NORTH Dakota | Environmental Quality

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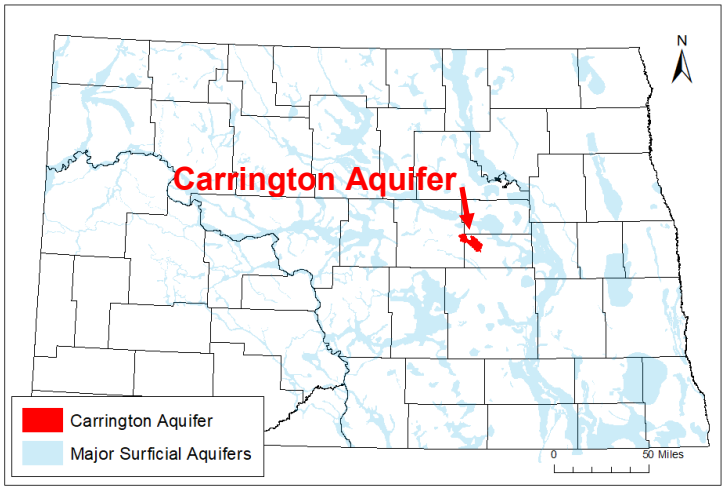
Agricultural Groundwater Monitoring Program

Carrington Aquifer

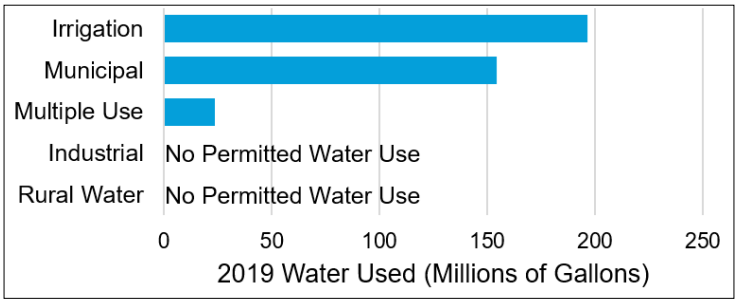
Foster and Wells Counties

Aquifer At-a-Glance	
Area	58.0 square miles
Aquifer Type	Unconfined and Confined Surficial
Major Land Uses over Aquifer (percentage of aquifer area covered in 2017)[1]	Crops (80%) Grassland/Pasture (7%)
Depth to Water (2020)*	3-30 feet
Total Unique Wells Sampled	35
Wells Sampled in 2020	17
Samples Collected in 2020	23
Years Sampled	1995, 2000, 2005, 2010, 2015, 2020

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



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



- Aquifer materials consist of sands and gravels that were deposited by streams moving meltwater away from glaciers during the last ice age. Much of the aquifer is overlain by up to 40-60 feet of clay till deposited by glaciers.[2,3]
- The aquifer is up to 80 feet thick and thins toward its edges. It averages about 40 feet thick.[2,3]
- Domestic, irrigation, and stock wells are installed in the aquifer.
- The city of Carrington draws water from the aquifer.
- In North Dakota, permits are required to withdraw large quantities of groundwater. In 2019, 375 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) Buturla, F. Jr., 1970, Geology and Ground-Water Resources of Wells County, North Dakota, North Dakota State Water Commission County Ground-Water Studies 12-Part 3, North Dakota Geological Survey Bulletin 51.

(3) Trapp, H. Jr., 1968, Geology and Ground-Water Resources of Eddy and Foster Counties, North Dakota, North Dakota State Water Commission County Ground-Water Studies 5-Part 3, North Dakota Geological Survey Bulletin 44.

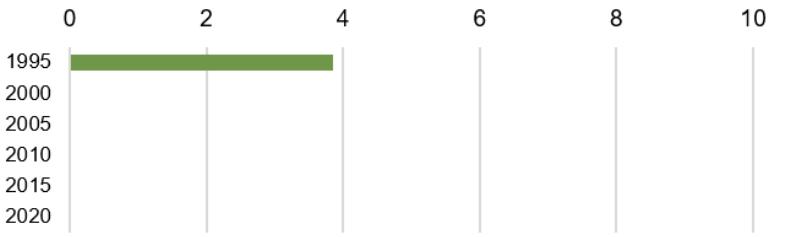
Water Chemistry

Is Aquifer Water High in…?	Analyte	Result	2020 Median Concentration	Potential Effects
	Arsenic	YES	0.013 mg/L	Skin or circulatory system damage, increased cancer risk
	Iron	YES	5.5 mg/L	Metallic taste/odor, discoloration of surfaces
	Manganese	YES	0.52 mg/L	
	Sodium	NO	35.3 mg/L	Taste, people with certain health conditions may need to limit intake
	Sulfate	NO	128 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

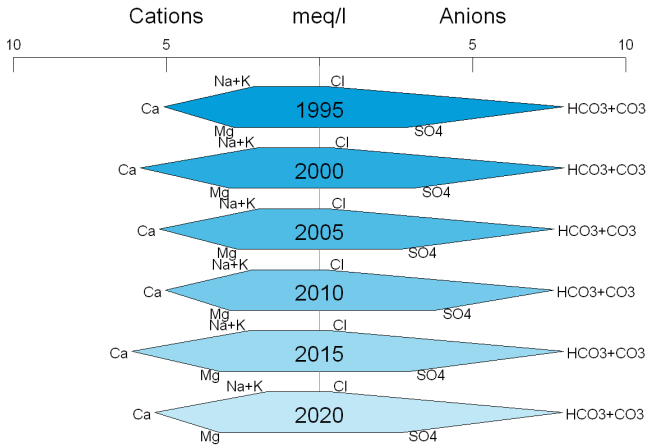
Nitrate

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



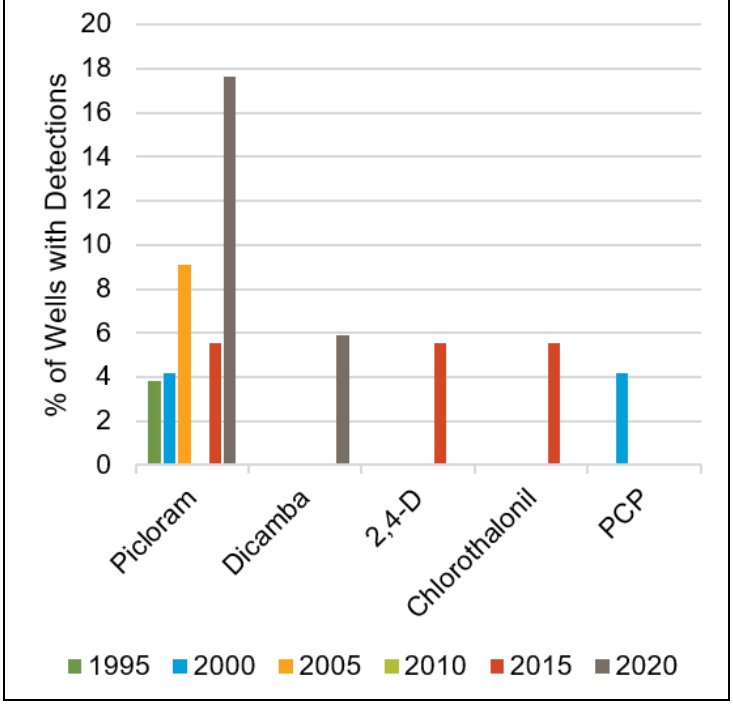
Stiff diagram of aquifer median general water chemistry.

Changes in diagram shape represent changes in general chemistry.



Pesticides

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



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	**7** of 35 Total Wells

2020 Pesticide Detections

Picloram	3 Wells	Herbicide applied to crops and roads/rights-of-way
Dicamba	1 Well	Herbicide applied to crops

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