA) method and by USEPA Method 507, a gas chromatograph (GC) method. The immunoassay results are only estimations of the actual concentration values. The IA test kits tend to overestimate concentrations, due to cross reactivity of chemically similar pesticides (e.g. atrazine and simazine).

[4] Total Trihalomethanes (TTHMs): (MCL = 0.80 mg/l) calculated as the sum of the concentrations of Bromodichloromethane, Dibromochloromethane, Bromoform, and Chloroform.

Five Haloacetic Acids (HAA5): (MCL = 0.060 mg/l) calculated as the sum of the concentrations of Monochloroacetic acid, Dichloroacetic acid, Trichloroacetic acid, Monobromoacetic acid, and Dibromoacetic acid.

Table 2. Potential Contaminant Source Inventory for Village of Wellington Drinking Water Source Protection Area

Map ID	Type	Inv. Code	Data Source
1*	Other Agricultural Sources	A-17	field survey
2*	Animal waste storage/disposal	A-3	field survey
3	cemetery	C-8	field survey
4*	Crops: corn, soybean, wheat	A-5	field survey
5	Other Agricultural Sources	A-17	field survey
6	Other Agricultural Sources	A-17	field survey
7	Dairy facility	A-8	field survey
8	Dairy facility	A-8	field survey
9*	Machine/metalworking shops	I-7	field survey
10*	Machine/metalworking shops	I-7	field survey
11*	Other Agricultural Sources	A-17	field survey
12*	Other	O-24	field survey
13*	Equipment rental/repair shops	C-10	field survey
14*	Greenhouses/Nurseries	A-12	field survey
15	Other Agricultural Sources	A-17	field survey
16*	Machine/metalworking shops	I-7	field survey
17	Farm chemical distributor	A-10	field survey
18*	Crops: orchards	A-6	field survey
19*	Other (campground)	O-24	field survey
20*	cemetery	C-8	USGS Geonames
21*	cemetery	C-8	field survey
22*	Dairy facility	A-8	field survey
23*	Drinking water treatment plants	M-4	OEPA-DSW Surface Impoundment GIS Layer
24*	Other (campground)	O-24	field survey
25*	Other (railroad/stream crossings)	O-24	field survey
26*	Other (railroad/stream crossings)	O-24	field survey
27	Other Commercial Sources	C-33	field survey

* Located within the Corridor Management Zone.
BOLD indicates a significant potential source in the protection area.

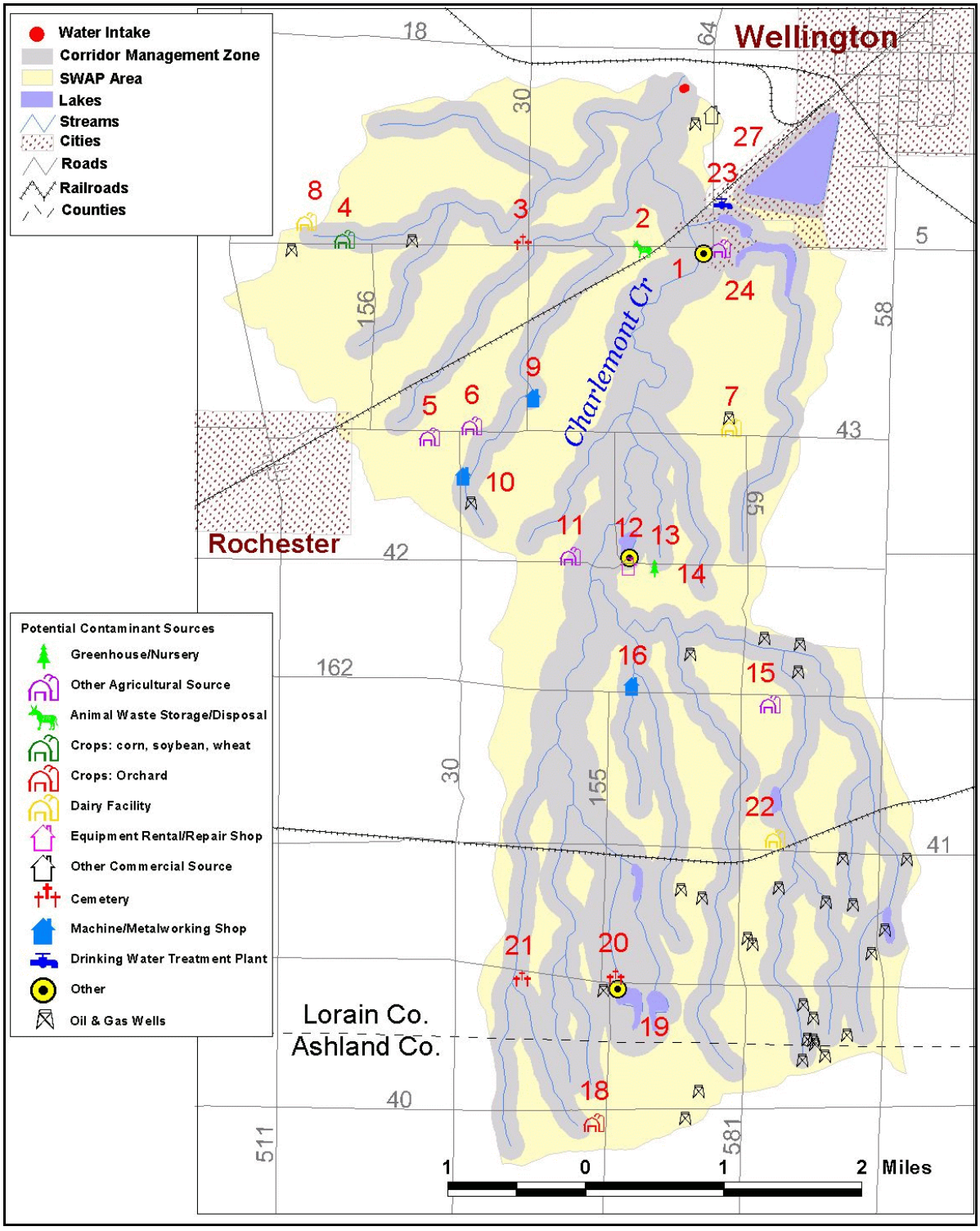

Figure 1 - Drinking Water Source Protection (SWAP) Area for the Village of Wellington

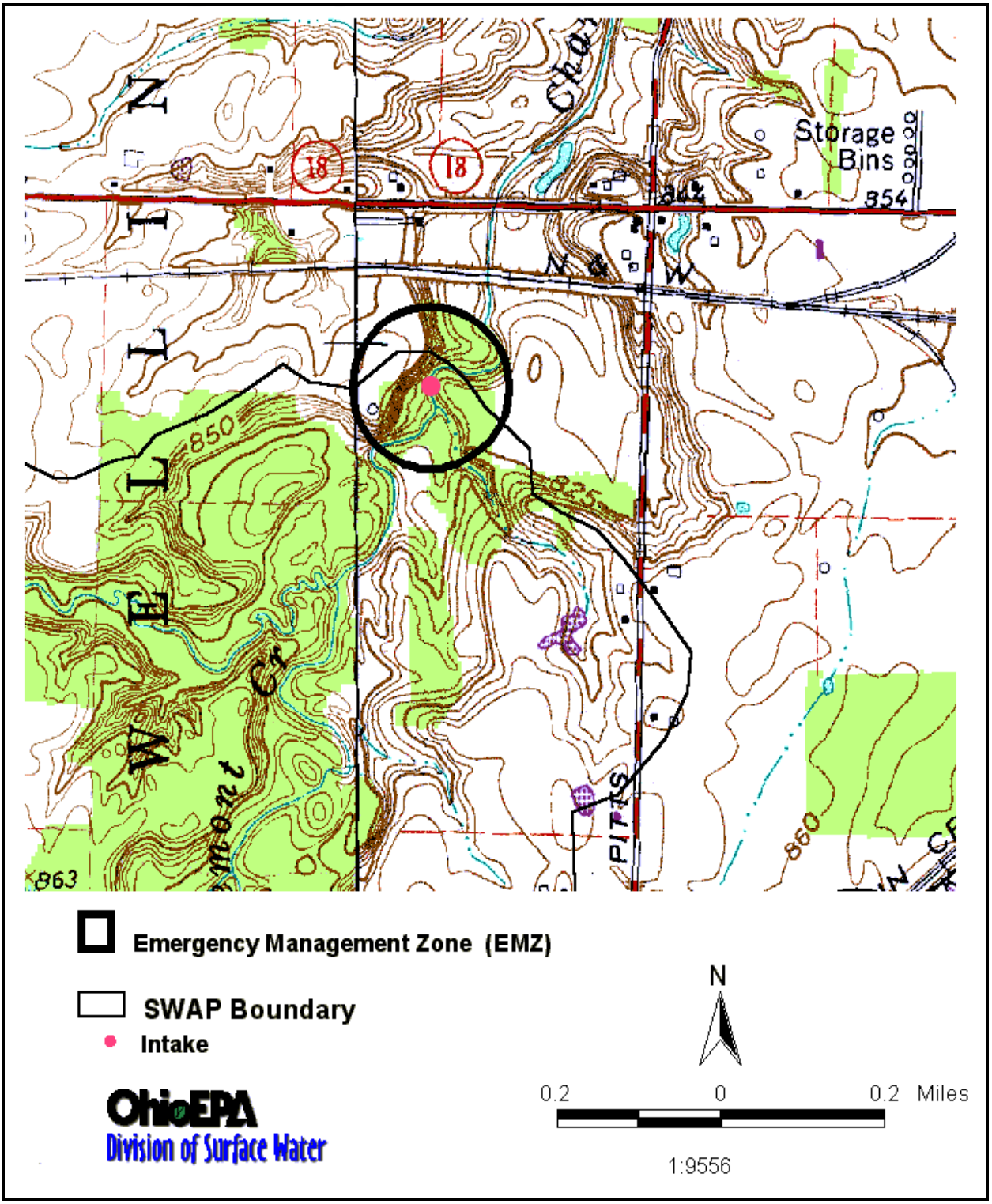

Figure 2 - Emergency Management Zone for the Village of Wellington

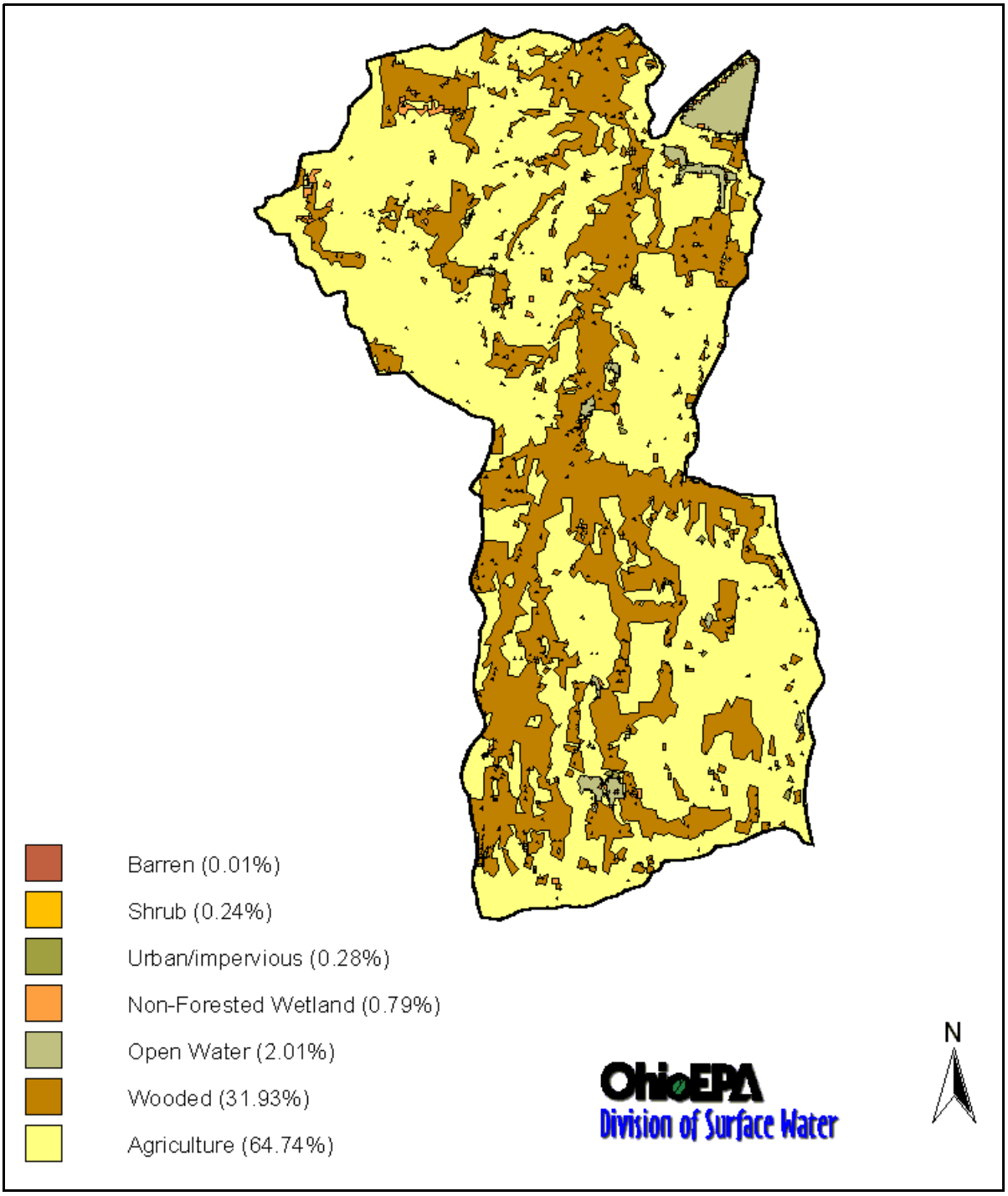

Figure 3 - Land use in the Wellington Drinking Water Source Protection (SWAP) Area

Figure 4 - Typical small farm in the Wellington SWAP area

Figure 5 - Typical rural residential and farm field in the Wellington SWAP area