Waterford Township – 2021 Private Well Sampling

The purpose of community focused sampling is to provide all county residents using a private well for drinking water a chance to test their well water for common contaminants. This report contains a summary of the results from private wells located in Waterford Township. Water samples were tested for geologically derived contaminants manganese and arsenic, as well as human-related contaminants lead, chloride, and nitrate.

Study Approach and Results Summary Table

Results from sampling in 2021 are summarized in this report. The County received 40 test kits from participants. Residents were asked to collect a water sample from both an outside untreated spigot and an inside primary drinking water tap. All outside samples were tested for manganese, arsenic, nitrate, and chloride. If the outside sample result exceeded 3.0 milligrams per liter (mg/L) for nitrate, 0.05 micrograms per liter (µg/L) for arsenic, or 0.090 mg/L for manganese, then the sample collected from the inside tap was tested for that chemical. In addition, all inside tap samples were analyzed for lead. A hardness test strip was provided as part of the sampling kit for well owners to test and report when submitting samples. In addition, the participants completed a survey indicating all water treatment methods affecting the inside tap.

Chemical	# of Well Samples	# of Detects	Drinking Water Guideline (DWG)	# of Samples above DWG	Mean (Average) Result	Maximum Result
Outside Arsenic µg/L	40	13	10 µg/L No safe amount	0	0.4	2.9
Outside Chloride mg/L	40	24	250 mg/L*	1	28	623
Outside Manganese mg/L	40	31	0.300 mg/L	5	0.108	0.592
Outside Nitrate mg/L	40	18	10 mg/L	4	2.4	16.5
Outside Hardness mg/L	36	36	None	N/A	371	425
Inside Arsenic µg/L	21	6	10 µg/L No safe amount	0	0.24	1.39
Inside Lead µg/L	40	17	15 µg/L No safe amount	1	1.7	32.6
Inside Manganese mg/L	14	7	0.300 mg/L	3	0.102	0.513
Inside Nitrate mg/L	9	9	10 mg/L	2	6.4	15.5
Inside Hardness mg/L	38	38	None	N/A	198	425

mg/L milligrams of chemical per liter of water equivalent to parts per million (ppm)
µg/L micrograms of chemical per liter of water equivalent to parts per billion (ppb)
< less than (result is below the level that the laboratory can report)
N/A not applicable
* 250 mg/L is not a health standard but indicates when the water may start to taste salty

Arsenic

Arsenic occurs naturally in rocks and soil and dissolves into groundwater. Arsenic in drinking water is linked to increased risk of cancers of the bladder, lungs, liver, and other organs. High levels of arsenic in drinking water can also contribute to cardiovascular and respiratory disease, reduced intelligence in children, and skin problems, such as lesions, discoloration, and the development of corns. The drinking water guideline for arsenic is 10 µg/L, but the US Environmental Protection Agency goal for arsenic in drinking water is 0 µg/L since prolonged exposure to any level of arsenic can increase the risk of cancer.

Results and findings

- Arsenic was found in 33% (13 of 40 wells) of the outside samples and in 29% (6 of 21 wells) of the inside samples. None of the sampled wells exceeded the drinking water guideline of 10 µg/L.
- Three wells had both a Reverse Osmosis (RO) system and an iron filter; there was a 100% reduction of arsenic. Some existing RO systems can have an additional filter installed to reduce arsenic.

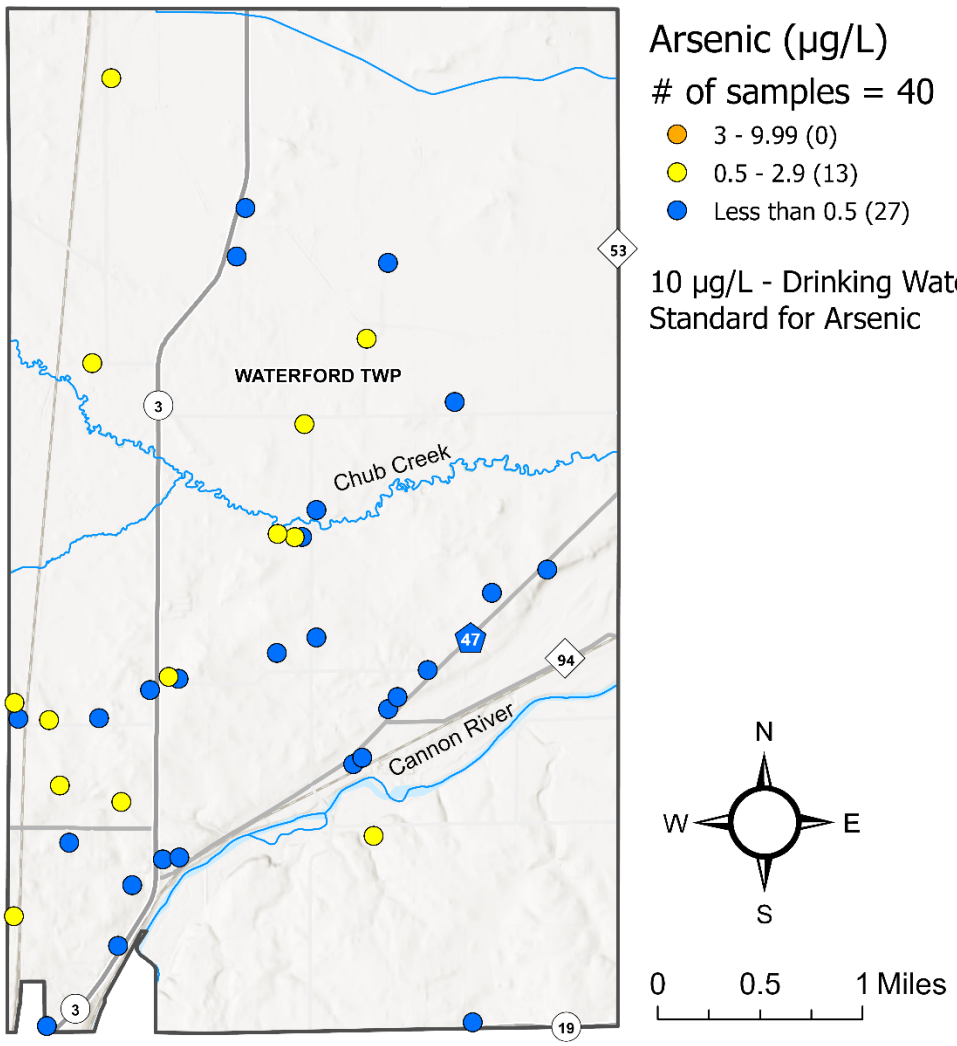

Figure 1. Arsenic results in untreated water from outside spigot

Manganese

Manganese occurs naturally in rocks and soil and dissolves into groundwater. Our bodies need a small amount of manganese to maintain health, and we get enough manganese from the foods we eat. However, research indicates that children and adults who drink water with high levels of manganese for a long time may develop problems with memory, attention, and motor skills. Infants are more vulnerable to the effects of manganese. For infants who drink well water or formula made with well water, manganese should not exceed 0.100 mg/L. For everyone else, the level of manganese should not exceed 0.300 mg/L. Non-health related problems (metallic taste and staining plumbing fixtures) may occur above 0.050 mg/L.

Results and findings

- Manganese was detected above the drinking water guideline of 0.300 mg/L in 13% (5 of 40) of outside samples and 21% (3 of 14) of inside samples.
- Water softeners were 95% to 99% effective in reducing manganese levels.

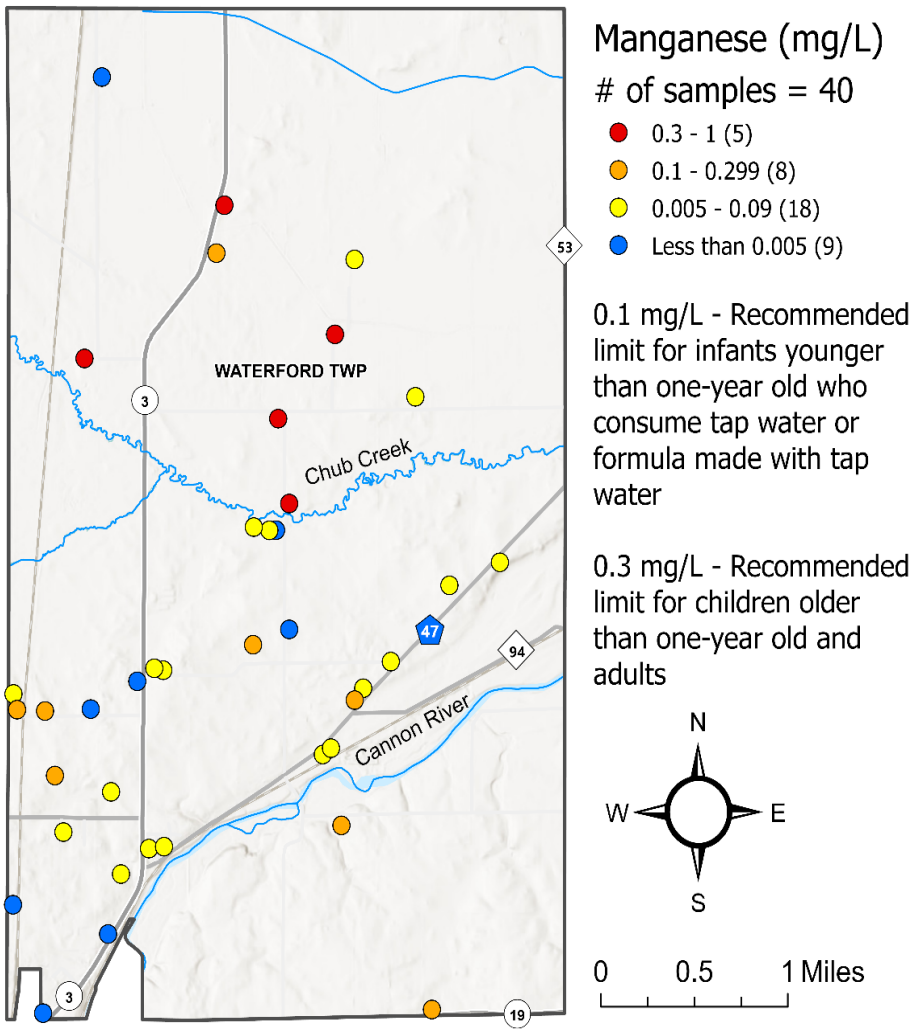

Figure 2. Manganese results in untreated water from outside spigot

Nitrate

Nitrate occurs naturally at very low levels. Nitrate in groundwater is usually associated with human activities including row crop agriculture, septic systems, and animal feedlots. In Dakota County, the major source is fertilizer used on agricultural crops, which leaches to the drinking water aquifers. A nitrate level above 10 mg/L in drinking water can be harmful to infants under six months old. Infants that consume water or formula mixed with water that is high in nitrate may develop “blue baby syndrome” (methemoglobinemia), a life-threatening condition. Adults may be susceptible to methemoglobinemia if they have certain health conditions. Always test for nitrate before giving well water to an infant. The presence of nitrate is a strong indication that herbicides or herbicide breakdown products are also present. Importantly, both nitrate and herbicides can be reduced using a water treatment device such as a reverse osmosis system (RO). Carbon filtration alone can reduce herbicide concentrations.

Results and findings

- Nitrate was detected in 45% (18 of 40) of outside samples; 10% (4 of 40) exceeded the 10 mg/L drinking water guideline. Nitrate exceeded the drinking water guideline in 22% (2 of 9 wells) in inside drinking water tap samples.
- One well treated by a Reverse Osmosis (RO) system resulted in a 90% nitrate reduction.
- Nitrate is statistically correlated with chloride, which means when one occurs the other is likely to occur. Both are applied to the ground surface by human activities and impact our drinking water aquifers.
- Nitrate is higher in older, shallower wells compared to those completed in the deeper Jordan Aquifer.

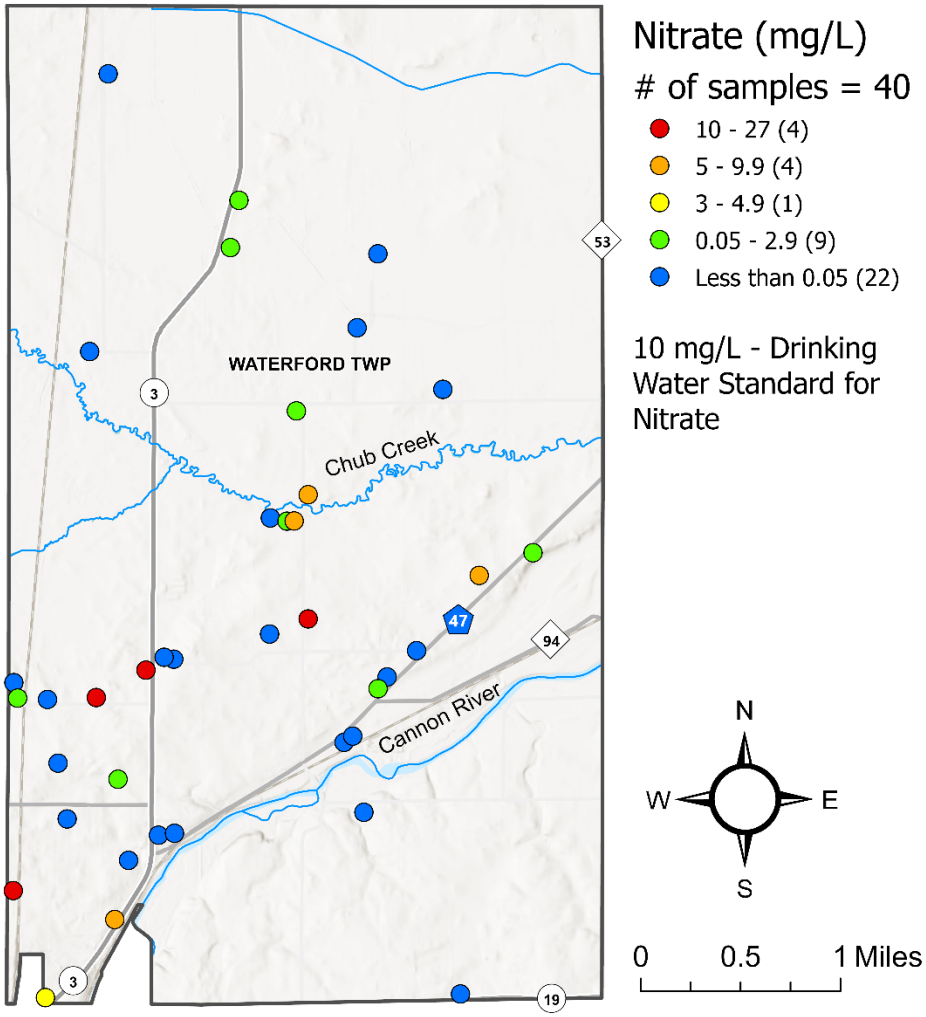

Figure 3. Nitrate results in untreated water from outside spigot

Chloride

Chloride occurs naturally in the rocks and soil across Dakota County at very low levels. High levels of chloride in groundwater indicate contamination from the application of road salt, potash fertilizer, water softener brine discharge into septic systems, or deicing salt applied to sidewalks and parking lots. Elevated chloride can potentially leach metals, like lead, from plumbing into the drinking water. There is no health-based guideline for chloride, but the USEPA recommends levels no higher than 250 mg/L to avoid undesirable tastes (saltiness). Chloride detected in well water indicates that the well is vulnerable to surface contamination.

Results and findings

- Chloride was found in 63% (25 of 40 wells) of the outside samples. One well (that distributes water to two properties) exceeded the USEPA recommended level of 250 mg/L.
- Chloride is statistically correlated with nitrate, which means when one occurs the other is likely to occur. Both are applied to the ground surface by human activities and impact drinking water aquifers.

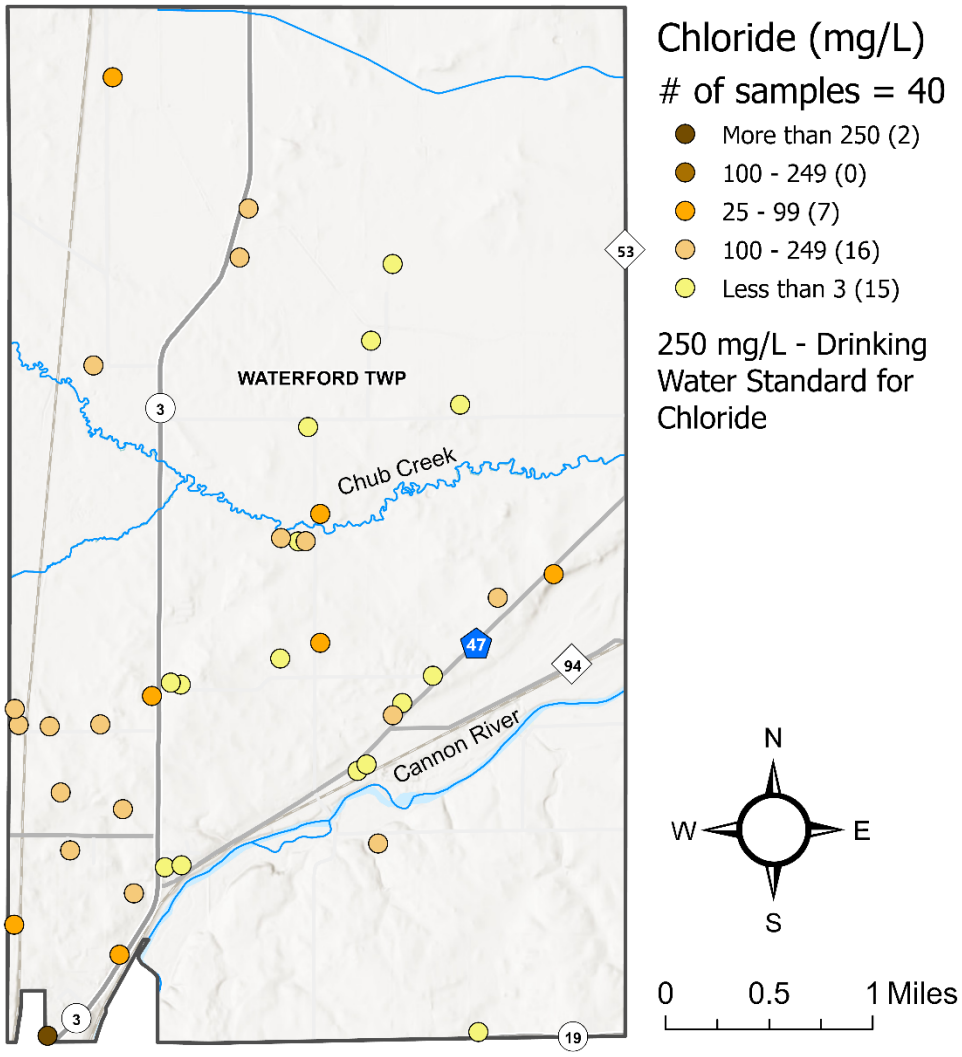

Figure 4. Chloride results in untreated water from outside spigot

Lead

Lead rarely occurs naturally in groundwater. Lead can leach into drinking water from lead pipes; lead solder on copper pipes; and brass faucets, fittings, and valves (including those advertised as lead-free). Brass fixtures, including fixtures that don't look like brass, such as chrome plate brass products, can contribute lead to drinking water. The USEPA federal drinking water guideline for lead is 15 µg/L, however, there is no safe level of lead. Lead exposure usually has no obvious health symptoms and can go unrecognized. Health concerns include impaired physical and mental development, hearing problems, and damage to the brain, kidneys, red blood cells, and nervous system. Pregnant women, infants, and children under six years of age are at the highest risk. The federal "Reduction in Lead in Drinking Water Act" (2014) reduced the amount of lead allowed in water systems and plumbing products by changing the definition of "lead free" from 8% lead content to not more than 0.25% lead in drinking water plumbing components.

Results and findings

All inside samples were tested for lead. Lead was detected in 43% (17 of 40) of the samples. One sample had a result of 32.6 mg/L which is more than double the drinking water guideline. No amount of lead is safe to drink. When purchasing a water treatment device look for one that is certified to reduce lead.

If drinking water has elevated levels of chemicals, do the following:

- ✓ Prepare infant formula with bottled water.
- ✓ **Do not boil** drinking water. Boiling water may concentrate contaminants, but it is effective at killing bacteria.
- ✓ **Identify** and, if possible, **remove** sources of contamination near the well. Fertilizers, animal wastes and sewage systems should be located far from the well and managed to avoid contamination. The top of the well should be at least 12 inches above the surrounding dirt or landscaping.
- ✓ **Install** a NSF, UL, or WQA certified water treatment system and **maintain** it annually. No single treatment process can remove all substances in water. If there are several substances you want removed from your water, you may need to combine treatment processes. The MN Dept. of Health website has information on water treatment at http://www.health.state.mn.us search water treatment.
- ✓ **Continue sampling**. Test your drinking water after you install treatment because there is often no other way to know if a treatment system is working properly. To test for common chemicals of concern, you can have a water test kit mailed to you by requesting one online at www.co.dakota.mn.us search well testing.
- ✓ A **Coliform Bacteria** test is recommended annually for private wells. Coliform bacteria was not tested as part of this study. Consider testing; see directions on how to get a test kit, below.

We can help

- Dakota County may have a copy of your original well record on file if the well was drilled after 1975. The well record can tell you the aquifer your well is tapping and assist a well contractor who may do future work on your well. To request your well record, go to: www.co.dakota.mn.us, Search Well Information
- If you choose to install a new well and will no longer be using your existing well, the old well will need to be sealed by a MN licensed well contractor. Dakota County may have grant funds available (usually 50% of the cost to seal the well). The application is located at: www.co.dakota.mn.us, Search Well Sealing Grant.

Further testing

Request a sample kit online from Dakota County at www.co.dakota.mn.us, Search: Water Test. Available tests include Coliform Bacteria, Nitrate, Arsenic, Manganese, Lead, and Fluoride.

Contact

Wes Rutelonis, Dakota County – Western Service Center, 14955 Galaxie Avenue, Apple Valley, MN 55124
Phone: 952-891-7537
Email: wes.rutelonis@co.dakota.mn.us