Iron and Iron Bacteria

Gallatin Local Water Quality District
Gallatin County, Montana

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Iron

Iron is a naturally occurring mineral and is not a health concern when present in your well water. It is found in rocks and soil and is the fourth most common element in Earth's crust. Iron in well water is the result of groundwater interacting with rock or sediment that contains iron. Its presence can also be from corrosion of pipes or plumbing when the pH of the water is below 6.5. When iron is oxidized, or in its ferric form, it is easily discernable by its reddish rust color. Dissolved, ferrous iron is usually clear but can cause a black appearance in water in some cases. Iron levels vary widely in Gallatin County, and not all wells have detectable iron.

Did you know…

- ***Iron*** *is naturally occurring in some groundwater sources.*
- ***Iron bacteria*** *in your well system are caused by an introduction of the bacteria from the ground surface.*
- *Neither iron nor iron bacteria in your water will make you sick, but both can be a nuisance.*

Iron Bacteria

The term "iron bacteria" describes several types of bacteria that use iron or manganese as their food source. Iron bacteria can be problematic for your well and water system but are not a health concern. The bacteria are caused by an introduction into the well from an outside source, such as drilling equipment or other materials. These microscopic organisms grow in colonies and appear orange-brown to pink in color, and grow in layers protected by a slimy biofilm. This biofilm can make getting rid of iron bacteria very difficult.

Signs of a potential iron bacteria problem include decreasing well yield, water that has a smell of "cucumbers", "fuel oil", "sewage", or "must", or the presence of rust colored slime inside of the toilet tank.

Problems

Although iron is an essential nutrient for human health and commonly consumed through food and drink, high levels of iron in well water can be aesthetically displeasing and can provide a food source for iron bacteria. Water with high levels of iron can appear red in color, stain household fixtures or laundry, and can also cause a metallic taste or turn some hot beverages and vegetables a dark color. The U.S. EPA has set a Secondary Maximum Contaminant Level for iron of 0.3 mg/L for color, staining, sediment and taste effects. A laboratory certified for drinking water analysis can help you determine the amount of iron you have in your water.

Iron mineral deposits appear as a hard scale, whereas iron bacteria form biofilms which are soft and slimy.

Iron bacteria can grow into slimy biofilms inside the well casing, or other water system locations such as inside toilet tanks, on faucet screens, pump impellers, well screens, or inside pipes. Large masses of these colonies can break off and obstruct important components of your household water system and cause a reduced yield or flow rate, and potentially even the viability of the well.

Iron bacteria can cause a nuisance, rust-colored, slimy biofilm.

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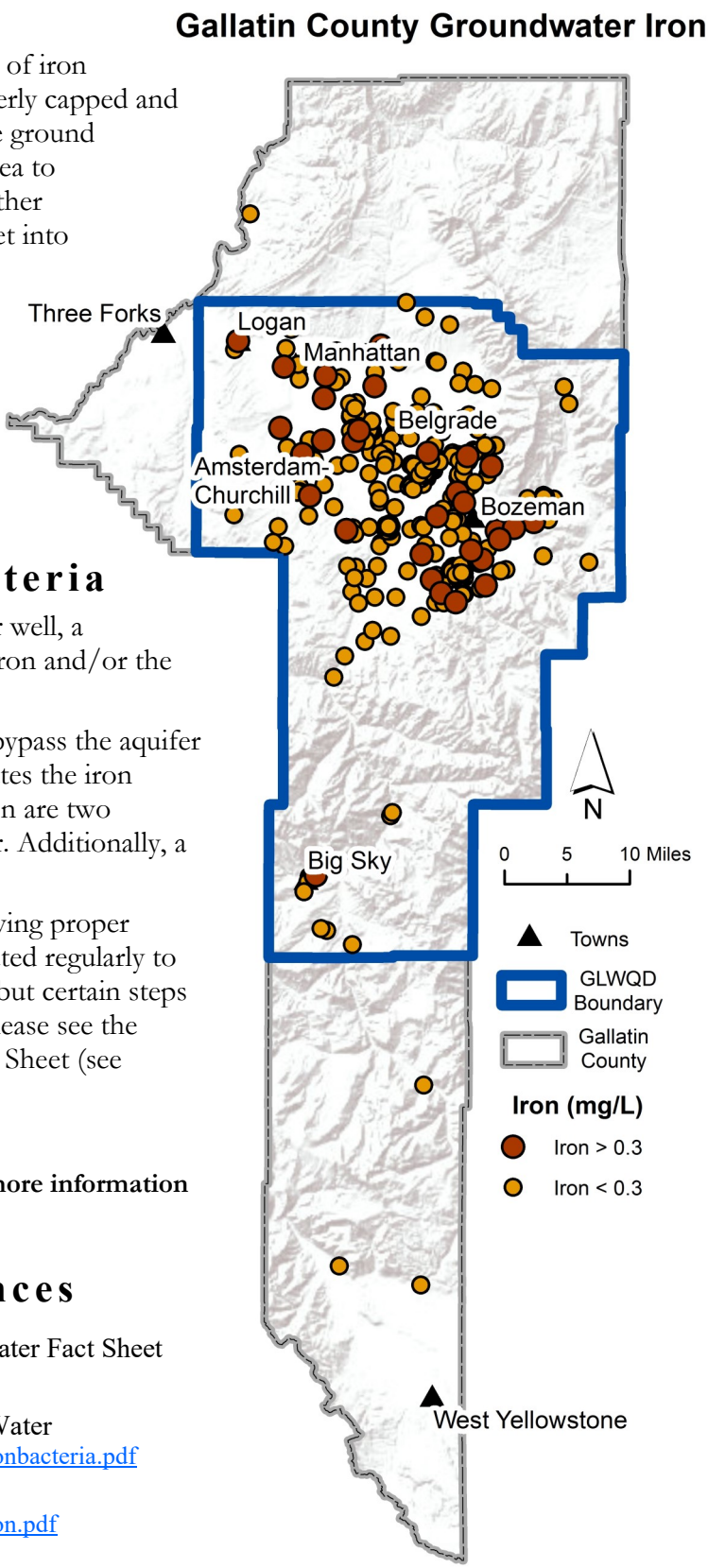
Iron Bacteria Prevention

Because they can be so difficult to remove, prevention of iron bacteria is crucial. The well should be watertight, properly capped and the casing should extend at least eighteen inches above ground surface. Inspect the well casing and the surrounding area to ensure it is intact and free from any cracks, holes, or other conduits for soil and water on the ground surface to get into the well. Anything that goes into the ground during drilling or well maintenance such as tools, pumps, pipe, gravel packing material, and even water entering a well should be disinfected with a strong bleach solution prior to entering the well. Any time the well is serviced, materials and tools should not be placed directly on the ground, and the well should be shock chlorinated afterwards.



Eliminating Iron or Iron Bacteria

If you think you may have iron or iron bacteria in your well, a laboratory certified to test drinking water can test for iron and/or the presence of iron bacteria.

It is sometimes possible to retrofit an existing well to bypass the aquifer zones that contain iron, or to drill a new well that isolates the iron containing zones. Ion exchange and oxidation/filtration are two common treatment options for removing iron in water. Additionally, a water softener can remove around 2-5 mg/L of iron.

If iron bacteria are present, a shock chlorination following proper procedures is recommended and may need to be repeated regularly to control bacteria growth. Shock chlorination is simple, but certain steps must be taken to ensure it is as effective as possible. Please see the GLWQD Domestic Well Disinfection Procedure Fact Sheet (see Further Reading section below for web link).

In severe cases, a well may need to abandoned.

Contact the Gallatin Local Water Quality District for more information at (406) 582-3168 or at www.glwqd.org.

Further Reading and References

Illinois Department of Public Health: Iron In Drinking Water Fact Sheet
http://www.idph.state.il.us/envhealth/factsheets/ironFS.htm

Minnesota Department of Health: Iron Bacteria in Well Water
http://www.health.state.mn.us/divs/eh/wells/waterquality/ironbacteria.pdf

Minnesota Department of Health: Iron in Well Water
http://www.health.state.mn.us/divs/eh/wells/waterquality/iron.pdf

National Groundwater Association Information Sheets
https://www.ngwa.org/what-is-groundwater/Information-sheets

Gallatin Local Water Quality District: Domestic Well Disinfection Procedure
https://glwqd.files.wordpress.com/2016/02/domestic-well-disinfection-procedure.pdf