

Part 1 Wellhead Protection Plan Executive Summary – City of Coleraine

Protection Areas - The recharge area for the wells is known as the wellhead protection area, or WHPA, and represents the area that contributes water to the city's wells within a 10-year time period. The area that contributes water within a one-year time period is known as the emergency response area, or ERA. Practical reasons require the designation of a management area that fully envelops the wellhead protection area, called the drinking water supply management area, or DWSMA. Each of these areas is shown in Figure 1.

Geology and Groundwater Flow – The city of Coleraine has two primary wells screened in a sand and gravel aquifer that is buried beneath a layer of clay-rich sediment. Such aquifers are known generically as Quaternary Buried Artesian Aquifers (QBAA). The city's aquifer is between approximately 70 and 120 feet below the ground surface (Table 1). Regionally, groundwater flow is to the southeast.

Table 1 - Water Supply Well Information

Local Well ID	Unique Number	Use/ Status	Casing Diameter (inches)	Casing Depth (feet)	Well Depth (feet)	Date Constructed/ Reconstructed	Aquifer	Well Vulnerability
Well #1	241430	Primary	24	75	121	1918	QBAA	Vulnerable
Well #4	110457	Primary	30 x 16	100	120	3/6/1976	QBAA	Vulnerable

Well Vulnerability - The vulnerability of each well has been assessed based on 1) well construction details, especially conformance with standards required by the state well code, 2) the geologic sensitivity of the aquifer, and 3) past monitoring results. Well #1 does not meet construction standards because grouting information is unknown. If the well was not grouted, it has the potential for acting as a conduit for flow of surface water and contaminants into the aquifer. To date, no evidence of this has been identified. Well #4 does meet construction standards, meaning the well itself should not provide a pathway for contaminants to enter the aquifer. The city's wells are considered vulnerable to contamination due to tritium being detected in the well water (Table 2). Detectable tritium indicates the presence of young (post-1953) water.

Table 2 - Isotope and Water Quality Results

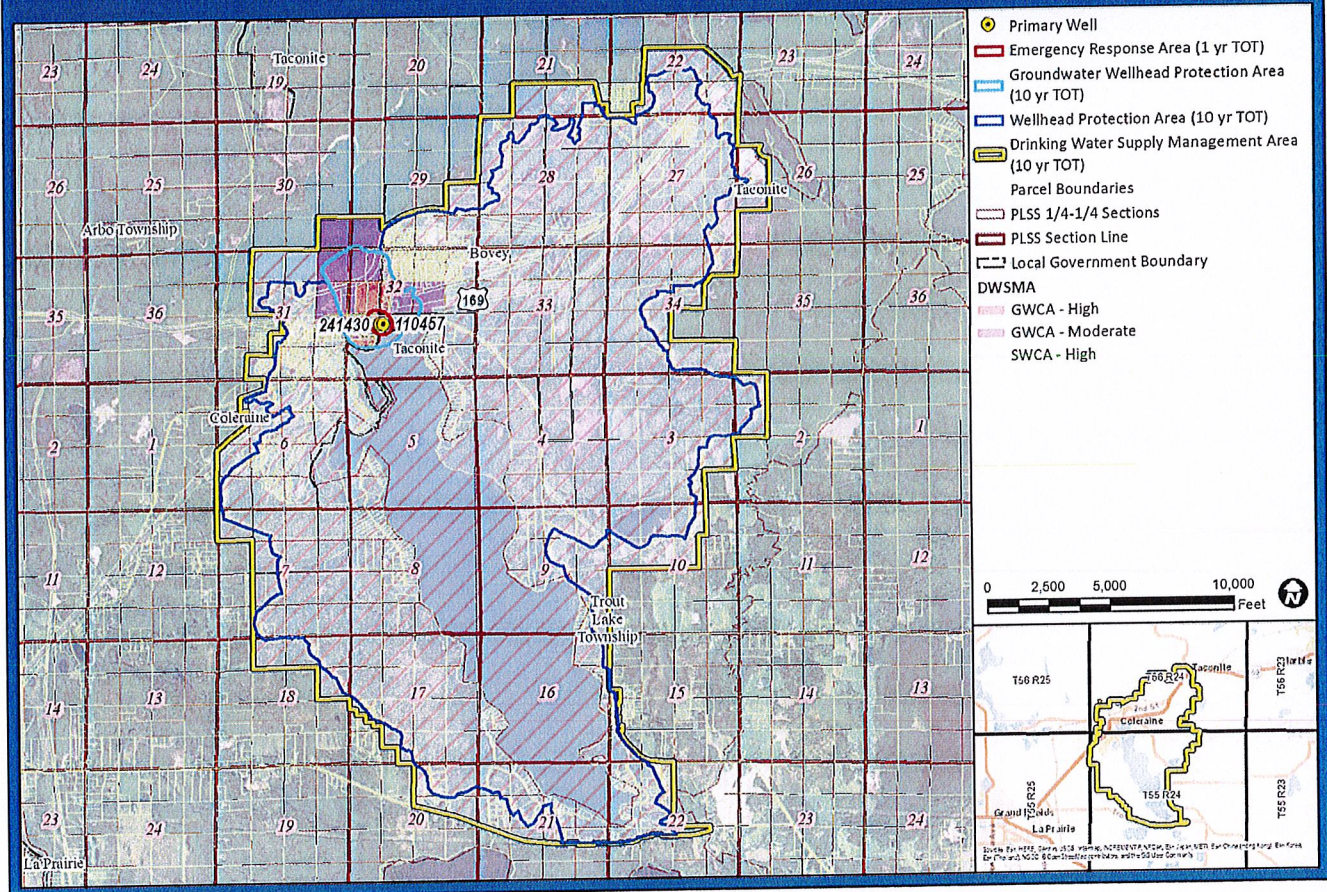
Unique Number (Well Name)	Tritium	Nitrate (mg/L)	Chloride/ Bromide Ratio	Chloride (mg/L)	Bromide (mg/L)	Arsenic (µg/L)
241430 (Well #1)	16.3 (2/9/2004)	<0.05 (7/14/2014)	410	13.7 (7/16/2012)	0.0334 (7/16/2012)	<1 (7/16/2012)
110457 (Well #4)	11.8 (5/19/2015)	<0.05 (6/29/2016)	413	12.6 (6/29/2016)	0.0305 (6/29/2016)	1.12 (7/16/2012)

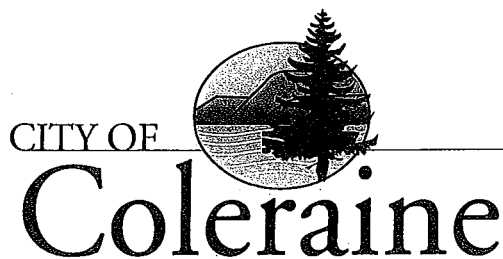
DWSMA Vulnerability - The vulnerability of the city's aquifer throughout the DWSMA is based on the geologic sensitivity ratings of wells and their monitoring data (Table 2), as well as an assessment of the risk posed by the connection between the city's aquifer and Trout Lake and its watershed. Based on this information, MDH has assigned a moderate groundwater vulnerability to the groundwater contribution area (GWCA) outside of the ERA and a high vulnerability to the ERA and surface water contribution area (SWCA) of the DWSMA. The moderate vulnerability rating suggests that water and contaminants may travel from the land surface to the city's aquifer within a time span of years to decades within most of the well capture zone. This portion of the city's DWSMA is considered prone to a variety of contaminant threats, including chemical storage tanks and abandoned wells which can provide conduits for contaminants to quickly reach the city's aquifer. The high vulnerability rating assigned to the ERA reflects uncertainty about the effectiveness of the confining unit at this location, and acknowledges the large component of young, human-impacted surface water detected at the city wells. The high vulnerability assigned to Trout Lake and its watershed reflect the fact that surface waters by their nature are prone to a wide variety of contaminant threats over short time periods due to their exposure at the land surface.

Water Quality Concerns - At present, none of the contaminants for which the Safe Drinking Water Act has established health-based standards are found above maximum allowable levels in the city's water supply, nor are any present at one-half of those levels. However, arsenic has been detected at very low levels.

Recommendations - Recommendations have been generated to improve future delineations and vulnerability assessments and should be considered for inclusion as management strategies in the city's wellhead protection plan. These activities include: well locating, water quality monitoring, and an aquifer test. Further details can be found in the Recommendations section of this report.

Figure 1
Drinking Water Supply Management Area and Vulnerability
City of Coleraine





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October 12, 2020

To: Chairperson, Itasca County Board
Chairperson, Itasca County Soil and Water Conservation District
Andy Hubley, Director, Arrowhead Regional Development Commission
Christopher Parthun, Principal Planner, Minnesota Department of Health

From: Harry Bertram, Public Works Superintendent, Wellhead Protection Manager

Re: Wellhead Protection Plan Amendment, Part 1, for the City of Coleraine

The City of Coleraine is in the process of amending our wellhead protection plan for its drinking water supply wells. As required by the Minnesota Wellhead Protection Rule (part 4720.5330, subpart 6), the Minnesota Department of Health approved Part 1 of the wellhead protection plan amendment for our system. This portion of the plan includes information pertaining to:

1. The delineation of the wellhead protection area,
2. The drinking water supply management area boundary, and
3. The well and drinking water supply management area vulnerability assessment.

Enclosed please find the items listed above. If you would like a complete copy of the amended Part 1 plan containing the technical information used to delineate the wellhead protection area, drinking water supply management area, and vulnerability of the wells and aquifer, please contact me at (218) 245-2112.

According to the Wellhead Protection Rule (part 4720.5330, subpart 7), a Public Information Meeting to discuss issues and concerns of the Part I Wellhead Protection Plan Amendment must be held within 60 days of the receipt of the notice of approval from MDH. However, the COVID-19 pandemic presents unforeseen challenges and limitations in holding a public information meeting. As such, the public information meeting will be held November 9, 2020 during the regular city council meeting, and a call-in telephone option will be available, the details are below. If you have questions or concerns about the amended Part I plan, please contact me.

The November 9th City Council meeting begins at 4pm. The doors to City Hall will open 15 minutes prior to the meeting and the public is welcome to attend, however, strict social distancing guidelines will be followed. Only six people will be allowed in the gallery at one time; this includes staff. We respectfully request that you wear a face mask.

Some of the City Council members may be participating by telephone. Members of the public may access the meeting via telephone conference. To access the meeting: dial 1-425-436-6378 and enter access code: 282213#. Please note that long distance charges may apply.

cc: Andy Arens, Itasca County Water Planner
Trudi Witkowski, Minnesota Department of Health