

Bismarck Aquifer

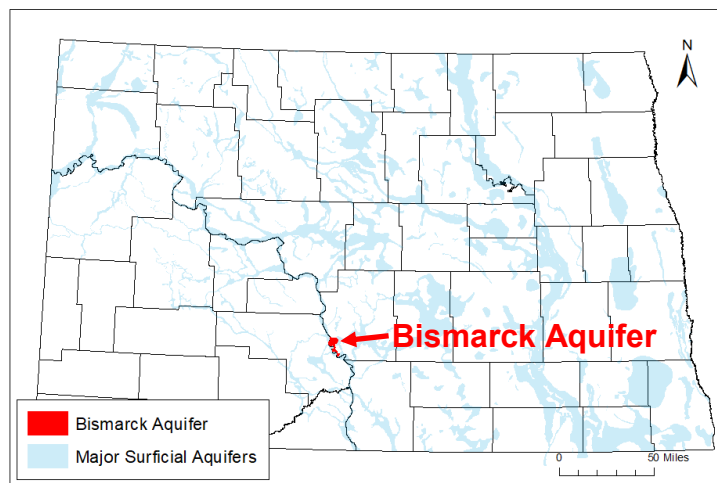
Burleigh County

Aquifer At-a-Glance

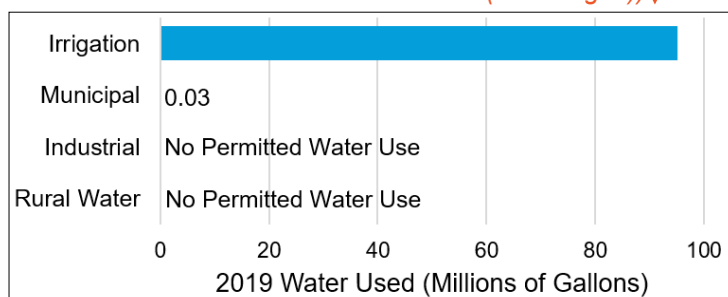
Area	27.8 square miles
Aquifer Type	Unconfined Surficial
Major Land Uses over Aquifer (percentage of aquifer area covered in 2017) ¹	Open Water/ Wetlands (34%) Developed (32%)
Depth to Water (2020)*	8-22 feet
Total Unique Wells Sampled	24
Wells Sampled in 2020	6
Samples Collected in 2020	7
Years Sampled	1995, 2000, 2005, 2010, 2015, 2020

*Depths to water may vary seasonally, year to year, and across the aquifer

- Aquifer materials consist of sands and gravels deposited by streams moving meltwater away from glaciers during the last ice age and more recent sands and gravels deposited by the Missouri River.²
- The aquifer ranges from 10-105 feet thick and averages 50 feet thick.²
- Domestic wells are common in the aquifer. Commercial, industrial, irrigation, and stock wells are also installed in the aquifer.
- The city of Lincoln draws water from the aquifer.
- In North Dakota, permits are required to withdraw large quantities of groundwater. In 2019, 95 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).



2019 Bismarck aquifer permitted water use (from 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) Randich, P.G. & Hatchett, J.L., 1966, Geology and Ground-Water Resources of Burleigh County, North Dakota, North Dakota State Water Commission County Ground-Water Studies 3-Part 3, North Dakota Geological Survey Bulletin 42.

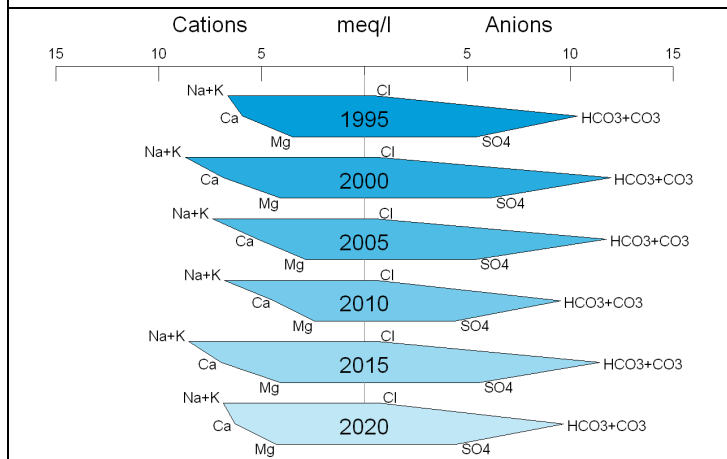
Water Chemistry

Is Aquifer Water High in...?	Analyte	Result	2020 Median Concentration	Potential Effects
	Arsenic	Locally	0.005 mg/L	Skin or circulatory system damage, increased cancer risk
	Iron	YES	12.8 mg/L	Metallic taste/odor, discoloration of surfaces
	Manganese	YES	1.01 mg/L	
	Sodium	YES	154 mg/L	Taste, people with certain health conditions may need to limit intake
	Sulfate	NO	213 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).				

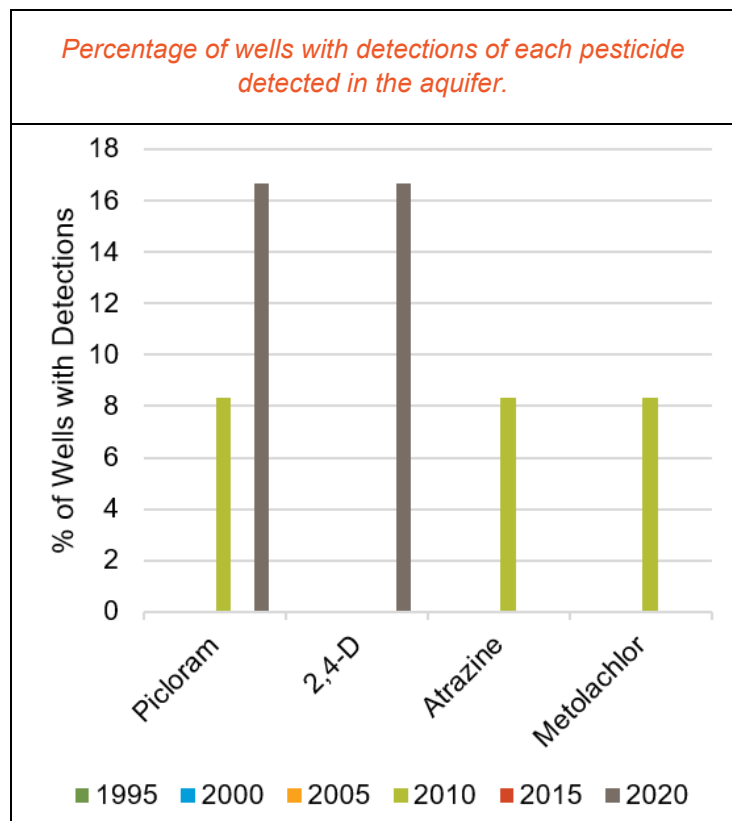
Dominant Water Type	Water Hardness
Sodium-Bicarbonate	Very Hard

Nitrate
<i>Percentage of Wells Exceeding the Nitrate Maximum Contaminant Level (MCL)* (10 mg/L as N).</i>
No Nitrate MCL Exceedances

Stiff diagram of aquifer median general water chemistry. Changes in diagram shape represent changes in general chemistry.



Pesticides



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	Picloram at 50% of MCL in 2011, not detected above PAL in later samples
MCL or HAL Exceedances	None

Number of Unique Wells with Pesticide Detections since 1995	3 of 24 Total Wells
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2020 Pesticide Detections		
Picloram	1 Well	Herbicide applied to crops and roads/rights-of-way
2,4-D	1 Well	Herbicide applied to crops and lawns

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

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