

Talon Metals/Rio Tinto Proposed Nickel Mine: Can We Protect the Mississippi and St. Croix River Watersheds from Toxic Sulfide Ore Mining?

June 2023



Kettle River Slough/ J. Walters/ Wild Rivers Conservancy



WaterLegacy's Mission: Protect Minnesota's fresh waters and the communities that rely on them.



Tamarack Wetlands

What is Sulfate Pollution?

- Some areas, like Northern Minnesota, Aitkin County are naturally low in sulfate. Wild rice thrives there.
- Taconite mines and coal plants are the largest dischargers of sulfate today in Minnesota.
- Nickel, copper, cobalt sulfide ore mining would discharge massive quantities of sulfate.
- Mining is source of sulfate pollution when rock containing sulfur is exposed to air and water.



Sulfide Mine Threats to Water, Wild Rice, Health



Geology: Copper, nickel, and cobalt are bound up with sulfur in the ore. **Massive sulphide mineralization = high sulfate.**

Sulfate exposed to air and water: acid mine drainage, leaching of toxic metals, such as arsenic, lead.

Sulfate in wetlands, sediments: 300 mg/L sulfate doubles mercury & nutrient release, increases methylmercury by **600%**.

Methylmercury in fish: bioaccumulates, concentrates up to **1,000,000 times** in fish at top of food chain. **Toxic** to developing brain: fetuses, infants, children.

Every sulfide mine (100%) in a water-rich environment has polluted surface and/or groundwater with acid mine drainage and/or toxic metals.

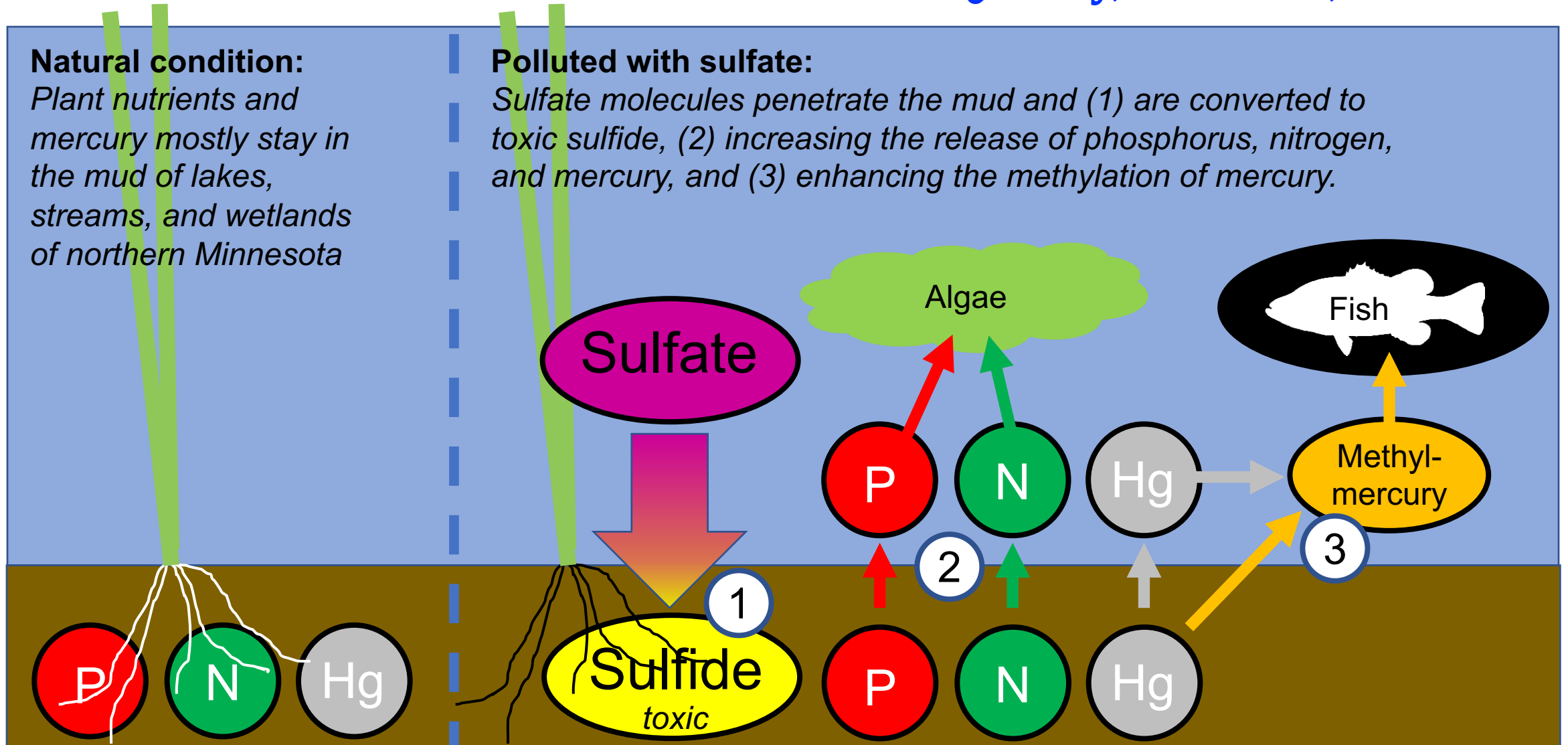
How Does Sulfate Pollution Affect Water Quality, Habitats, Health

Natural condition:

Plant nutrients and mercury mostly stay in the mud of lakes, streams, and wetlands of northern Minnesota

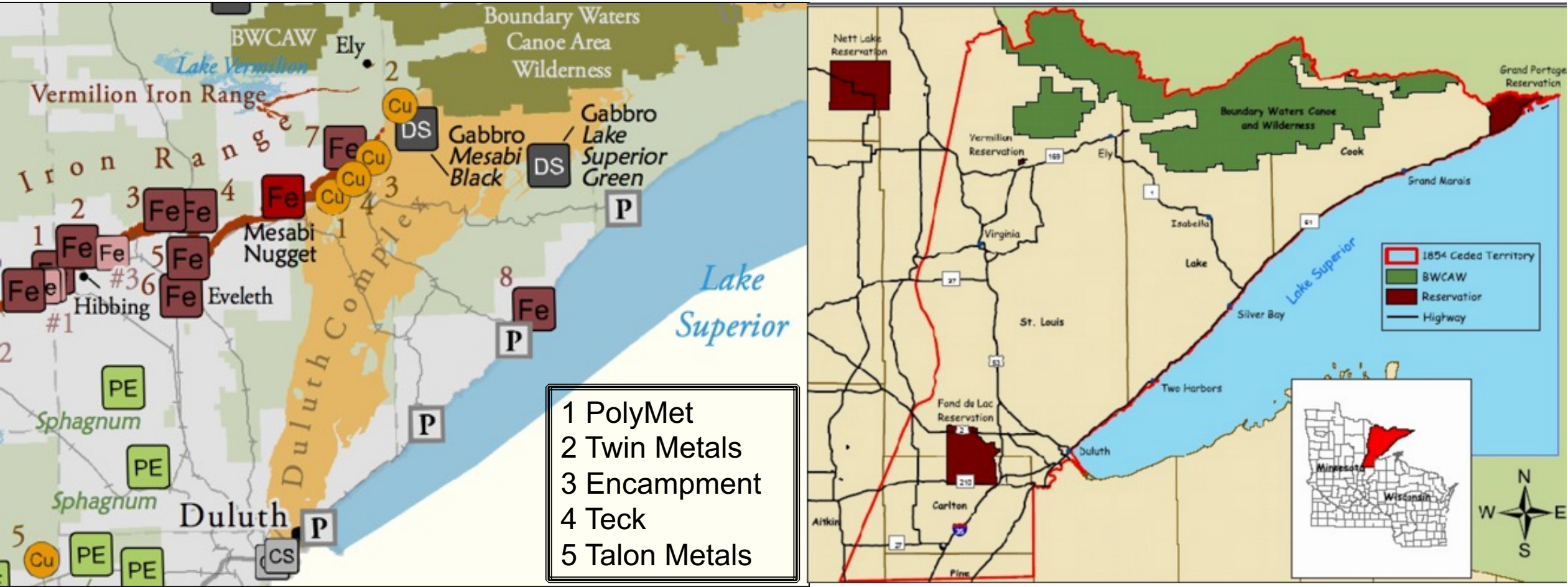
Polluted with sulfate:

Sulfate molecules penetrate the mud and (1) are converted to toxic sulfide, (2) increasing the release of phosphorus, nitrogen, and mercury, and (3) enhancing the methylation of mercury.



Schematic Prepared by Amy Myrbo, PhD, working with Friends of the Boundary Waters

Minnesota Regions Affected by Existing & Proposed Mining



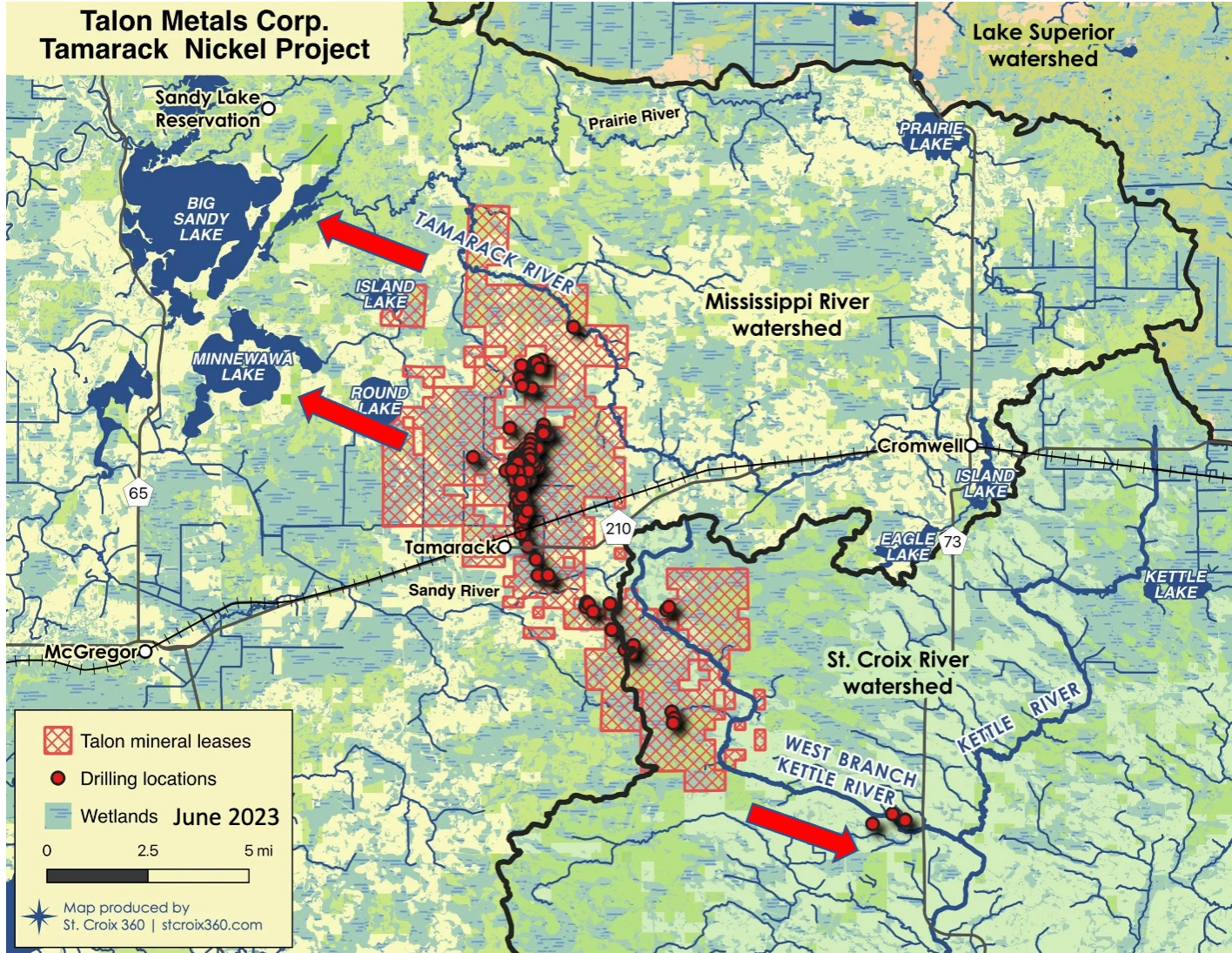
Boundary Waters (Rainy River) Watershed: Twin Metals, Teck, Encampment.

Lake Superior Watershed: PolyMet, Teck.

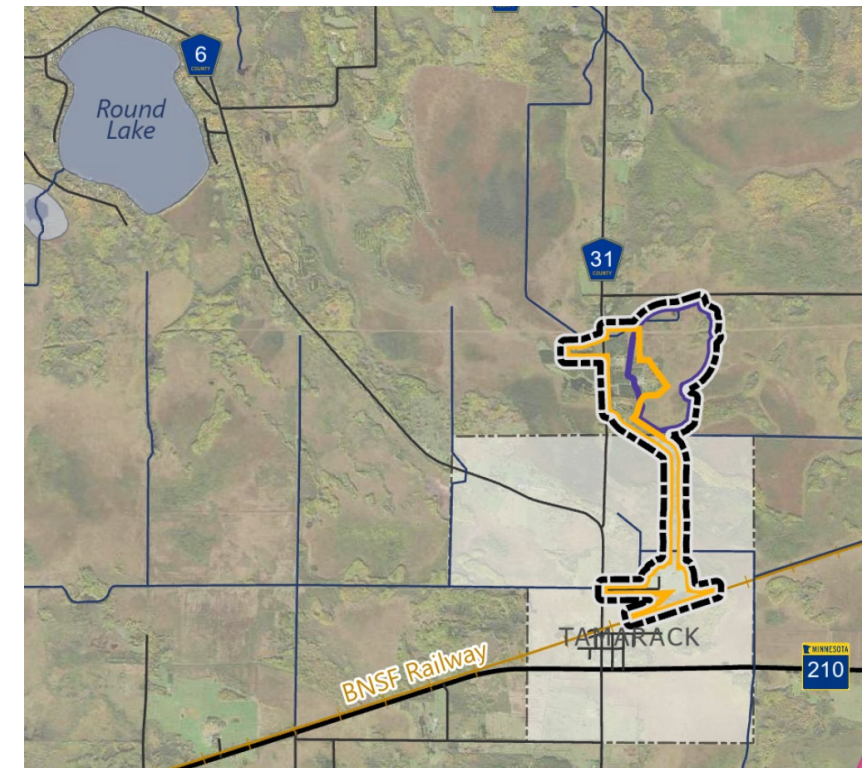
1854 Treaty Resources: PolyMet, Twin Metals, Encampment, Teck, Talon Metals.

1837, 1855 Treaty Resources, Mississippi River Watershed, St. Croix Watershed: Talon Metals.

Talon Metals Potential Mine Scope & Vulnerable Waters

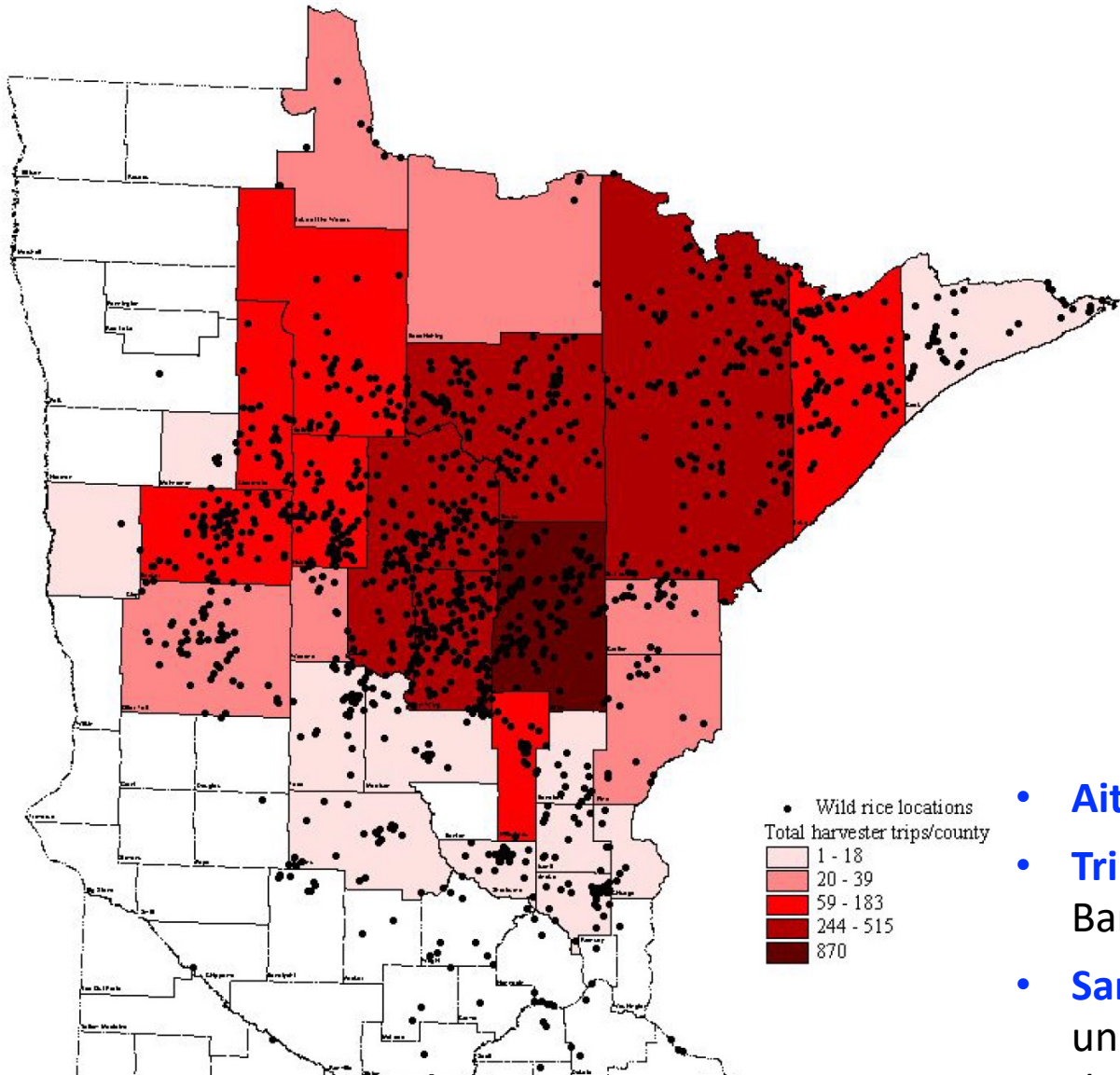


- **Excessive Nutrients:** Lake Minnewawa and Big Sandy Lake.
- **Excessive Mercury in Fish:** Round, Minnewawa, and Big Sandy Lakes, Kettle & St. Croix Rivers.
- **Wild & Scenic Rivers:** Kettle River, Upper St. Croix River.



- 31,000 acres of land control and leases. 11 miles strike length.
- EAW Project: 447 acres, 2.1 miles, @ 8 million tons of ore.
- Depth of minerals found from a few hundred to 3,400 feet.

Talon Metals Mine Risk to Environmental Justice and Wild Rice



- **Aitkin County:** Minnesota wild rice abundance, most harvest trips.
- **Tribal Communities:** Minnewawa, Sandy Lake, East Lake, Mille Lacs Band of Ojibwe, Fond du Lac Band of Lake Superior Chippewa.
- **Sandy Lake Tragedy 1850-51:** U.S. Government attempted to undermine treaty payments, relocate Ojibwe. Estimated 400 deaths.

Sulfide Mining Effects on Drinking Water, Air Quality

Drinking Water Contaminants

(Minnesota Well Index shows 32 water supply wells within 1 mile of the project area)

Nitrates: impair how blood carries oxygen, can kill infants. Ammonium nitrate explosives.

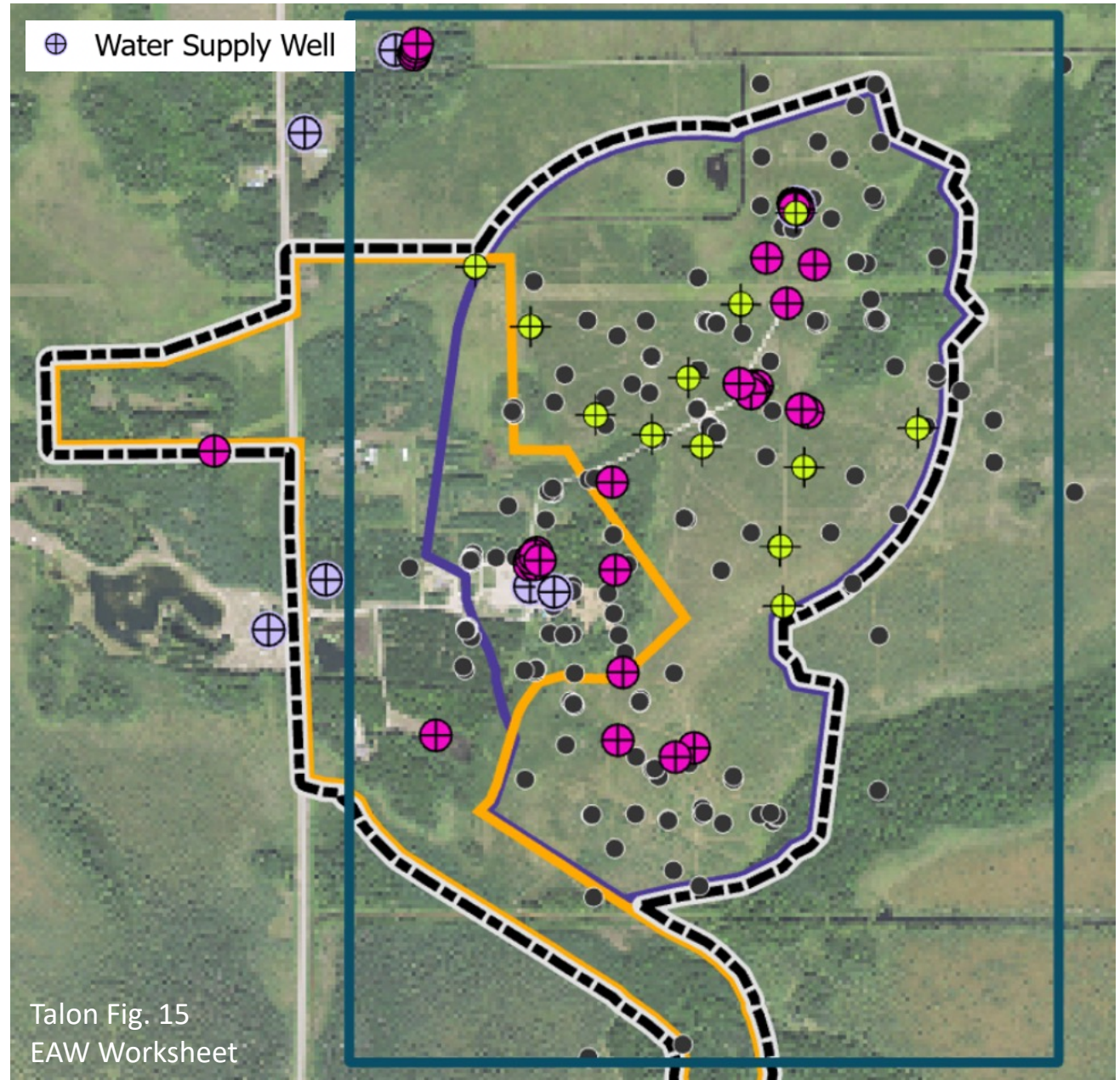
Arsenic: carcinogen. Leached from rock.

Air Emissions (crusher, hauling, loading)

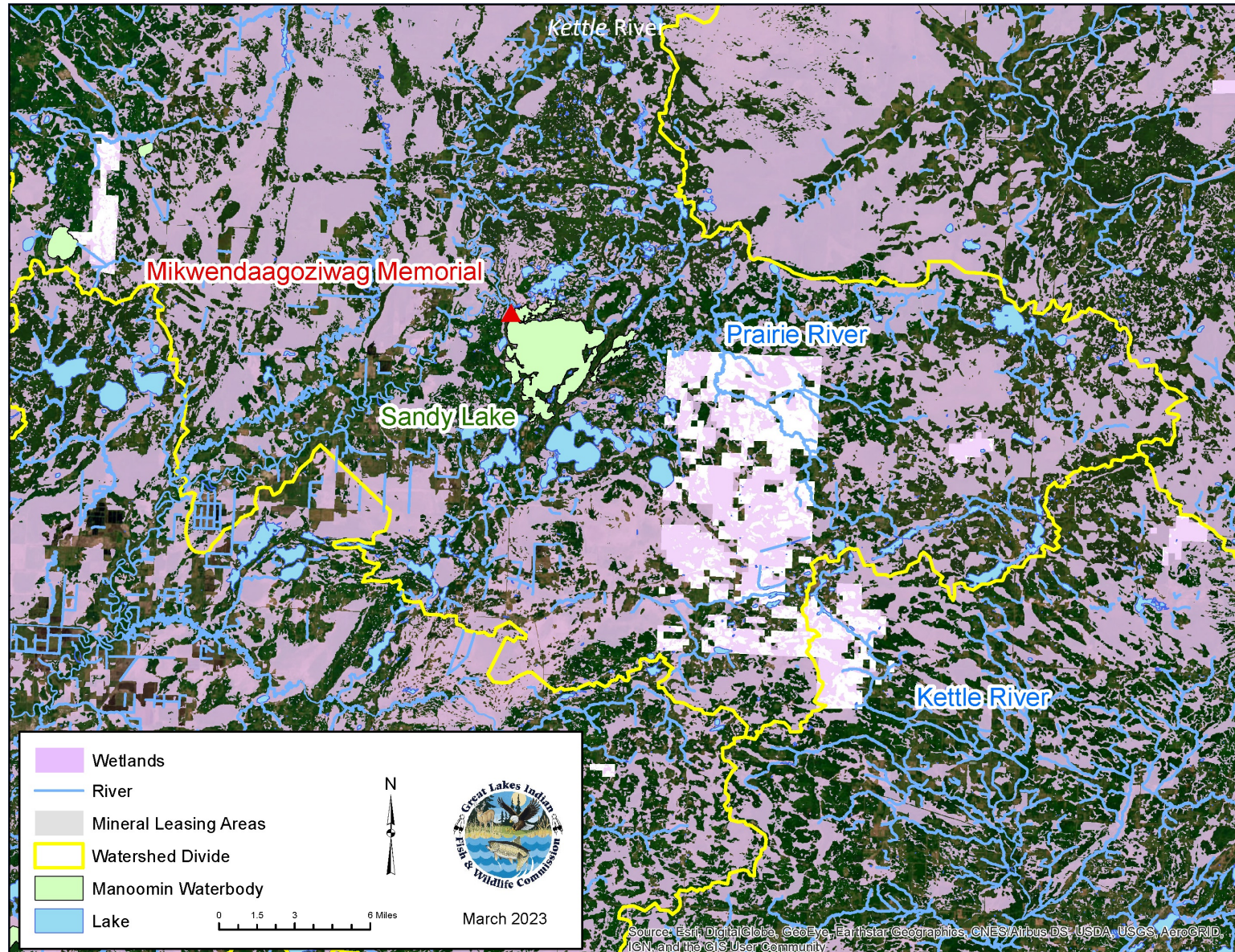
Nickel: carcinogen, lung cancer.

Cadmium: carcinogen, lung disease.

Particulates: lung & heart disease.



Talon Metals Mine Dewatering – Wetlands & Shallow Lakes



Source: Talon Metals EAW Worksheet

“The Project Area is primarily classified as wetlands.”

“[M]ine workings are expected to intersect local discrete zones and area of enhanced permeability.” **Fractures.**

Talon peak mine inflow rate: 800-1,600 gallons per minute (gpm). This is up to 2.3 million gallons per day, or 841 million gallons per year.

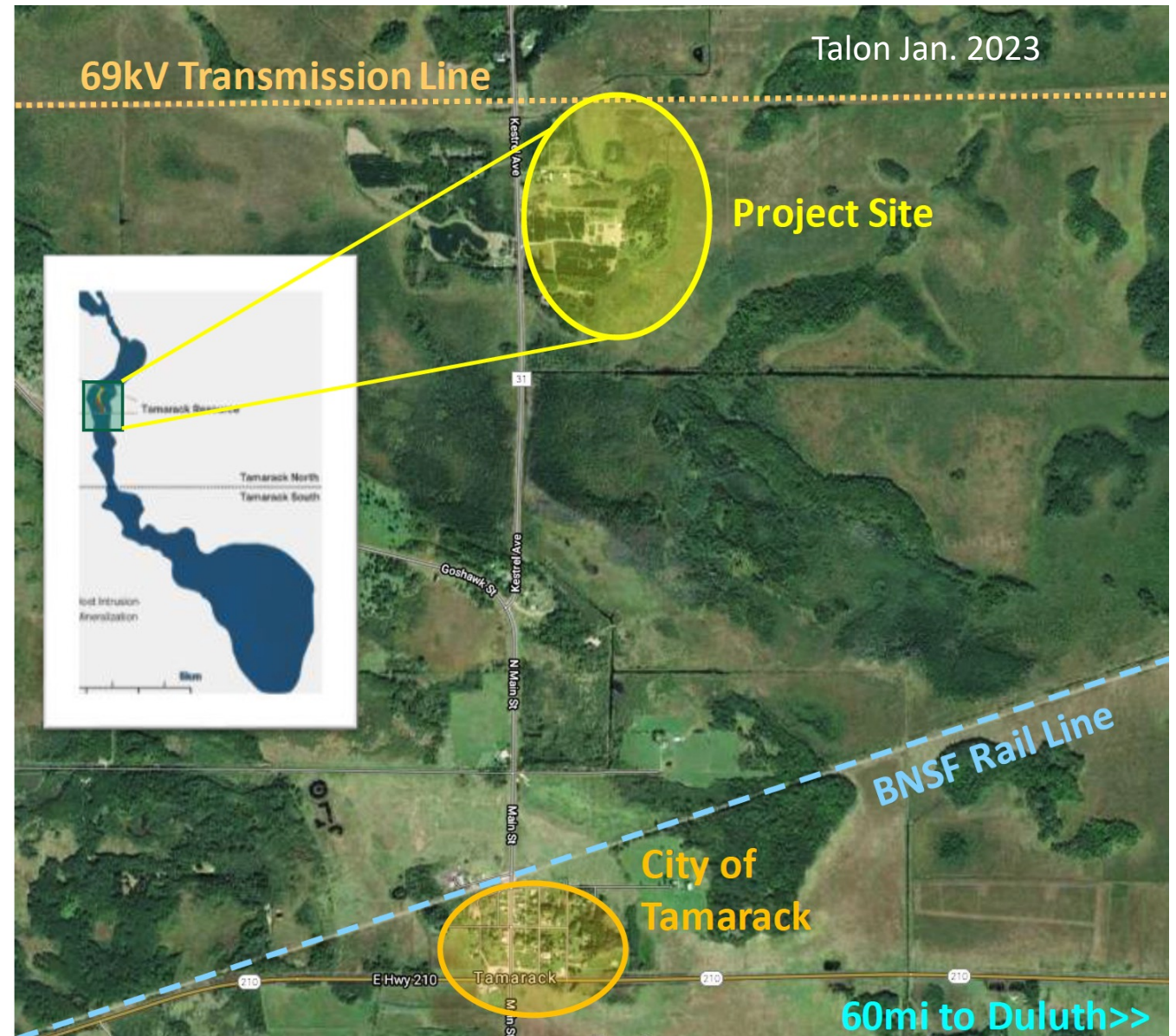
For comparison, **PolyMet** mine predicted maximum inflow of 870 gpm from its three mine pits in its peak mining year, about **half of Talon dewatering.** (PolyMet FEIS 5-111)

Dewatering contact water would be treated and discharged to a ditch that flows to the Tamarack River

Talon – Potential for “District-Scale” Nickel Sulfide Mining

- U.S. government granted **\$114,846,344** for North Dakota ore processing plant.
- Transport ore 475 miles by rail to North Dakota. EAW Worksheet: also transport high sulfide waste rock. Likely more than 30 times volume of shipping concentrate.
- Storage and crushing of waste rock on site, dust and particulates air deposition on surface, nearby wetlands.
- Each new NI 43-101 Technical Report report shows increased mineral resource. Almost tripled since 2014.
- Foreseeable expansion, misleading process.
- **Politics and money before environmental review, tribal consultation, permitting.**

“[T]he Tamarack Intrusive Complex has district-scale potential.” Talon chief exploration and operations officer Brian Goldner (Jan. 2023)



What Would a Talon Mining District Risk?



St. Croix River: Craig Blacklock



Tamarack, MN Wetlands



Savannah Portage



Ricing, Fond du Lac Band



Big Sandy Lake

What Actors Would be Responsible for Tamarack Nickel Mine?

Talon Metals - British Virgin Islands-based mineral exploration company. Property flipper.



Rio Tinto/Kennecott: Less than $\frac{1}{4}$ of 1% of the jobs in Salt Lake and Utah Counties. But 30% of total pollution. Ten times more than next largest source – an oil refinery.

[Utah Physicians for a Healthy Environment]



Rio Tinto destroys 46,000-year-old Aboriginal site in Australia to expand iron ore mine (2021).

Myth of the “Model” Sulfide Mine – None Have Been Proved

“Prove It First” Wisconsin Law 1997-2017 (repeal).

Show mine has operated and closed for 10 years without environmental contamination.

No mine met the test: including Eagle Mine (Michigan), Flambeau Mine (Wisconsin), Rainy River (Ontario).

“Prove It First” Minnesota Bill introduced since 2021.

Supported by 24 Senators, 44 House members. **No hearing.**



PROVE IT FIRST!

Eagle Mine: nickel-copper (2014-2027, was to close in 2021).

Underground mine. Processing at Humboldt Mill (32 miles away) **Exceedance of EPA drinking water standards for nitrate and arsenic at mine.** Sulfate and manganese at processing plant.

Flambeau Mine: copper, gold, silver (1993-1997).

Open-pit. **Copper concentrations in Stream C of site so high stream devoid of aquatic life,** now listed as impaired. Manganese and sulfate in groundwater and Flambeau River

Rainy River Mine: gold, silver (2017-2032?)

Open-pit mine. Fined for discharge of ammonia from mine pit and non-compliance resulting in dam breach and release.

Do We Really Know Whether Nickel EVs Are the Future?

Future of EV Batteries May Not Be Nickel

- Lithium-ion batteries that use iron and phosphorous in their cathodes, known as LFP batteries, are an alternative to NMC [nickel, manganese, and cobalt] batteries . . .
- LFP advantages over NMCs: more domestically available materials, lower cost, higher ignition point, and longer lifespan. Already in market.
- **Many new technologies, from sodium batteries to fuel cells, require no lithium or nickel.**

Talon “Green Nickel”

- Tesla agreement with Talon Metals requires product by 2026. Insufficient time for scientific analysis.
- **Permitting would not control use of ore for specific purpose.**

Ford Mustang & F-150 (LFP)



Tesla Model 3 (LFP)

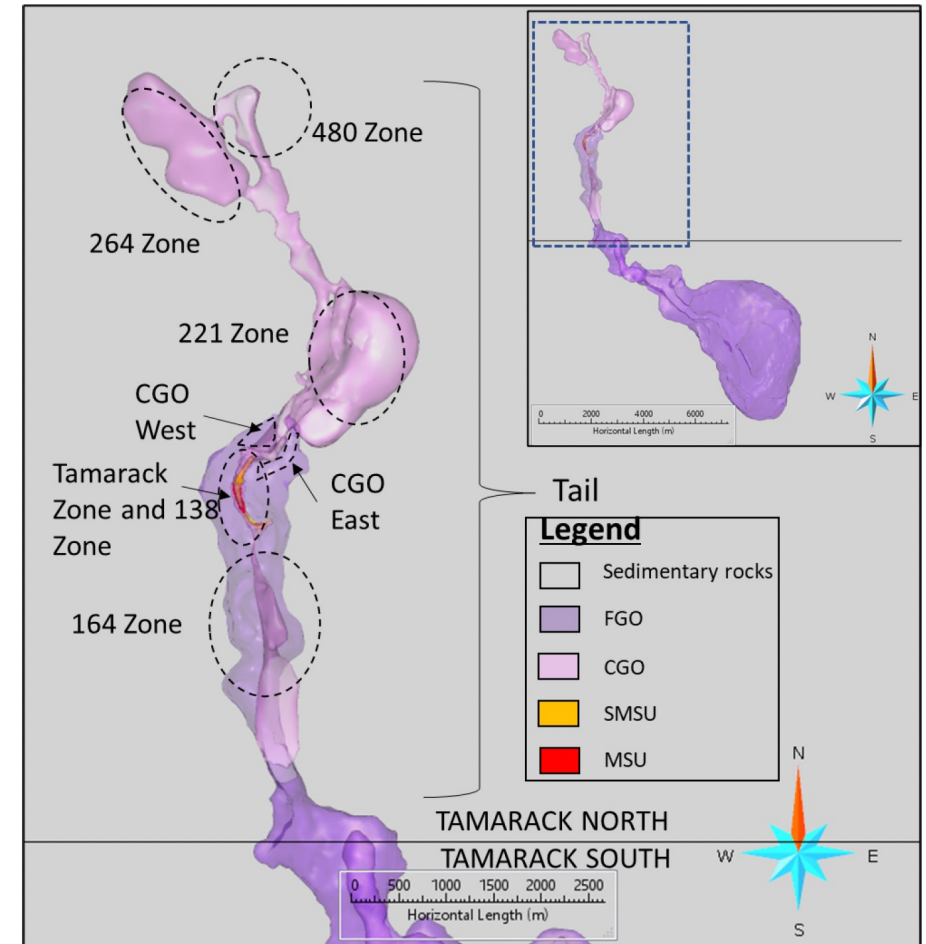
Environmental Review Process – What Happens Now?

Process:

- **Mandatory EIS for new mine. (Minn. R. 4410.4400, subp. 8(B)).**
- **Minnesota DNR will review Talon submittal to assess whether the basic information is present for scoping what must be in EIS.**
- **DNR and Cooperating Agencies will prepare a draft EIS scoping document.**
- **There will be at least one public scoping meeting, time for public written comments on the scope of the EIS.**

Issues:

- **Lack of basic information for EIS scoping.**
- **Scope of mining “district scale” project.**
- **Lack of later recourse if analysis truncated.**



“[W]e can push forward this mine in the permitting process and hopefully get a permit while we're also exploring for additional nickel resources in Minnesota.” Talon chief external affairs officer Todd Malan (June 2023)