

2016 Chippewa County Groundwater Quality Inventory

SUMMARY

Groundwater is the principal water supply for municipalities, industries and rural residents of Chippewa County. While municipal water supplies are regularly monitored and required to meet drinking water standards, private well owners must make decisions regarding when and what to test for and what to do if there is a problem. In an effort to effectively target management and public health outreach efforts related to groundwater and private well owners, Chippewa County has conducted extensive groundwater sampling of private wells in 1985 (715 wells) and 2007 (800 wells). Previous testing efforts focused on sampling for the following analytes: nitrate-nitrogen (1985,2007), chloride (1985,2007), total hardness (1985) and pH (1985,2007) and conductivity (1985,2007).

In the summer of 2016, Chippewa County collaborated with the UW-Stevens Point Center for Watershed Science and Education to sample 744 wells. The 2016 sampling included all analytes from previous sampling efforts. Testing was expanded to include arsenic, phosphorus, alkalinity, iron, manganese, sodium, potassium, lead, zinc, sulfate, calcium, magnesium, and copper. Additional testing for pesticides and wastewater tracers was performed on 60 of the 744 wells to better understand sources of nitrate.

The goals of this project were to:

- 1) Evaluate current groundwater quality of Chippewa County by conducting well water sampling for an expanded set of analytes.
- 2) Understand the spatial and temporal groundwater quality patterns and summarize the information for the local officials, county staff and citizen of Chippewa County.

Key Findings:

- Groundwater phosphorus, hardness, pH, alkalinity concentrations are strongly influenced by geology/aquifer type.
- While phosphorus concentrations in groundwater are generally low, elevated levels occurred in wells that passed through Tunnel City and/or Wonewoc formations. Elevated groundwater phosphorus has potential implications for streams that originate from either of these formations.
- Low pH, hardness and alkalinity indicative of corrosive water were commonly found in western and southern Chippewa County. Corrosive water can increase levels of lead, copper or zinc if these metals occur in household plumbing systems.
- Elevated manganese and iron concentrations were associated with areas of glacial sediments found primarily in northeastern Chippewa County. Wells located along the western and southern shore of Lake Wissota were also more likely to contain elevated manganese and iron.
- None of the wells tested were greater than arsenic maximum contaminant level of 0.010 mg/L.
- Nineteen percent of wells tested were greater than the 10 mg/L nitrate-N drinking water standard.
- Wells were categorized based on percent agricultural land category (<25, 25-50, 50-75, >75%) and septic system density. Nitrate concentrations increased as the percentage of agricultural land within ½ mile of the well increased. There was also evidence that development density (septic systems/lawns) contribute to elevated nitrate concentrations in groundwater.
- Mean nitrate-N concentrations decreased with increasing casing depth.
- Mean nitrate-N and chloride levels increased from 1985 to 2007 and again from 2007 to 2016.
- The percentage of wells above the drinking water standard for nitrate increased from 12.3% in 2007 to 18.3% in 2016.



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