

NOTE:

All mine related information is taken from the publically available TALON 2021 Preliminary Economic Analysis - PEA (https://talonmetals.com/wp-content/uploads/2021/02/Talon-Tamarack-PEA3_2021.pdf) and 2022 PEA (https://talonmetals.com/wp-content/uploads/2022/11/Final_NI43101_Report_Talon_TamarackN_20221102.pdf)

Tamarack Water Alliance

Meeting with MN DNR (1/31/23)

<https://tamarackwateralliance.org/>

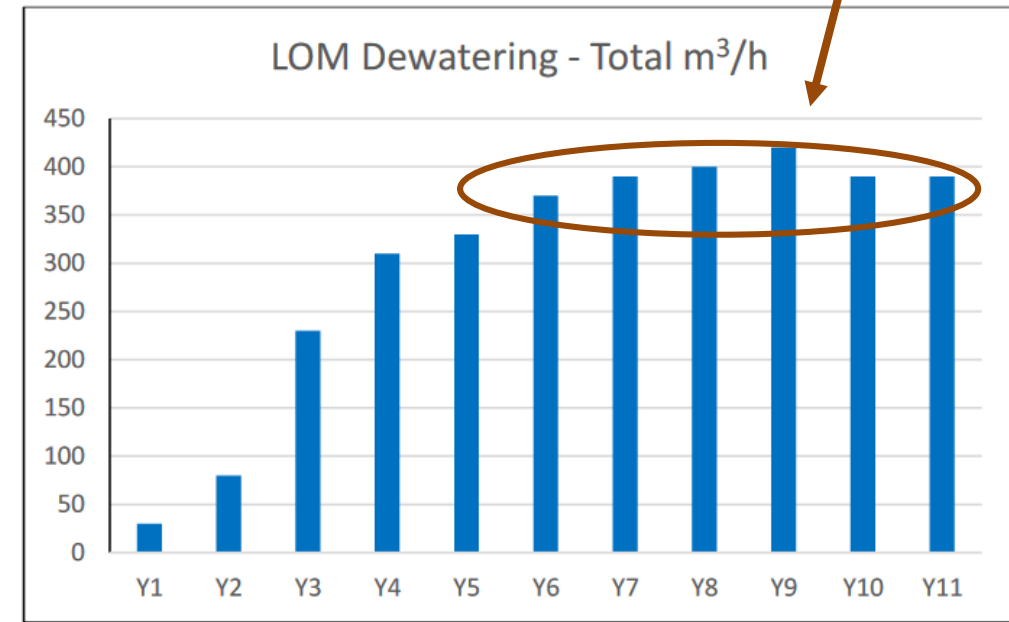
- **Whats New Since Our Last Call**
- **Key Concerns**
- **Respecting 1855 Treaty Rights**

New Developments

- ❖ On October 19th, 2022, Talon Metals announced that they would move the ore processing and tailings management facility from the Tamarack mine site to an existing industrial brownfield site in Mercer County, North Dakota.
 - Tailings cannot be used in a cement paste format to fill increasing the risk of significant increases in mine water and impacts on the aquifers
 - Large rail facilities will be required with 50-100 rail cars being serviced per day creating additional toxic dust
- ❖ On January 19, 2023, Talon Metals announced the discovery of new “high-grade” nickel-copper mineralization nearly 2 miles north of the current nickel-copper resource area.
 - This increases the scope of the project, increasing risks of water and air impact and contamination
 - We expect this should delay permitting as Talon must do extensive drilling to quantify the resource and baseline this new find.
- ❖ Michigan Eagle Mine finally released their 2021 report
 - 2021 Annual Mining and Reclamation Report, Eagle Mine, LLC
(https://www.eaglemine.com/files/ugd/145c36_8ba8f315c6d04aec933216a522621511.pdf)
 - New report shows significantly higher surface water drops – emphasizing the risk to the Tamarack area’s water levels and quality

Metal / Ore Processing – Impact on Water

- ❖ Talon originally planned to use the tailings mixed with cement to create a cement paste that would be used to fill the mined out stopes (caverns)
- ❖ Minimizes cave-ins BUT ALSO, the "set" cement mixture decreases water seepage
- ❖ However, by moving all the tailings to North Dakota, how do they fill these mined out stopes in the mine?
 - If Talon does not fill the mined out stopes, these areas become sources of mine water that must be "dewatered" from the mine. The more surface area you leave exposed in the mine, the more water seeps into the mine so the 2.6 million gallons is now a very low end estimate. In reality, real pumping levels may be MUCH more!
 - If Talon continues down the plan to fill the stopes with a cement paste, where do they get the material? Logically, on average, they might need another 40 or so train car loads of gravel shipped every day, 365 days a week. From where?
- ❖ Blasting may also increase water seepage from new / expanded cracks



Page 228 of the 2021 Talon PEA

Figure 16-16: Mine Dewatering Requirements

- Groundwater inflows are based on an average inflow of 9.9 gpm per water bearing feature
- An average of one water bearing feature per 216 m of drill data has been measured through past logging;
- It is assumed that groundwater inflows can be reduced by 20% by grouting;
- **TALON HAS NO PLACE TO DUMP THIS WATER WHICH OF COURSE MUST ALSO BE FILTERED!**

New Eagle Mine Report – Large Water Level Impacts

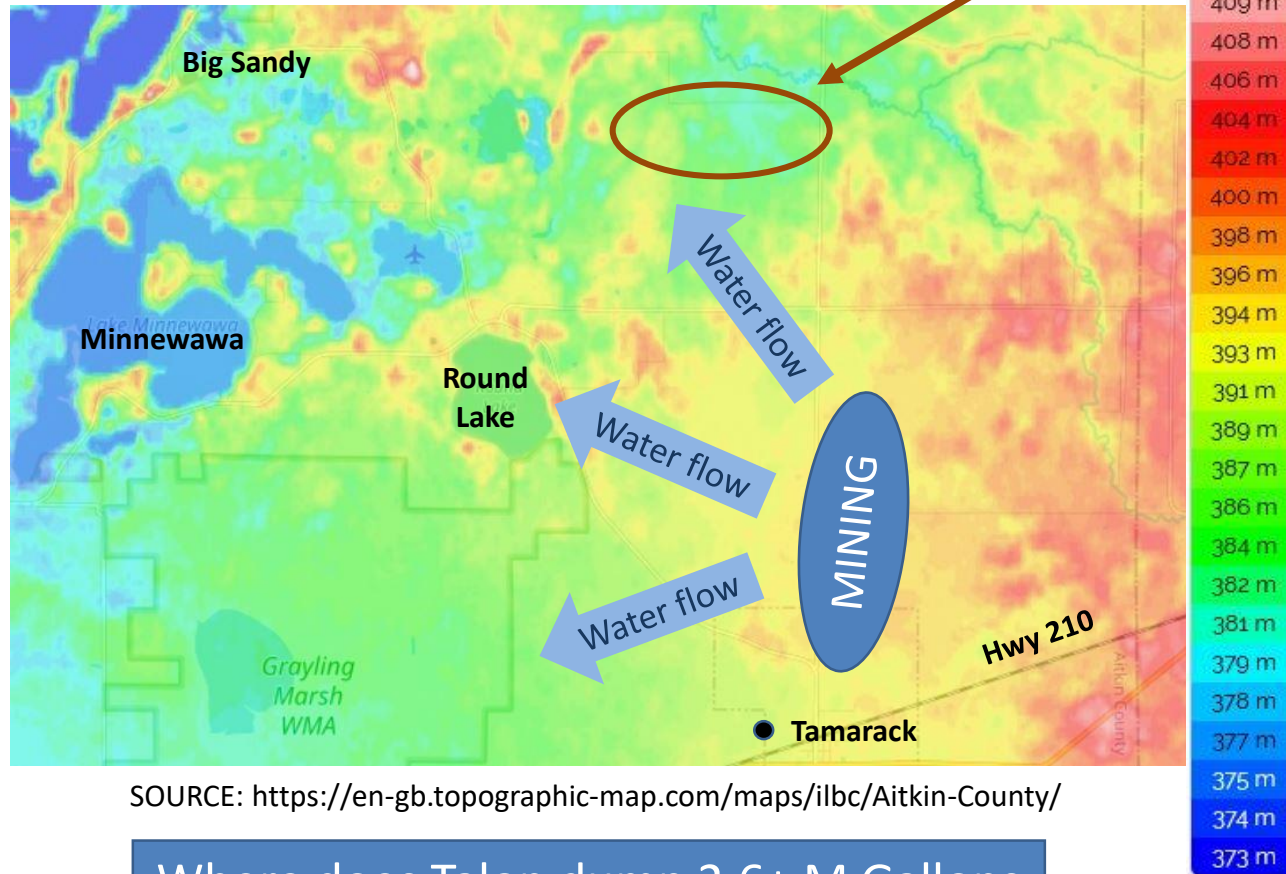
- ❖ Given mine service well pumping of approximately **90,000 gallons per day** (from page 11 of the referenced report), a few examples of surface water level monitoring outages are listed below (from page 21) -
 - **QAL023B** – The mean water level readings from October 2020 – May 2021 and August – September 2021 **were a maximum of 1.7 feet (ft) below the calculated minimum background baseline level. The lowest reading was recorded in May 2021. Water levels were not measured at this location from June through September because the water levels fell far enough below the equipment at this monitoring location that it didn't take readings.**
 - **QAL044B** – The mean water level readings from January – September 2021 were **a maximum of 1.1 ft below the minimum baseline level** calculated for this location. The lowest reading was recorded in September 2021.
 - **QAL065D** – The mean water level readings from January – September 2021 were **a maximum of 1.1 ft below the minimum baseline level** calculated for this location. The lowest water level was recorded in August and September 2021.
 - **QAL066D** – The mean water level readings from October 2020 – September 2021 were **a maximum of 2.0 ft below the minimum baseline level** calculated for this location. The lowest reading was reported in September 2021
- ❖ Despite well pumping of less than 5% of that projected in Tamarack, significant drops in surface water were measured, potentially much greater than 2 feet (at QLA023B).

A multi-year independent water flow analysis must be done in the Tamarack area given the high risk of water impact (e.g. collaborative study with Univ of Minn, tribes and Talon)

2021 Annual Mining and Reclamation Report, Eagle Mine, LLC
(https://www.eaglemine.com/_files/ugd/145c36_8ba8f315c6d04aec933216a522621511.pdf)

Mining – Impacted Areas

New Deposit – closer to lakes, Savannah State Park, ...



SOURCE: <https://en-gb.topographic-map.com/maps/ilbc/Aitkin-County/>

Where does Talon dump 2.6+ M Gallons of water per day???

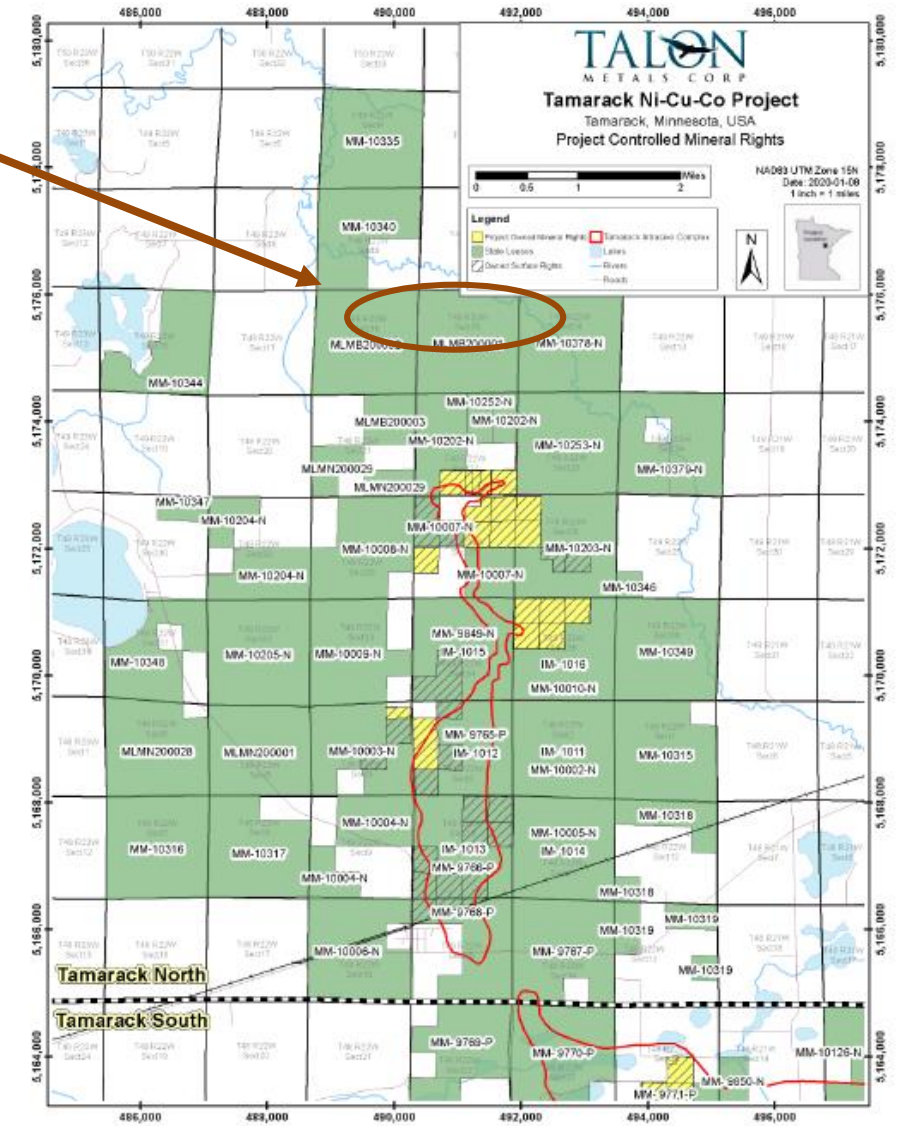


Figure 4-2: Tamarack North Project Mineral and Surface Rights

Concerns - Air

- ❖ **Vented Airborne Dust** from blasting and ore handling is contaminated with sulfide particles as well as many other toxic minerals – Eagle Mine monitors for at least 33 toxic substances
- ❖ No provision in the Talon PEA to address airborne contamination
- ❖ Eagle Mine does a very poor job at managing dust – a possible cause of the water contamination demonstrated in the Eagle Mine Exception report
 - After including an air filtration system in its original permit, [Eagle sought to have it removed in 2013, which the MDEQ approved](#), blowing a plume of [unfiltered mine emissions](#) out over the Salmon Trout River and the Yellow Dog Plains. No stack monitoring is taking place, and the emissions have not been measured since September 2014, before the mine was in full operation.
Source: Mining Action Group
<http://savethewildup.org/2013/03/air-filtration-necessary-on-eagle-mine-air-stack-to-keep-air-clean/>
- ❖ At the Tamarack mine site, the plant is replaced by a huge rail facility to transport the ore to North Dakota
- ❖ Talon will be loading at least 43 rail ore cars each day (365 days a year).
 - According to the 2021 Preliminary Economic Analysis, the Talon mine facilities will extract 1.3 million tonnes of ore per year
- ❖ This large rail loading facility will create additional toxic dust issues beyond what we have previously noted.

Concerns – Other

- ❖ At Eagle Mine TDRSA (Temporary Development Rock Storage Area) is lined with both a primary and secondary lining
 - A leak detection system is installed between the liners to monitor primary lining integrity
 - A total of approximately 55 gallons of water was purged from the leak detection sump in 2020, a larger volume than 2019.
 - Thus we see that the lining system does leak after only a few years of operation
 - **The leak levels are currently very small at this point but as noted in the document, increasing slightly over time.**
- ❖ Impacts on the community
 - Blasting will occur right underneath (within 700 – 1000 ft) of the town of Tamarack.
 - Blast impacts will be felt by all for many miles
 - Economy – tourism dollars will be greatly reduced ... who wants to vacation (or live) next to a toxic sulfide mine site
 - People in the area will suffer from impaired rice production (impacting native peoples), lower water levels and contamination of the environment

Recommendations – Minimum Requirements

❖ AIR:

- Require vent filters, coverings for rock/ore piles
- Dust mitigation capabilities must be implemented for all ore handling including rail transport

❖ WATER:

- All mine water must be thoroughly filtered (E.g. Reverse Osmosis)
- Require extensive and wide spread base lining of the area
- Require a very extensive, peer reviewed study of ground water systems in the area to evaluate the impact of mine pumping requirements
- Require mitigations such that surrounding areas of the mine are not impacted
- Require an environmentally sound plan for water disposal (after it is pumped from the mine)

❖ ROCK/ORE STORAGE – no permanent mining waste is left on the surface

- Require all rock/ore storage areas are double lined and monitored

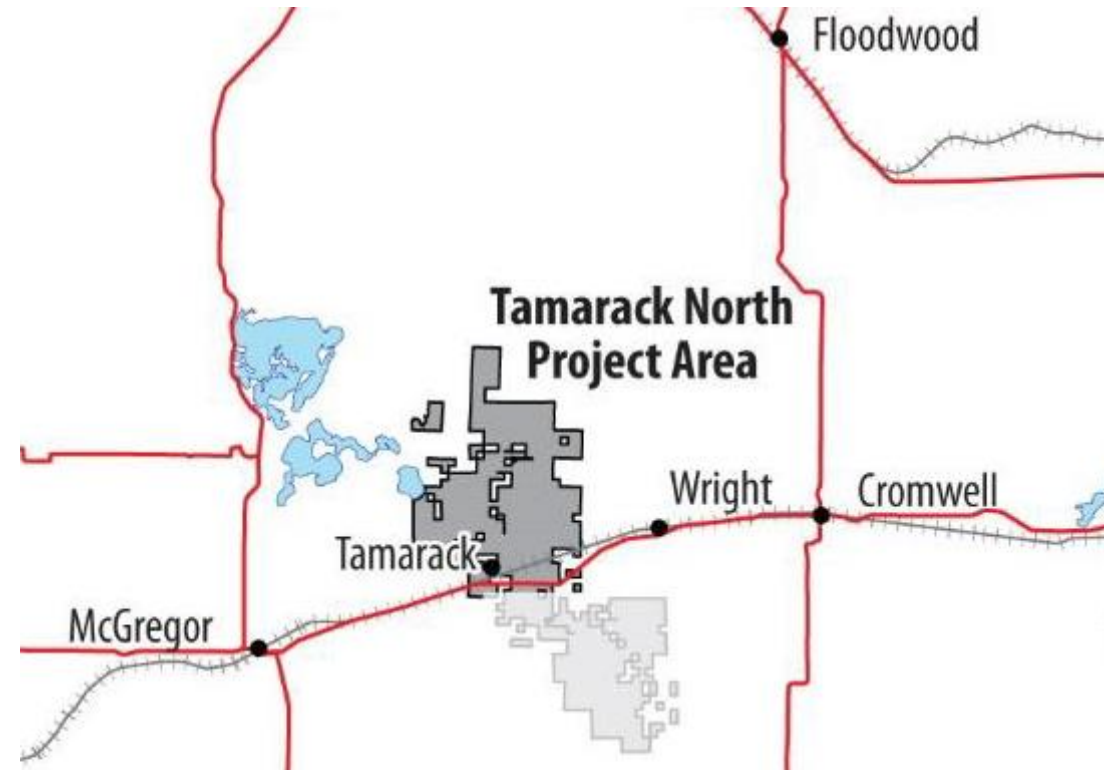
Backup Material

The Proposed Tamarack Mine

- ❖ Talon Metals is a mineral exploration and marketing company registered in the British Virgin Islands with offices in Toronto Canada and Tamarack MN.
 - The Tamarack Project is currently 51% owned by Talon Metals Corp. (Talon), and the remaining owned by Kennecott Exploration Company (Kennecott / Rio Tinto) and is operated by Talon.
 - Located in a wetland area, in the 1855 and 1854 treaty territory / Anishinaabe lands, near Minnewawa and Big Sandy Lake... Mississippi and Kettle Rivers (St. Croix)
- ❖ Talon plans to build an underground high sulfide Nickel-Copper mine in coming years
 - Talon told us they plan to start the permitting process in early 2023
- ❖ This NOT an iron mine! Nickel-Copper-Cobalt minerals are bonded to sulfur mined as sulfide ores
 - When these ores are exposed to air and moisture, a chemical reaction occurs that generates sulfuric acid that migrates into the surrounding environment and, through leaching, releases heavy metals present in the waste rock, pit walls, and tailings basins of mining operations.
 - Tamarack sulfide deposits (and tailings) also contain cobalt and other highly toxic minerals
 - The sulfuric acid along with dissolved heavy metals released onto the land will seep into the rich aquifers below and then into streams and lakes at levels that are toxic to fish and other aquatic life
 - The close proximity of sulfide mines to valued water bodies such as lakes and rivers of the Mississippi watershed intensifies the magnitude of this issue
 - All of the water bodies in the Tamarack area are linked by multiple aquifers.

Proposed Tamarack High Sulfide Nickel-Copper Mine

- ❖ The Tamarack North Project covers approximately 20,348 acres - Nearly **32 square miles!**
 - With plans to mine over 11 million tonnes of ore over an 11-12 year period (12 Million US tons) (page 192 of the PEA)
 - 3.926 million tonnes of “indicated” resource / ore
 - 7.163 million tonnes “inferred” resource / ore
- ❖ Concerns based on Talon’s Preliminary Economic Analysis – an NI 43-101 Technical Report:
 - Vented Airborne Dust from Blasting and CFTF is Contaminated with Sulfide Particles
 - Talon must pump more than 2.6 million gallons a day from the mine due water entering from the aquifers and service water used in operations – Discharge of water, water quality (filtering) and aquifer levels are of concern
 - Mine site includes a tailings pile which will be left on the surface - Liners and covers will eventually leak contaminating the area



- **Indicated Resources** are resources which have a high certainty of being there but are somewhat less reliable than measured resources as drill hole spacing is much greater than for measured resources.
- **Inferred resources** are not based on any drill hole campaign and are an educated guess often relying on seismic data and an understanding of the geology of the area. The market gives little to no value to inferred resources