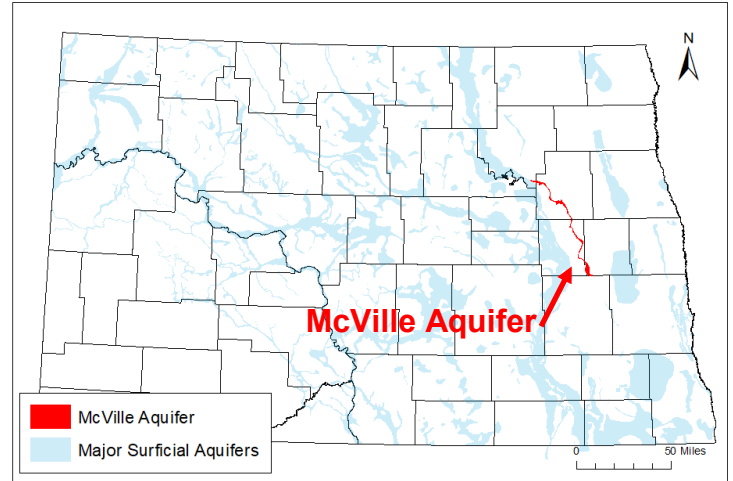


McVile Aquifer

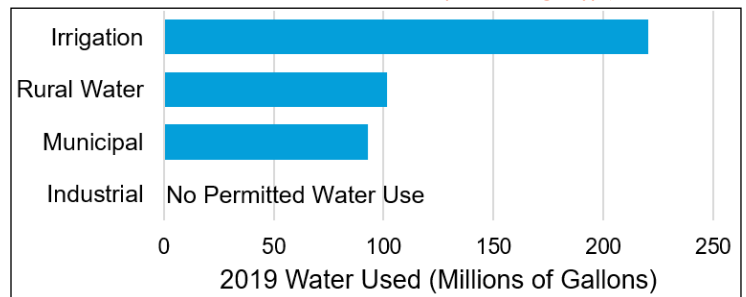
Griggs, Nelson, and Steele Counties

Aquifer At-a-Glance	
Area	60.2 square miles
Aquifer Type	Unconfined Surficial
Major Land Uses over Aquifer (percentage of aquifer area covered in 2017) ¹	Crops (49%) Grassland/Pasture (24%)
Depth to Water (2018)*	3-45 feet
Total Unique Wells Sampled	12
Wells Sampled in 2018	3
Samples Collected in 2018	3
Years Sampled	1998, 2003, 2008, 2013, 2018

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



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



- Aquifer materials consist of sands and gravels that fill an ancient river channel. Northern parts of the aquifer underly a layer of glacially-derived clay.^{2,3}
- The aquifer ranges from a quarter to a half mile wide for most of its length. Thicknesses vary widely from a foot to over 300 feet. Average thicknesses range from 80 feet in Steele and Griggs counties to 180 feet in Nelson County.^{2,3}
- Domestic, irrigation, and stock wells are installed in the aquifer.
- The cities of Cooperstown, McVile, and Lakota and the Dakota Rural Water District rural water system draw water from the aquifer.
- In North Dakota, permits are required to withdraw large quantities of groundwater. In 2019, 415 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).

References

(1) US Department of Agriculture, 2017, National Agricultural Statistics Service Cropland Data Layer.
 (2) Downey, J.S., 1973, Ground-Water Resources of Nelson and Walsh Counties, North Dakota, North Dakota State Water Commission County Ground-Water Studies 17-Part 3, North Dakota Geological Survey Bulletin 57.
 (3) Downey, J.S. & Armstrong, C.A., 1977, Ground-Water Resources of Griggs and Steele Counties, North Dakota, North Dakota State Water Commission County Ground-Water Studies 21-Part 3, North Dakota Geological Survey Bulletin 64.

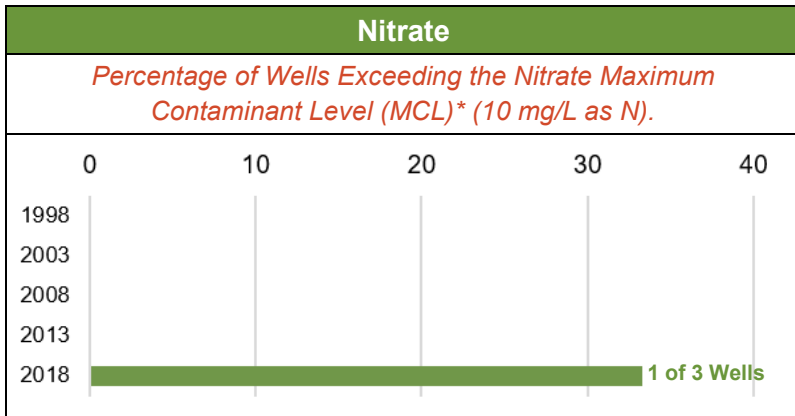
About the Agricultural Groundwater Monitoring Program

- 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.

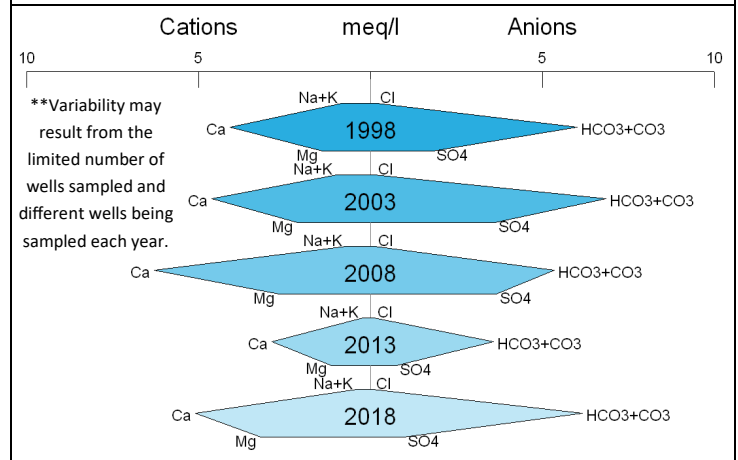
Water Chemistry

Is Aquifer Water High in...?	Analyte	Result	2018 Median Concentration	Potential Effects
	Arsenic	Locally	<0.005 mg/L	Skin or circulatory system damage, increased cancer risk
	Iron	YES	1.73 mg/L	Metallic taste/odor, discoloration of surfaces
	Manganese	YES	0.76 mg/L	
	Sodium	NO	7.5 mg/L	Taste, people with certain health conditions may need to limit intake
	Sulfate	NO	46.7 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-Bicarbonate	Very Hard



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 1998	0 of 12 Total Wells
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2018 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.