NORTH Dakota | Environmental Quality
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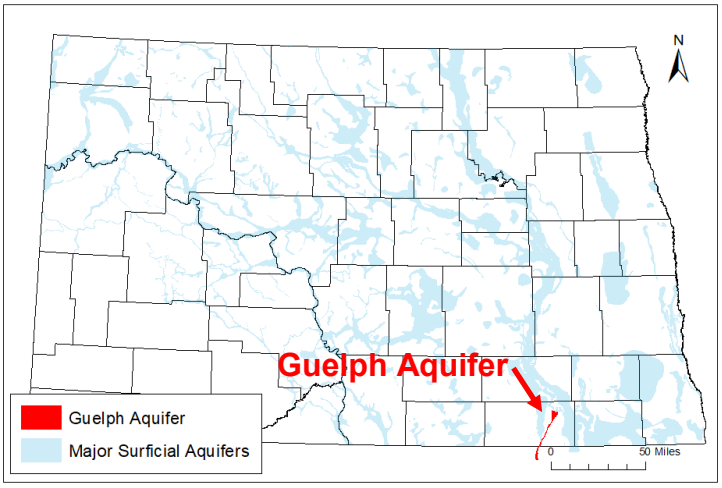
Agricultural Groundwater Monitoring Program

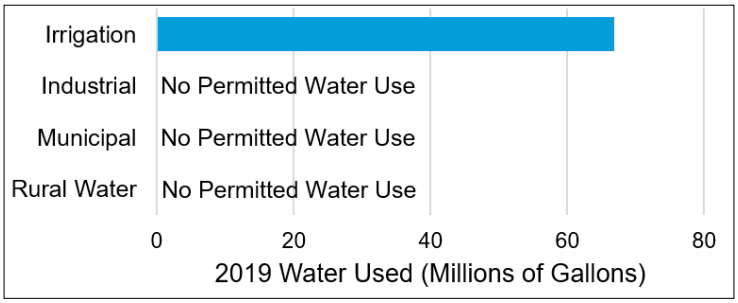
Guelph Aquifer

Dickey County

Aquifer At-a-Glance	
Area	27.3 square miles
Aquifer Type	Unconfined and Confined Surficial
Major Land Uses over Aquifer (percentage of aquifer area covered in 2017)[1]	Crops (74%) Grassland/Pasture (14%)
Depth to Water (2020)*	6-32 feet
Total Unique Wells Sampled	11
Wells Sampled in 2020	7
Samples Collected in 2020	7
Years Sampled	1995, 2000, 2005, 2010, 2015, 2020
*Depths to water may vary seasonally, year to year, and across the aquifer	



2019 Guelph aquifer permitted water use (from North Dakota State Water Commission (swc.nd.gov))



- Aquifer materials consist of sands and gravels interspersed with silts and clays deposited an older version of the James River.[2]
- The aquifer ranges from 24-53 feet thick and averages about 35 feet thick. The depth to the aquifer deposits increases to the south; at the aquifer's southern end it is buried by over 70 feet of glacial clay till.[2]
- Domestic, irrigation, and stock wells are installed in the aquifer.
- In North Dakota, permits are required to withdraw large quantities of groundwater. In 2019, 67 million gallons of permitted water were drawn from the aquifer; irrigation use consumed the largest quantity of water. For more information on water use and permits, contact the North Dakota State Water Commission (swc.nd.gov).

About the Agricultural Groundwater Monitoring Program

- The North Dakota Department of Environmental Quality monitors a network of wells in approximately 50 surficial aquifers that are at elevated risk of agricultural contamination.
- Aquifers are sampled on a 5-year rotation.
- Monitoring began in 1992.
- The vast majority of these aquifers are located in central and eastern North Dakota.
- Water is tested for 21 general chemistry parameters, eight trace metals, and 64 pesticides.

References

(1) US Department of Agriculture, 2017, National Agricultural Statistics Service Cropland Data Layer.
(2) Armstrong, C.A., 1980, Ground-Water Resources of Dickey and LaMoure Counties, North Dakota, North Dakota State Water Commission County Ground-Water Studies 28-Part 3, North Dakota Geological Survey Bulletin 70.

Water Chemistry

Is Aquifer Water High in…?	Analyte	Result	2020 Median Concentration	Potential Effects
	Arsenic	YES	0.015 mg/L	Skin or circulatory system damage, increased cancer risk
	Iron	YES	6.0 mg/L	Metallic taste/odor, discoloration of surfaces
	Manganese	YES	1.24 mg/L	
	Sodium	NO	43.9 mg/L	Taste, people with certain health conditions may need to limit intake
	Sulfate	YES	746 mg/L	Taste/odor, laxative effect for people not used to the water
	For more information about Maximum Contaminant Levels (MCLs), health effects, and treatment options for these contaminants and more, see the NDDEQ's fact sheets (deq.nd.gov/wq/1_Groundwater) or visit the US EPA website (epa.gov/ground-water-and-drinking-water).			

Dominant Water Type	Water Hardness
Calcium-Sulfate	Very Hard

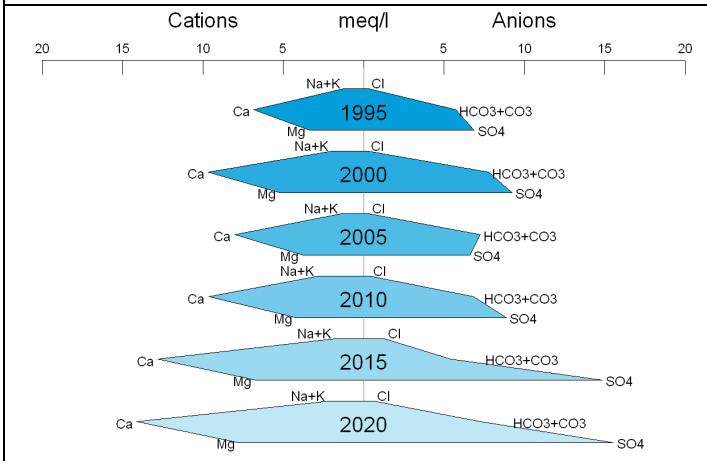
Nitrate

Percentage of Wells Exceeding the Nitrate Maximum Contaminant Level (MCL) (10 mg/L as N).*

No Nitrate MCL Exceedances

Stiff diagram of aquifer median general water chemistry.

Changes in diagram shape represent changes in general chemistry.



Pesticides

Percentage of wells with detections of each pesticide detected in the aquifer.

No Pesticide Detections

State Pesticide Management Plan

Agricultural Groundwater Monitoring Program aquifers are monitored as a part of the State Pesticide Management Plan. A Prevention Action Level (PAL) threshold of 25% of the pesticide's Maximum Contaminant Level (MCL)* or Health Advisory Level (HAL) is used to identify whether action is needed to prevent further contamination.

Prevention Action Level Exceedances	**None**
MCL or HAL Exceedances	**None**

Number of Unique Wells with Pesticide Detections since 1995	**0** of 11 Total Wells

2020 Pesticide Detections

No Pesticide Detections

*Note that MCLs are for public drinking water systems; private wells are not regulated in North Dakota. MCLs still provide guidelines for drinking groundwater.