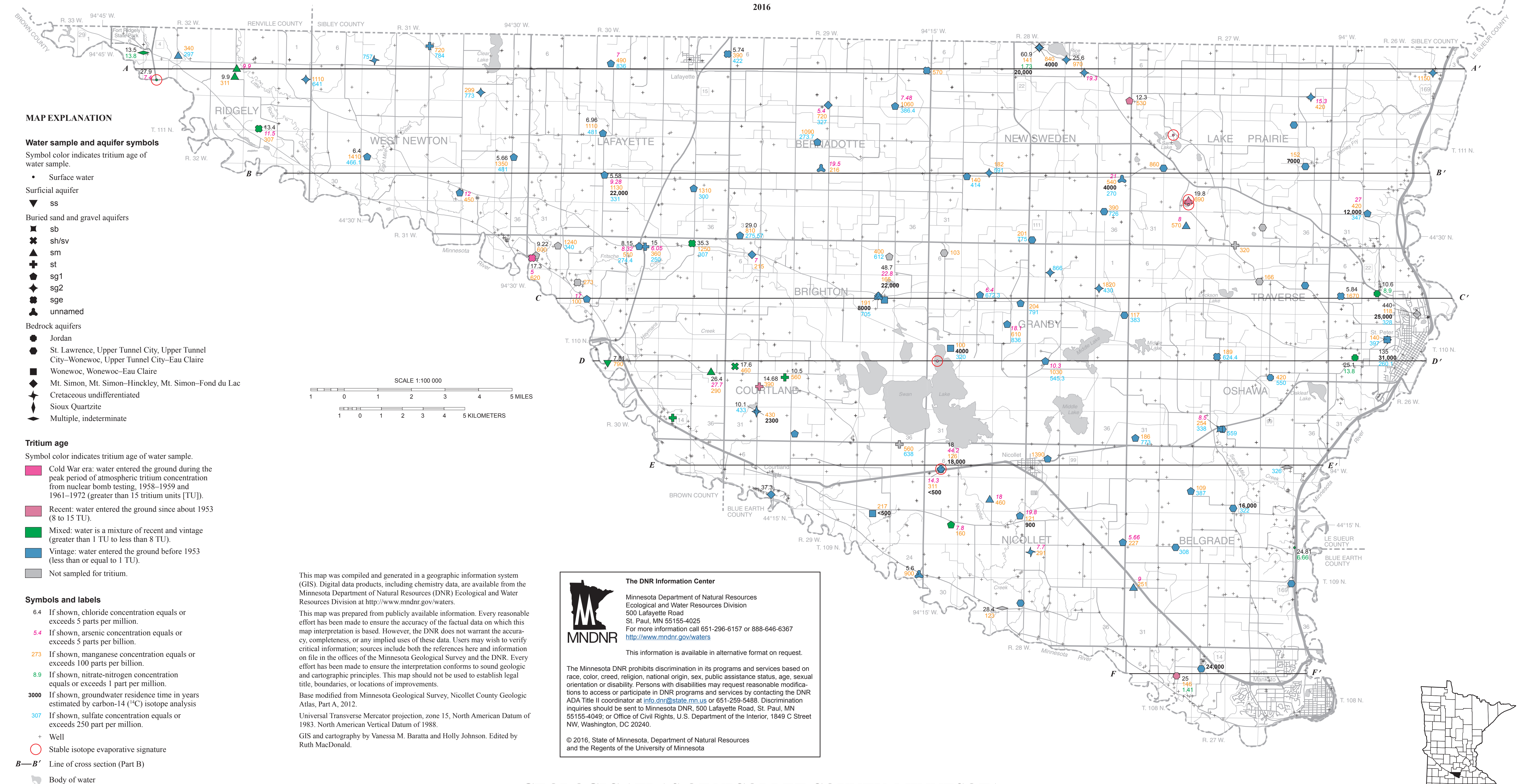


Chemical Hydrogeology
By Vanessa M. Baratta and Todd A. Petersen

2016



MAP EXPLANATION

Water sample and aquifer symbols

Symbol color indicates tritium age of water sample.

- Surface water
- Surficial aquifer
 - ▼ ss
- Buried sand and gravel aquifers
 - sb
 - ✕ sh/sv
 - ▲ sm
 - ⊕ st
 - ◆ sg1
 - ◆ sg2
 - ◆ sge
 - unnamed
- Bedrock aquifers
 - Jordan
 - St. Lawrence, Upper Tunnel City, Upper Tunnel City-Wonewoc, Upper Tunnel City-Eau Claire
 - Wonewoc, Wonewoc-Eau Claire
 - ◆ Mt. Simon, Mt. Simon-Hinckley, Mt. Simon-Fond du Lac
 - ◆ Cretaceous undifferentiated
 - ◆ Sioux Quartzite
 - ◆ Multiple, indeterminate

Tritium age

Symbol color indicates tritium age of water sample.

- Cold War era: water entered the ground during the peak period of atmospheric tritium concentration from nuclear bomb testing, 1958–1959 and 1961–1972 (greater than 15 tritium units [TU]).
- Recent: water entered the ground since about 1953 (8 to 15 TU).
- Mixed: water is a mixture of recent and vintage (greater than 1 TU to less than 8 TU).
- Vintage: water entered the ground before 1953 (less than or equal to 1 TU).
- Not sampled for tritium.

Symbols and labels

- 6.4 If shown, chloride concentration equals or exceeds 5 parts per million.
- 5.4 If shown, arsenic concentration equals or exceeds 5 parts per billion.
- 273 If shown, manganese concentration equals or exceeds 100 parts per billion.
- 8.9 If shown, nitrate-nitrogen concentration equals or exceeds 1 part per million.
- 3000 If shown, groundwater residence time in years estimated by carbon-14 (¹⁴C) isotope analysis
- 307 If shown, sulfate concentration equals or exceeds 250 part per million.
- + Well
- Stable isotope evaporative signature
- B—B' Line of cross section (Part B)
- Body of water

This map was compiled and generated in a geographic information system (GIS). Digital data products, including chemistry data, are available from the Minnesota Department of Natural Resources (DNR) Ecological and Water Resources Division at <http://www.mndnr.gov/waters>.

This map was prepared from publicly available information. Every reasonable effort has been made to ensure the accuracy of the factual data on which this map interpretation is based. However, the DNR does not warrant the accuracy, completeness, or any implied uses of these data. Users may wish to verify critical information; sources include both the references here and information on file in the offices of the Minnesota Geological Survey and the DNR. Every effort has been made to ensure the interpretation conforms to sound geologic and cartographic principles. This map should not be used to establish legal title, boundaries, or locations of improvements.

Base modified from Minnesota Geological Survey, Nicollet County Geologic Atlas, Part A, 2012.

Universal Transverse Mercator projection, zone 15, North American Datum of 1983. North American Vertical Datum of 1988.

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The DNR Information Center

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