



## **Tamarack Water Alliance Community Zoom Meeting Wednesday, November 1, 2023, 10am CT**

*Hello from the Tamarack Water Alliance! If you are new to our email list we welcome you. Local residents who volunteer with Tamarack Water Alliance compile and send this monthly newsletter to share updates, invitations, and informational articles.*

Everyone is invited to attend our open community virtual Zoom meeting on **Wednesday, November 1, 2023 at 10am CT**. The topic is **Carbon Capture** with Tom Anderson, MSEE presenting.

**Download** Tamarack Water Alliance fact sheets  
<https://www.tamarackwateralliance.org/resources.html>

**Sign-Up To Receive Updates from the DNR** on Talon Metals Environmental Impact Statement  
<https://www.dnr.state.mn.us/input/environmentalreview/tamarack-nickel-project.html>

If you believe nickel-sulfide mining is too risky in Aitkin County, Tamarack Water Alliance has yard signs with this messaging available. Your \$6 donation helps defray costs. Email [waters@tamarackwateralliance.org](mailto:waters@tamarackwateralliance.org) to arrange pickup of your sign.

**Volunteer** with the Tamarack Water Alliance. Send us an **email** at [waters@tamarackwateralliance.org](mailto:waters@tamarackwateralliance.org).

Encourage your friends, family and neighbors to sign up for the monthly Tamarack Water Alliance **email newsletter** (<http://eepurl.com/hOboEb>).

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## Carbon Capture Near Tamarack, MN

In 2022, the Department of Energy awarded \$2.2 million of funding to a Rio Tinto-led team to explore carbon storage potential at the Tamarack nickel joint venture in central Minnesota. Rio Tinto will contribute \$4 million in funding for the 3-year project (<https://www.riotinto.com/news/releases/2022/DOE-backs-Rio-Tinto-led-team-to-explore-carbon-storage-at-Tamarack>)

The Tamarack Nickel Project includes a large bowl of what is known as porous ultramafic rock sitting outside the resource of nickel and other battery minerals. The project will include laboratory studies and field work to confirm the carbon storage potential of the site and to better understand the area's hydrology and assess different carbon mineralization technologies. The effort would also develop a roadmap to guide decisions on implementation post 2025.

Talon Metals, the majority owner and operator of the Tamarack Nickel Project and Rio Tinto's joint venture partner, is contributing ore body knowledge and land access for scientific field work as Talon controls the mineral rights in that area.

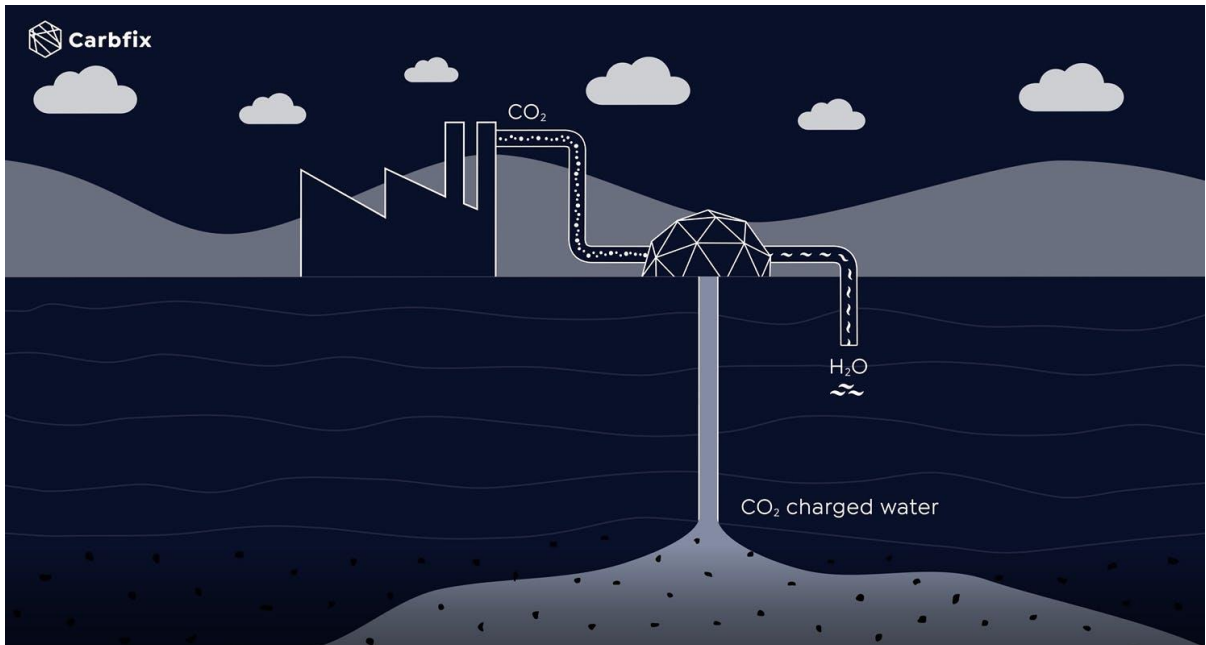
### How Carbon Capture Might Work

Rio Tinto will be working with a team that includes Carbfix (<https://www.carbfix.com/how-it-works>), a leading global company providing technology to capture and remove CO<sub>2</sub> from the atmosphere. The Carbfix technology extracts atmospheric CO<sub>2</sub> that is used to create carbonic acid in a water solution which is then injected into deep volcanic rock (basalt) where it reacts with favorable rock formations to form solid carbonate minerals.

A basic requirement underlying this type of carbon capture is the existence of porous, deep basalt rock (volcanic rock / porous ultramafic rock) into which the CO<sub>2</sub> solution is injected. The rock must be porous to allow the solution to be absorbed into the rock. It is interesting to note that that new volcanic rock tends to be much more porous than old volcanic rock. As such, this technique works well in Iceland since Iceland is newly formed being made from volcanic rock. Indeed, Iceland is one of the most active volcanic areas in the world where a volcano erupts on average every 3-5 years. Another good place is Hawaii as it is also very volcanic and newly made. The western US is moderately active volcanically evidenced by the eruption of Mt. St. Helens and the geysers in Yellowstone. However Minnesota's basalt is quite old. Most northern Minnesota basalt was formed about 1 billion years ago. Nevertheless a small bowl in the South Tamarack project area was identified as having the potential of sufficiently porous rock to support carbon capture.

If carbon capture is deemed feasible at that site, an onsite plant would pull CO<sub>2</sub> out of the atmosphere using filters and other technologies. This in itself can be a challenging task since CO<sub>2</sub> only makes up 0.04% of the air. The concentrated CO<sub>2</sub> is combined with water to form carbonic acid. The carbonic acid and water solution is then pumped under pressure into basalt deep into the earth.

This process requires a great deal of water and is illustrated by the Carbfix image below:



The injected carbonated water is denser than the surrounding water in the geological formation and therefore has the tendency to sink into the porous rock after it has been injected.

Basaltic rocks are highly reactive and contain the elements needed for immobilizing CO<sub>2</sub> through the formation of carbonate minerals.

### What Could Go Wrong?

At ambient temperatures, pure carbonic acid is a stable gas. As such, it is possible that some amount of the CO<sub>2</sub> pumped into the earth is then released back into the atmosphere, filtering up through the porous rock. If carbonic acid leaks upward, it will likely come into contact with local aquifers potentially acidifying the water table. Not good for the environment obviously. Will the Rio Tinto work investigate this possibility? We don't know. This type of carbon capture is a relatively new technology with many unknowns. In addition, the process requires a great deal of water which would likely be pumped from the local aquifers potentially lower surface water levels.

### Other Options Exist

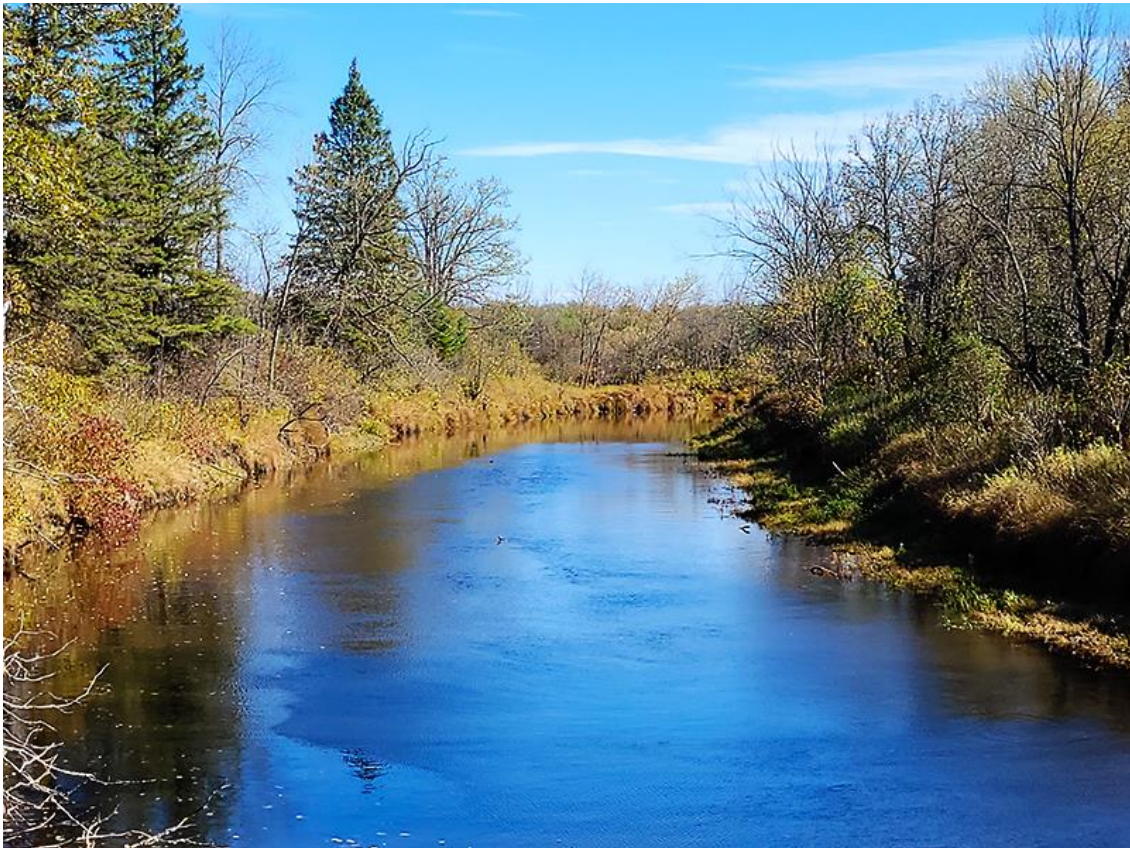
Based on work at the University of Minnesota (<https://extension.umn.edu/managing-woodlands/carbon-minnesota-trees-and-woodlands#manage-for-carbon-sequestration-rates-2244061>), we see that woodlands / forests also capture / sequester carbon. They found that carbon sequestration decreases in woodlands as they age. When looking at all forest types in Minnesota, they found the following levels of carbon sequestration:

- 10-year-old forests: 0.60 tons of carbon per acre per year

- 50-year-old forests: 0.20 tons of carbon per acre per year
- 100-year-old forests: 0.15 tons of carbon per acre per year

As a comparison, PNNL's Wallula Basalt Carbon Storage Pilot Project referenced in the Rio Tinto press release captures about 1000 metric tons of CO<sub>2</sub> per year. In effect, about 1700 acres of 10 year old forest will capture as much CO<sub>2</sub> as does the PNNL project.

What would you prefer? Support a Carbon Capture plant near Tamarack that might use a great deal of water and may potentially damage water quality? Or, support the reforestation of an equivalent number of acres of forest to sequester carbon naturally?



### **One Watershed One Plan**

Aitkin, Itasca and Carlton counties are currently engaged in planning for the segment of the One Watershed One Plan comprehensive watershed plan for the Mississippi River from Grand Rapids to Aitkin. This segment includes the area around Tamarack, Minnesota. The public is welcome to all policy committee meetings and to participate

in scheduled expert committee meetings. Details about meetings and copies of draft documents are on the website.

Learn more about it here:

<https://bwsr.state.mn.us/one-watershed-one-plan>

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## Who We Are

**Tamarack Water Alliance** ([tamarackwateralliance.org](http://tamarackwateralliance.org)) is a group of local residents and landowners working together with others from across Minnesota to protect water and community health from the dangers of sulfide mining near our beloved lakes and wild rice beds, at the headwaters of the Kettle River and in the Mississippi River watershed.

A proposal by a foreign owned mining company to mine nickel and other metals near Tamarack in Aitkin County threatens the health of our communities. This kind of sulfide mining, especially in water-rich environments, has never been done without severe impacts to water and the health of those downstream. Mining here is also a threat to environmental justice and the long-term economic security of nearby native and rural communities.

Review our community slide presentation,  
([tamarackwateralliance.org/docs/TamarackMineConcerns-Consolidated.pdf](http://tamarackwateralliance.org/docs/TamarackMineConcerns-Consolidated.pdf))

Download informative flyers: (<https://tamarackwateralliance.org/resources.html>)

- Talon Mine Risks,
- Geology of Aitkin County,
- High Sulfide Mines Create Acid Mine Drainage,
- Nickel Not Needed for Future EV Batteries,
- Minnesota's Prime Wild Rice Lakes Under Threat,
- Minnesota Regulators Poor Record In Protecting The Environment,
- Eagle Mine Environmental Report & Saving Our Meager Nickel Reserves

We will be sending this monthly newsletter to keep you informed about this project, to share information and opportunities to act, and to invite you to gatherings where you can connect with others who share a passion for clean water and community health.

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