

# Lake Nettie Aquifer

## McLean and Sheridan Counties

### Aquifer At-a-Glance

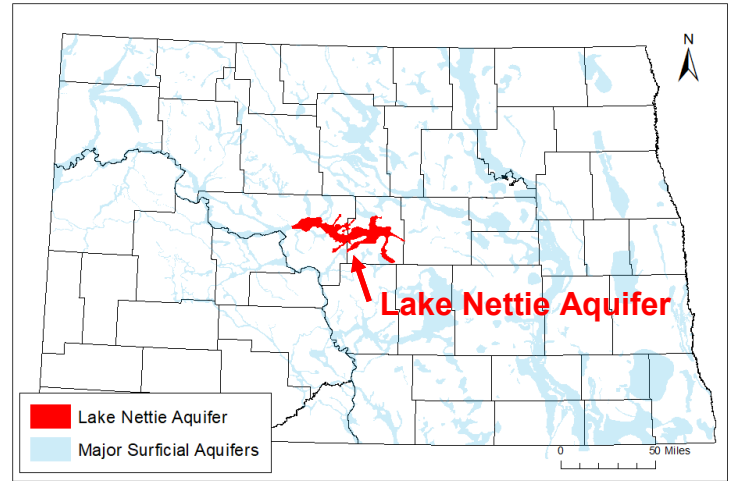
Area	419.0 square miles
Aquifer Type	Unconfined and Confined Surficial
Major Land Uses over Aquifer (percentage of aquifer area covered in 2017) <sup>1</sup>	Crops (39%) Grassland/Pasture (36%)
Depth to Water (2020)*	1-37 feet
Total Unique Wells Sampled	58
Wells Sampled in 2020	32
Samples Collected in 2020	38
Years Sampled	1995, 2000, 2005, 2010, 2015, 2020

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

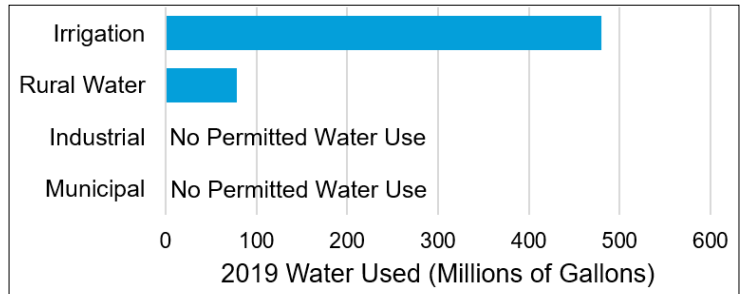
- Aquifer materials consist of sands and gravels that fill an ancient valley that was carved by meltwater from glaciers. The aquifer consists of up to three layers separated by clay tills deposited by glaciers. Some parts of the uppermost layer are overlain by clay till.<sup>2,3</sup>
- The aquifer is over 300 feet thick in places and averages 70 feet thick. The uppermost layer of the aquifer ranges from 2-74 feet thick in McLean County and 10-185 feet thick in Sheridan County.<sup>2,3</sup>
- Domestic and stock wells are common in the aquifer. Irrigation wells are also installed in the aquifer.
- The McLean-Sheridan Rural Water District draws water from the aquifer.
- In North Dakota, permits are required to withdraw large quantities of groundwater. In 2019, 558 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](http://swc.nd.gov)).

#### References

- (1) US Department of Agriculture, 2017, National Agricultural Statistics Service Cropland Data Layer.
- (2) Burkart, M.R., 1981, Ground-Water Resources of Sheridan County, North Dakota, North Dakota State Water Commission County Ground-Water Studies 32-Part 3, North Dakota Geological Survey Bulletin 75.
- (3) Klausning, R.L., 1974, Ground-Water Resources of McLean County, North Dakota, North Dakota State Water Commission County Ground-Water Studies 19-Part 3, North Dakota Geological Survey Bulletin 60.



2019 Lake Nettie aquifer permitted water use (from North Dakota State Water Commission ([swc.nd.gov](http://swc.nd.gov)))↓



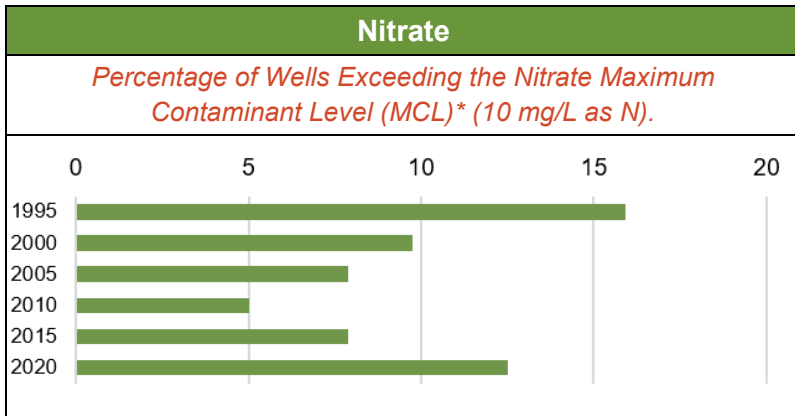
### About the Agricultural Groundwater Monitoring Program

- 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.

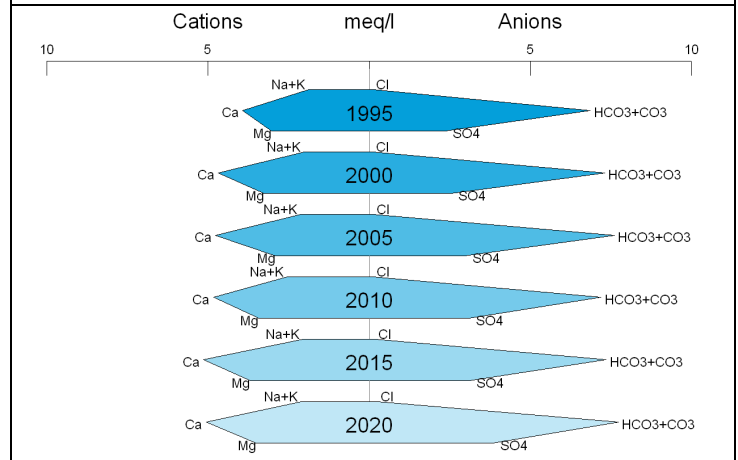
# Water Chemistry

Is Aquifer Water High in...?	Analyte	Result	2020 Median Concentration	Potential Effects
	Arsenic	Locally	0.006 mg/L	Skin or circulatory system damage, increased cancer risk
	Iron	YES	3.45 mg/L	Metallic taste/odor, discoloration of surfaces
	Manganese	YES	0.66 mg/L	
	Sodium	NO	44.4 mg/L	Taste, people with certain health conditions may need to limit intake
	Sulfate	NO	184 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 ( <a href="http://deq.nd.gov/wq/1_Groundwater">deq.nd.gov/wq/1_Groundwater</a> ) or visit the US EPA website ( <a href="http://epa.gov/ground-water-and-drinking-water">epa.gov/ground-water-and-drinking-water</a> ).				

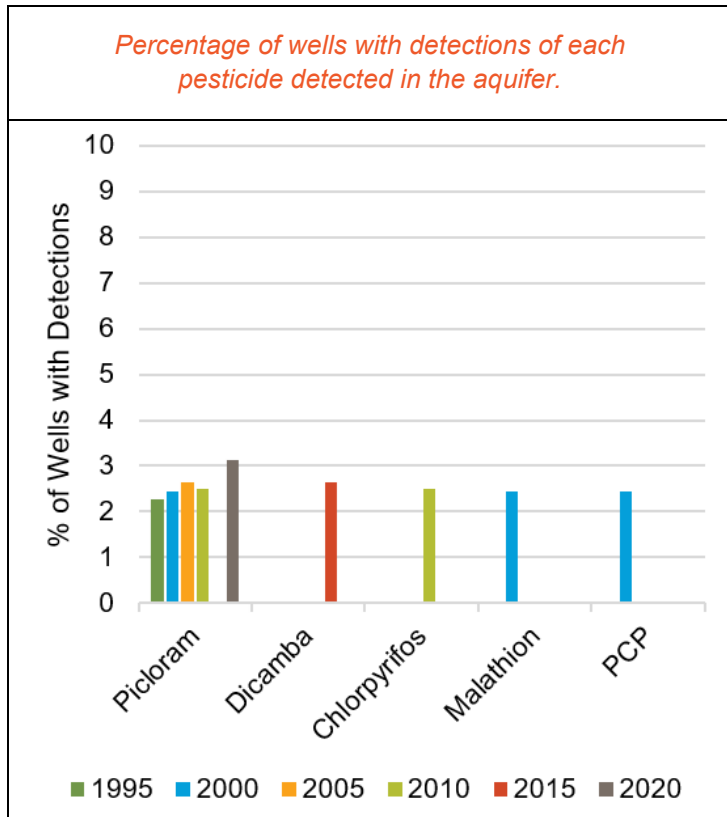
Dominant Water Type	Water Hardness
Calcium-Bicarbonate	Very Hard



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



# Pesticides



## 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: **5** of 58 Total Wells

## 2020 Pesticide Detections

Picloram	1 Well	Herbicide applied to crops and roads/rights-of-way
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\*Note that MCLs are for public drinking water systems; private wells are not regulated in North Dakota. MCLs still provide guidelines for drinking groundwater.

Feel free to use this information, but please credit the North Dakota Department of Environmental Quality.