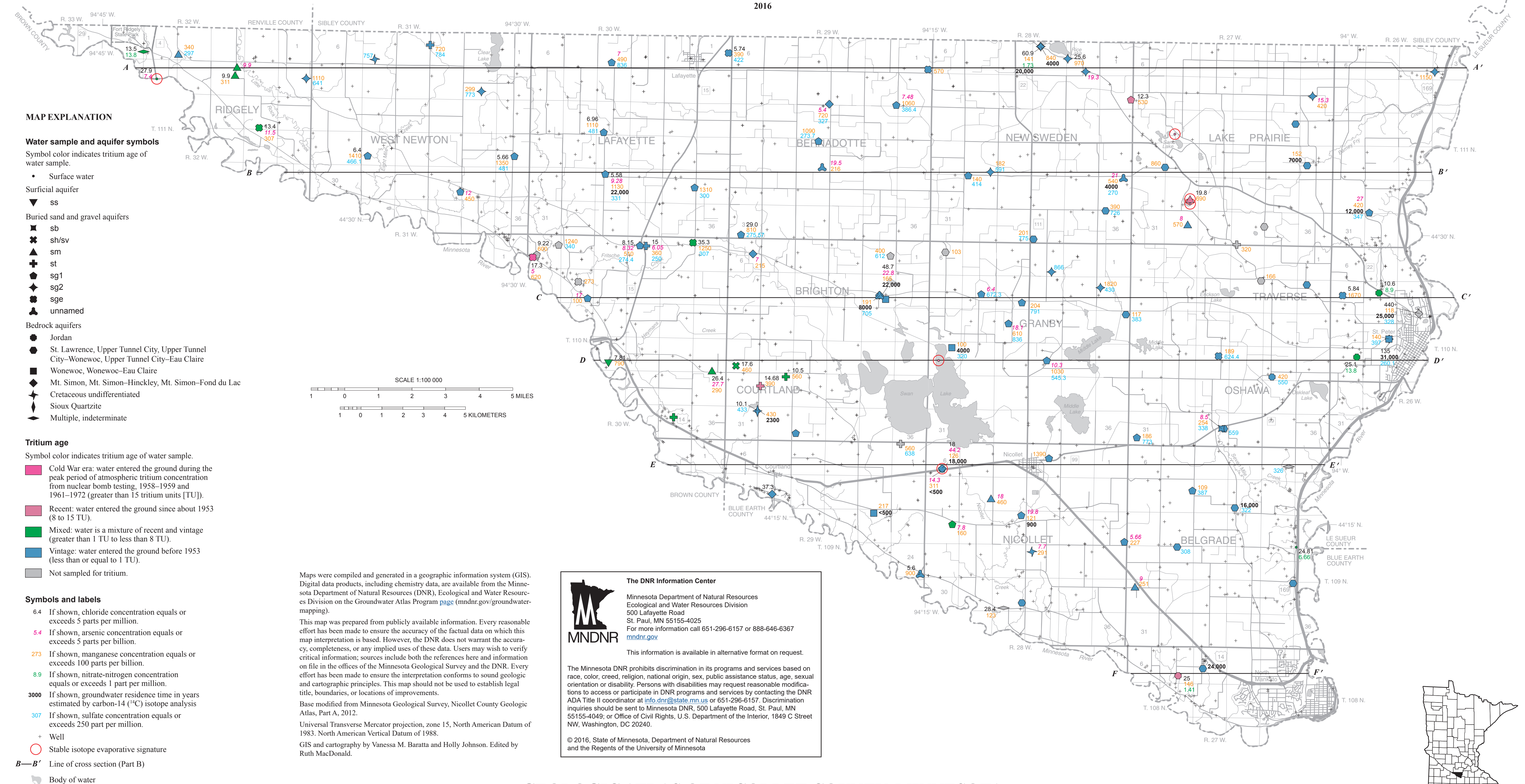


Chemical Hydrogeology
By Vanessa M. Baratta and Todd A. Petersen

To accompany atlas Report and Plate 8.

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

Maps were 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 on the Groundwater Atlas Program [page](http://mndnr.gov/groundwater-mapping) (mndnr.gov/groundwater-mapping).

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.

GIS and cartography by Vanessa M. Baratta and Holly Johnson. Edited by Ruth MacDonald.

The DNR Information Center

Minnesota Department of Natural Resources
Ecological and Water Resources Division
500 Lafayette Road
St. Paul, MN 55155-4025
For more information call 651-296-6157 or 888-646-6367
mndnr.gov

This information is available in alternative format on request.

The Minnesota DNR prohibits discrimination in its programs and services based on race, color, creed, religion, national origin, sex, public assistance status, age, sexual orientation or disability. Persons with disabilities may request reasonable modifications to access or participate in DNR programs and services by contacting the DNR ADA Title II coordinator at info.dnr@state.mn.us or 651-296-6157. Discrimination inquiries should be sent to Minnesota DNR, 500 Lafayette Road, St. Paul, MN 55155-4049; or Office of Civil Rights, U.S. Department of the Interior, 1849 C Street NW, Washington, DC 20240.

© 2016, State of Minnesota, Department of Natural Resources and the Regents of the University of Minnesota

