

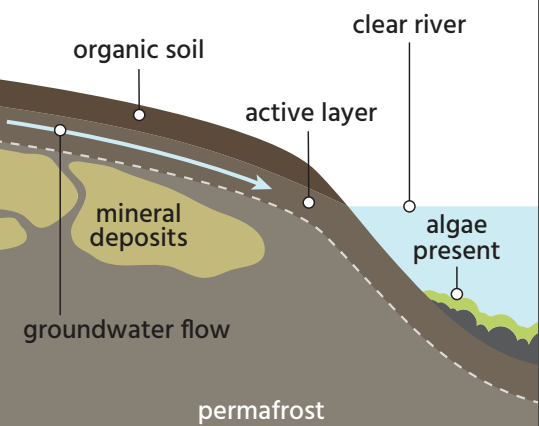
# RUSTING ARCTIC RIVERS

Rivers across northern Alaska have recently turned orange in color. Because of their appearance, they are often called “rusting rivers.”

Fish and other creatures face challenges living in rusting rivers and streams. Efforts are underway to monitor potential impacts and address community concerns.

Rusting rivers can come and go. A river may turn orange in late summer or fall and run clear the next year, or may stay orange for many years.

A map of observed rusting rivers can be viewed on our website by following the QR code within this pamphlet.



An orange tributary of the Kugoruk River. Western Brooks Range, July 2023.

## POSSIBLE IMPACTS

*Based on limited information:*

We have no evidence of negative human health effects at this time, but we are learning more about this emerging concern.

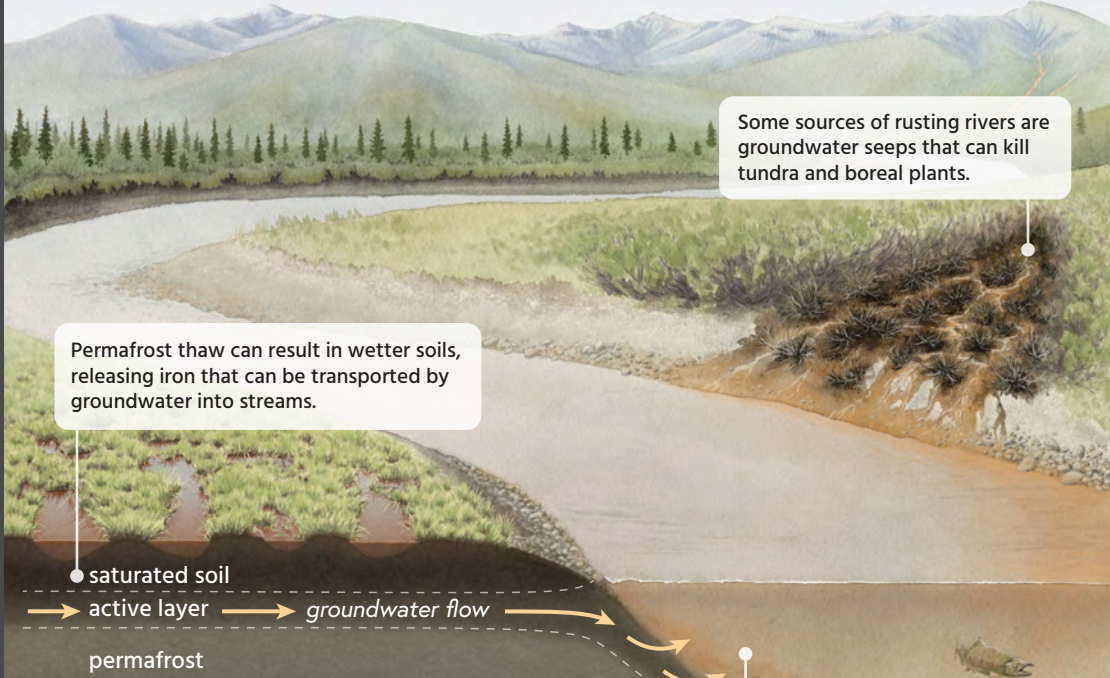
Drinking water for nearby villages may be affected by heightened metal levels. Understanding the water chemistry can help improve testing and water treatment.

Certain types of metals are also known to be bad for human health. Understanding water quality can help healthcare workers make informed decisions for communities.

Rusting rivers may impact fish populations that people rely on. An increase of metals in rivers can cause a loss of habitat for fish and the aquatic insects they depend on.

## ENVIRONMENTAL IMPACTS

Scientific questions remain about the physical and chemical effects of rusting rivers on the environment, especially on fish. We still have more to learn about the direct health effects on fish and aquatic insects, loss of fish habitat, and metals being transported down river. The most common Arctic fish species that may be affected are Dolly Varden, chum salmon, and Arctic grayling.



## HUMAN IMPACTS

Fishing and community water systems may be impacted by increased presence of metals.

Possible impacts include fewer fish, more metals in fish meat, and concerns for water filtration systems.



Rusting rivers are more murky and acidic, and have higher amounts of iron and other metals than nearby clear-water streams. Streambeds are typically blanketed with iron minerals that can impact the aquatic environment.

Illustrations and design by Julia Ditto  
Photos by Josh Koch, USGS.

## QUESTIONS FOR COMMUNITIES:

- What are your biggest questions about rusting rivers?
- How can we best share information that we gather with your community?
- What types of communication do you prefer (social media, printed newsletters, etc.)?
- Have you observed a rusting river?

To provide answers to these questions or submit an observation, please email us at:

**rustingrivers@fws.gov**

For observations, please share the date and location, and a photo if possible.



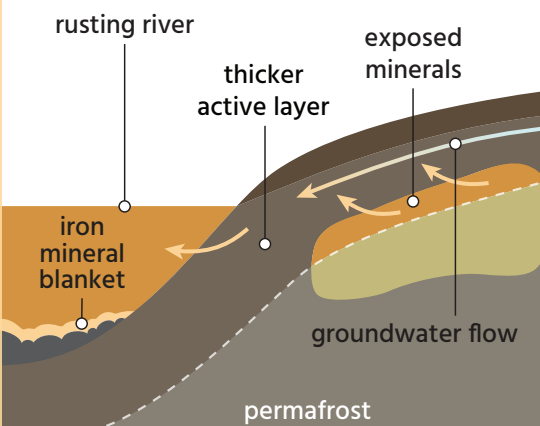
Scan this QR code for more information about rusting rivers.



## WHY ARE RIVERS TURNING ORANGE?

While we are uncertain, current observations suggest:

- 1 Rusting rivers are caused by thawing permafrost, which unlocks minerals that have been frozen for thousands of years. The thawing of permafrost allows water to soak deeper into the ground, where it comes into contact with metal deposits. Those metals are carried along into rivers where they continue to react with the environment and in some cases become brightly colored.
- 2 The metal that is most visible is iron, which is why river water turns orange and looks like rust. Other metals, such as aluminum, copper, and zinc, are present in rusting rivers too.







Photos by Josh Koch, USGS

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