

## Nitrate

Nitrate is a compound that occurs naturally and also has many human-made sources. Nitrate is in some lakes, rivers, and groundwater in Minnesota. When nitrate is found in Minnesota groundwater, it is usually at very low concentrations. However, some groundwater has nitrate concentrations that present a health risk—especially for babies. You cannot taste, see, or smell nitrate in your water.

## Safe Level

Drinking water with concentrations of nitrate (measured as nitrate-nitrogen) below 10 milligrams of nitrate per liter of water (mg/L) is considered safe for everyone in your family. 10 mg/L is the U.S. Environmental Protection Agency standard for nitrate in drinking water for public water supplies.

## Health Risks

Consuming too much nitrate can affect how blood carries oxygen and can cause methemoglobinemia (also known as blue baby syndrome). Bottle-fed babies under six months old are at the highest risk of getting methemoglobinemia. Methemoglobinemia can cause skin to turn a bluish color and, left untreated, can result in serious illness or death.

The following conditions may also put people at higher risk of developing methemoglobinemia: anemia, cardiovascular disease, lung disease, sepsis, glucose-6-phosphate-dehydrogenase deficiency, and some metabolic problems.

## Prevent Contamination

- **Keep nitrate sources away from your well.** Sources may include fertilizer, septic systems, and animal waste.
- **Construct your well in a safe spot.** See the “Protecting Your Well” webpage for tips.
- **Regularly inspect your well for damage.** Contact a licensed well contractor if your well is damaged.

## Test Your Well Water

### Test for nitrate every other year.

You are responsible for keeping your well water safe and testing it as needed. MDH recommends you use an accredited laboratory to test your water. Contact an accredited laboratory to get sample containers and instructions, or ask your county environmental or public health services if they provide well testing services.



*MDH may recommend you test for additional contaminants based on where you live.*

## Address Contamination

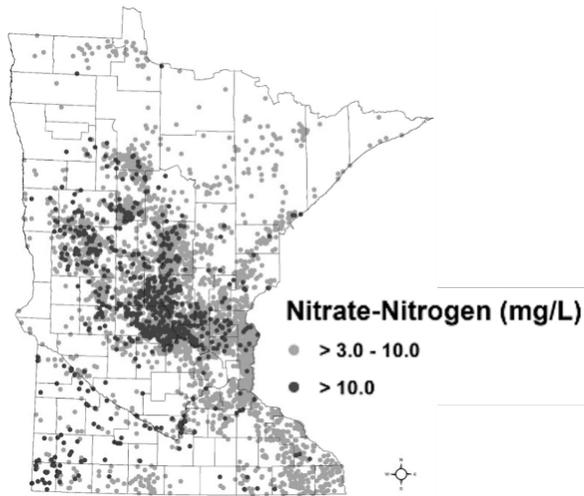
Drinking water with concentrations of nitrate above 10 mg/L can cause immediate health problems. If nitrate is detected in your water at concentrations above 10 mg/L, follow these steps:

- Get your drinking water from a safe alternative source.
  - Make sure babies under six months old do not drink the well water.
  - Do not try to boil nitrate out of the water. Boiling will make nitrate more concentrated.
  - Have a licensed well contractor inspect your well.
  - Find and get rid of any potential sources of nitrate contamination. The “Protecting Your Well” webpage can help you identify sources to check.
  - Home water treatment may be an option if you meet these three criteria:
    1. You have taken steps to reduce or eliminate all potential sources of nitrate;
    2. A licensed well contractor inspected your well and completed any needed repairs; and
    3. No babies under six months old drink the water.
- See the “Home Water Treatment” webpage or contact MDH for guidance.

## Nitrate in Minnesota Water

About four percent of new wells have nitrate concentrations above 3 mg/L in Minnesota. Concentrations of nitrate above 3 mg/L are likely the result of runoff or leakage from fertilized soil, animal feedlots, septic systems, wastewater, landfills, or urban drainage. It can be difficult to pinpoint where the nitrate in drinking water comes from due to the many possibilities.

- Most concentrations above 3 mg/L are in central and southeastern Minnesota.
- Concentrations above 10 mg/L are mainly in central and southwestern Minnesota.



*Nitrate-Nitrogen in New Private Wells (1991-2016)*

## Wells Vulnerable to Nitrate

- Shallow wells.
- Dug wells with casing that is not watertight.
- Wells with damaged or leaking casing or fittings.

## Resources

- [Protecting Your Well](http://www.health.state.mn.us/divs/eh/wells/construction/protect.html)  
([www.health.state.mn.us/divs/eh/wells/construction/protect.html](http://www.health.state.mn.us/divs/eh/wells/construction/protect.html)).
- [Licensed Well and Boring Contractor Directory](http://www.health.state.mn.us/lwcsearch)  
([www.health.state.mn.us/lwcsearch](http://www.health.state.mn.us/lwcsearch)).
- [Search for Accredited Laboratories](http://www.health.state.mn.us/labsearch)  
([www.health.state.mn.us/labsearch](http://www.health.state.mn.us/labsearch)).
- [Home Water Treatment](http://www.health.state.mn.us/divs/eh/water/factsheet/com/pou.html)  
([www.health.state.mn.us/divs/eh/water/factsheet/com/pou.html](http://www.health.state.mn.us/divs/eh/water/factsheet/com/pou.html)).

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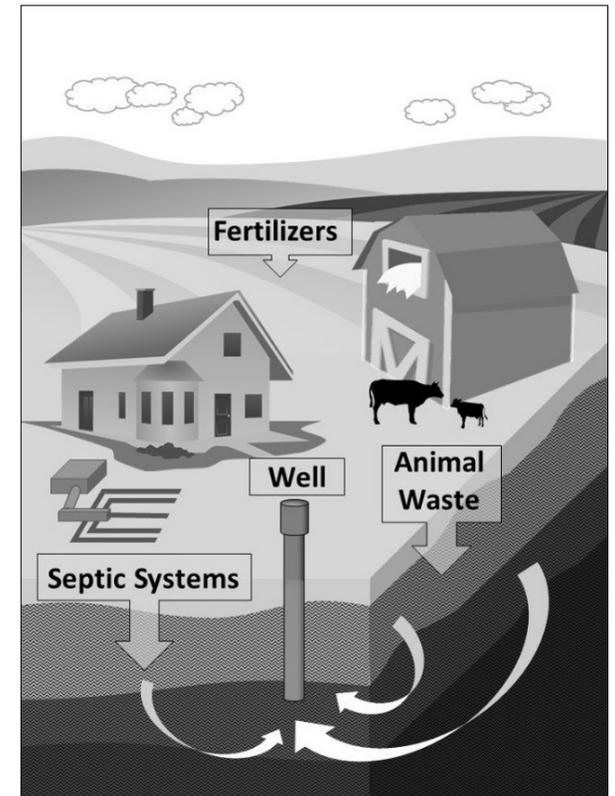
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# Nitrate in Well Water



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Well Management Section  
Environmental Health Division