

Manganese & PRIVATE WELLS



What is manganese?

Manganese is a natural element found in soil, water, air, and rocks deep underground. In the environment, manganese is often found combined with other elements such as iron, oxygen, sulfur, and chlorine.

Manganese is used to make fireworks, batteries, fertilizer, paints, and cosmetics. Manganese can also be used as an additive in gasoline.

How does manganese get in my private well water?

Manganese can enter your private well water from erosion of rocks underground and leaching from soil into groundwater. Manganese can also enter groundwater from steel and aluminum manufacturing.

How can manganese affect my health?

Manganese is an essential element, meaning your body needs it in small amounts. It helps with bone mineralization, energy metabolism, metabolic regulation, and cellular protection. However, drinking high levels of manganese may cause adverse health effects. Manganese has a specific smell and taste and may cause black staining on dishware and clothes.

Drinking high levels of manganese over short periods of time can lead to:

- Muscle rigidity
- Tremors
- Weakness or fatigue
- Irritability

Pregnant women, infants, and children are more at risk for manganese toxicity.

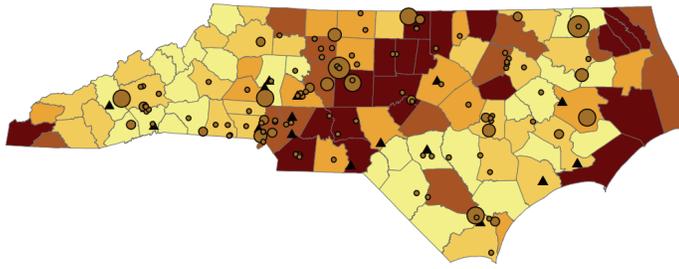
What level of manganese should I be concerned about?

The **US Environmental Protection Agency** developed a health advisory level of **0.3 milligrams of manganese per liter of water (mg/L)**. This health advisory was developed to help protect children from adverse neurological impacts associated with chronic oral exposures manganese (i.e. drinking water).

The **US Environmental Protection Agency** and **NC Department of Environmental Quality** developed an aesthetic standard of **0.05 mg/L**. This standard was developed to prevent bitter metallic taste and brown-black staining of water. This standard was developed in 1989.

Where is manganese found in NC?

Manganese is found in various concentrations across North Carolina. The Mountain region counties average 0.05 mg/L with approximately 15% of tested wells exceeding the 0.05 mg/L aesthetic standard. Counties in the Piedmont region had the highest average manganese levels (0.09 mg/L), with 24% of wells exceeding the 0.05 mg/L aesthetic standard. The Coastal Plain counties' well water results averaged 0.06 mg/L with 22% of wells exceeding the aesthetic standard. Alleghany, Caswell, Guilford, Stanly and Wilson counties are counties with the highest overall manganese averages. The maximum manganese levels in individual wells were found in Guilford (46 mg/L), Caswell (45 mg/L), Cherokee (37 mg/L), and Jackson (26 mg/L) counties. However, **most wells in NC have no risk of exceeding the federal health advisory level of 0.300 mg/L.**



Manganese reported in Toxics Release Inventory (lbs.)

- 0.1 - 19,211
- 19,212 - 65,818
- 65,819 - 137,533
- 137,534 - 266,828
- 266,829 - 640,115

▲ National Priorities List sites reporting manganese

Concentration of manganese detected in private wells (µg/L)

- 15.00 - 35.00
- 35.01 - 50.00
- 50.01 - 75.00
- 75.01 - 100.00
- 100.01 - 281.71

Manganese SMCL: 50 µg/L

Manganese is a naturally-occurring element, of which a small amount is essential for all plants and animals. Manganese may be present in drinking water from the erosion of natural deposits. It is also used in steel production and may be added as an octane enhancer in some gasoline.^{11,28}

[Health information about manganese.](#)

How do I test for manganese in my private well?

Use a certified lab to test your well water for manganese every two years, as part of the North Carolina Division of Public Health’s (NC DPH) recommended inorganic panel screen. Contact the private well program at your county health department to assist you with getting your water tested. Pricing of testing varies from county to county.

What if my manganese levels are high?

You can install a treatment system to reduce the levels of manganese in your private well.

Treatment systems that reduce the levels of manganese in your well water include:

- Oxidizing Filtration
- Cation exchange, also known as a Water Softener

You can also reduce your exposure by using bottled water or connecting to a public water supply, if possible.

Where can I find more information about manganese and my well?

Visit the NC Division of Public Health’s Private Well and Health Program website: <http://epi.publichealth.nc.gov/oe/programs/wellwater.html>.

There you can find:

- Contacts for your county private well program
- Manganese in well water maps
- A guide for selecting a treatment system
- Other private well resources

You can also call the NC DPH’s Private Well and Health Program at 919-707-5900.

Where did this information come from?

ATSDR: www.atsdr.cdc.gov/toxfaqs/tfacts151.pdf

EPA: www.epa.gov/ccl/regulatory-determination-1-support-documents-manganese

National Sanitation Foundation: www.nsf.org/consumer-resources/what-is-nsf-certification/water-filters-treatment-certification/contaminant-reduction-claims-guide

NC Department of Environmental Quality: <https://deq.nc.gov/about/divisions/water-resources/water-quality-regional-operations/groundwater-protection/groundwater-quality-monitoring/private-well-water-quality>

NC Department of Health and Human Services: <https://epi.dph.ncdhhs.gov/oe/wellwater/by-county.html>

