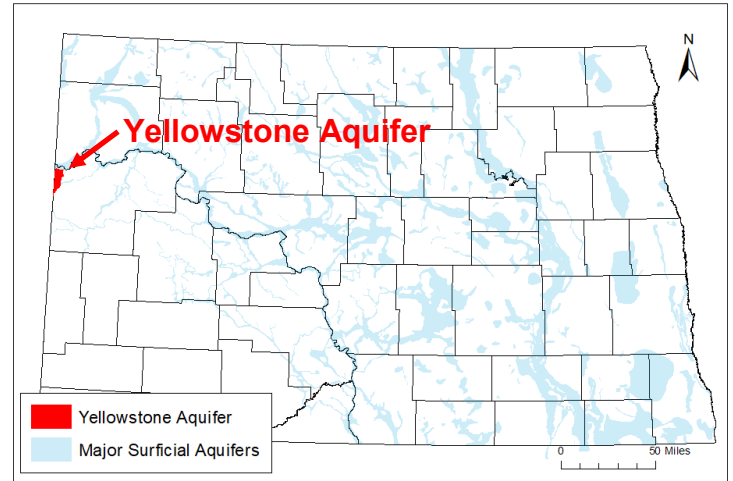


# Yellowstone Aquifer

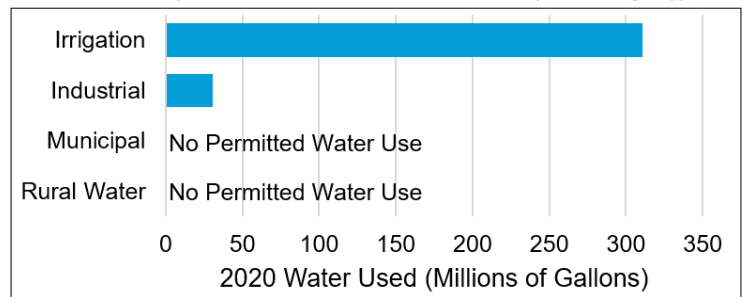
## McKenzie County

Aquifer At-a-Glance	
Area	45.6 square miles
Aquifer Type	Unconfined Surficial
Major Land Uses over Aquifer (percentage of aquifer area covered in 2017) <sup>1</sup>	Crops (66%) Open Water/Wetlands (22%)
Depth to Water (2021)*	9-12 feet
Total Unique Wells Sampled	21
Wells Sampled in 2021	11
Samples Collected in 2021	15
Years Sampled	1996, 2001, 2006, 2011, 2016, 2021

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



2020 Yellowstone aquifer permitted water use (from North Dakota Department of Water Resources ([dwr.nd.gov](http://dwr.nd.gov))) ↓



- Aquifer materials consist of sands and gravels. Most of these materials were deposited by the Yellowstone and Missouri Rivers when they were blocked by glaciers north of Williston during the last ice age.<sup>2</sup>
- The aquifer is up to 135 feet thick and averages 100 feet thick.<sup>2</sup>
- Domestic and industrial wells are common in the aquifer. Irrigation and stock wells are also installed in the aquifer.
- In North Dakota, permits are required to withdraw large quantities of groundwater. In 2020, 341 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 Department of Water Resources ([dwr.nd.gov](http://dwr.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.

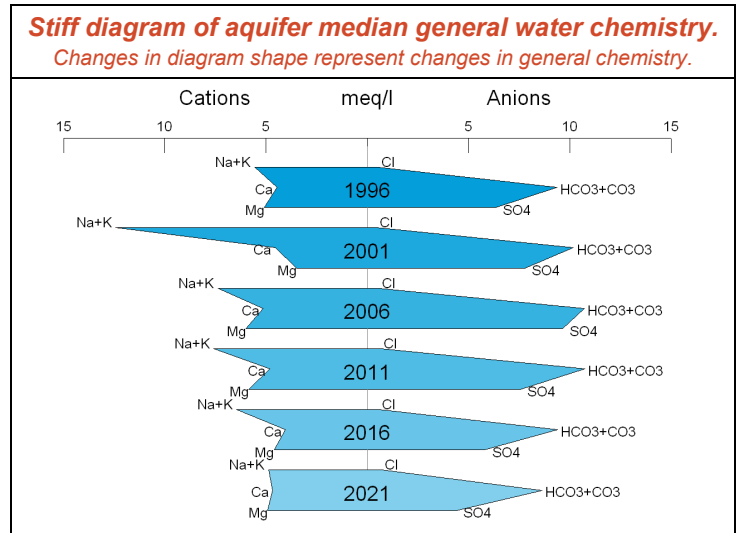
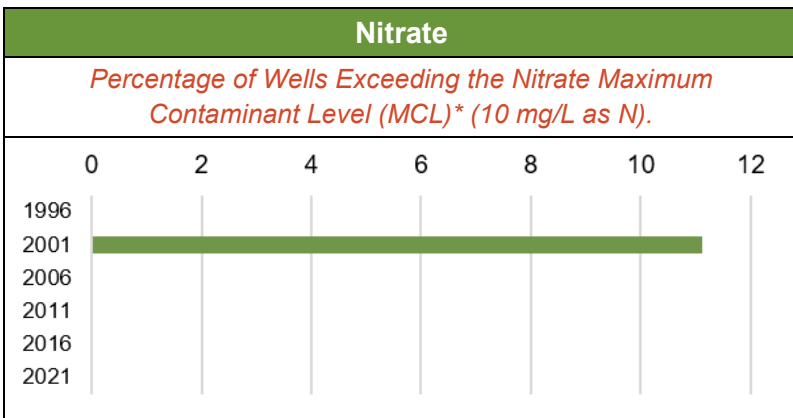
**References**  
 (1) US Department of Agriculture, 2017, National Agricultural Statistics Service Cropland Data Layer.  
 (2) Croft, M.G., 1985, Ground-Water Resources of McKenzie County, North Dakota, North Dakota State Water Commission County Ground Water Studies 37-Part 3, North Dakota Geological Survey Bulletin 80.

# Water Chemistry

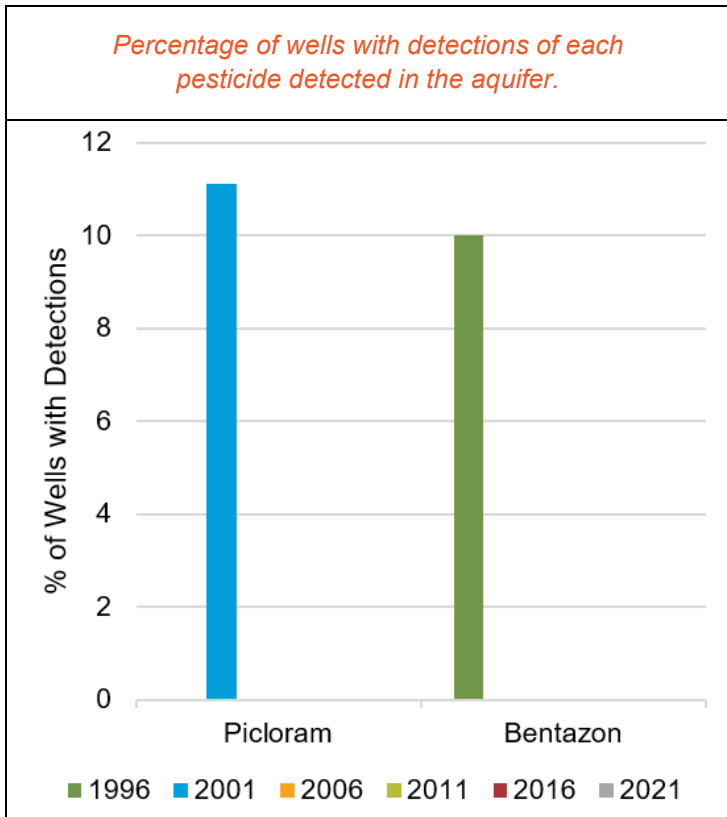
Is Aquifer Water High in...?	Analyte	Result	2021 Median Concentration	Potential Effects
	Arsenic	Locally	< 0.005 mg/L	Skin or circulatory system damage, increased cancer risk
	Iron	Locally	< 0.05 mg/L	
	Manganese	YES	0.24 mg/L	Metallic taste/odor, discoloration of surfaces
	Sodium	YES	108 mg/L	
	Sulfate	Locally	211 mg/L	Taste, people with certain health conditions may need to limit intake
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](http://deq.nd.gov/wq/1_Groundwater)) or visit the US EPA website ([epa.gov/ground-water-and-drinking-water](http://epa.gov/ground-water-and-drinking-water)).

Dominant Water Type	Water Hardness
Sodium-Magnesium-Bicarbonate	Very Hard



# 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	None
MCL or HAL Exceedances	None

Number of Unique Wells with Pesticide Detections since 1996	2 of 21 Total Wells
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2021 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.