

SAVE THE BOUNDARY WATERS

To: Interested Parties

From: The Campaign to Save the Boundary Waters

Subject: Dispelling Twin Metals' critical minerals fiction

Since it first proposed mining sulfide-ore metals next to the Boundary Waters, Chilean mining conglomerate Antofagasta has sought to rationalize a risky Twin Metals mine. The truth is this: the only reason for this mine is profit for a foreign mining company. Originally Antofagasta, owner of the proposed Twin Metals mine, claimed the region needed the jobs. But after peer-reviewed economic research from Harvard University¹ showed a Twin Metals mine would actually result in fewer jobs and less income over a twenty year period, Antofagasta and its supporters moved to their next rationale du jour – critical minerals. These minerals are important to everyday life and transitioning to a clean energy economy. However, the idea that the American people must jeopardize the Boundary Waters to get them is a story that lives only in the heads of Twin Metals boosters, and is an argument that is misguided, at best.

This is reinforced by an article published this morning in the Minnesota Reformer that quoted an analyst, Adrian Gardner, who specializes in nickel at the research firm Wood Mackenzie who was asked about the relevance of critical mineral mining in Minnesota to the larger issue. “Is it going to make a difference? In short, no,” he said².

We don't have to choose between clean energy and protecting the Boundary Waters

Twin Metals has spun a tale about the need for its mine to power a clean energy future and our domestic security, but the truth is sulfide-ore copper mining in this location would sacrifice the Boundary Waters while producing an insignificant amount of metals compared to United States demand. We can (and do) work with allies like Canada, Norway, and Australia to secure the critical minerals we need and better recycle minerals in our own country.

¹ Stock JH, Bradt JT. [Analysis of Proposed 20-year Mineral Leasing Withdrawal in Superior National Forest](#). Ecological Economics. 2020;174 :1-9.

² Connelly, Colleen. [Would Minnesota mining end U.S. reliance on Russian nickel? Experts say probably not](#). Minnesota Reformer, March 30, 2022.

Twin Metals supporters also recently cynically jumped on Russia's invasion of Ukraine to hype the need for this dangerous project, but the fact is the United States imports few critical minerals from Russia, far fewer than from our traditional allies mentioned above. For example, when it comes to nickel the 2022 U.S. Geological Survey shows that major U.S. suppliers are Canada, Norway, Finland, and Australia. Russia represents something less than 8% and is grouped with "other"³.

A wiser approach to critical minerals is that of the Biden administration, which recently unveiled major investments in domestic industries that produce these minerals and materials.⁴ The policy strongly supports domestic production while providing those special places, such as the watershed of the Boundary Waters, must be off-limits to mining and protected from mining impacts. Nearly 70 percent of Minnesotans support a ban on sulfide-ore copper mining near the Boundary Waters⁵; this is clearly the approach favored locally.

In the end, the claim by Antofagasta and its supporters that the dangerous Twin Metals mine is needed for critical mineral production is yet another in a list of their attempts to greenwash this risky project.⁶

"Eighty-eight percent of a grain of sand is still less than a grain of sand." Minerals from a Twin Metals mine are insignificant to United States demand

Twin Metals' website and lobbying materials misleadingly suggest that minerals from its operations would supply a significant amount of U.S. or even global demand. For example, its website claims that "we have what the country needs," followed by graphics showing 34% of U.S. copper reserves, 95% of U.S. nickel reserves, and 88% of U.S. cobalt reserves⁷. These numbers, intentionally or not, deceive even as Twin Metals seeks to impress.

A Twin Metals mine would involve only a fraction of a fraction of the Duluth Complex.

The figures promoted on the Twin Metals website conflate the deposits Twin Metals seeks to develop (four) with the much larger Duluth Complex, which contains roughly 18 identified deposits, most of which Twin Metals has no claim to and/or are not in the Rainy River-Headwaters. Of those four deposits, the Twin Metals mine plan proposes

³U.S. Geological Survey (2022). *Mineral commodity summaries: Nickel*. U.S. Dept. of Interior. <https://pubs.usgs.gov/periodicals/mcs2022/mcs2022-nickel.pdf>

⁴ White House Fact Sheet. [Securing a Made in America Supply Chain for Critical Minerals](#). February 22, 2022.

⁵ ALG Research. [Minnesotans Strongly Oppose Mining on the Edge of the Boundary Waters](#). July 20, 2020.

⁶ Save the Boundary Waters. [Metal Mining Rebrands Itself to Ride Clean Energy Wave](#). October 2022.

⁷ Twin Metals Minnesota (n.d.). Why Minnesota. Retrieved Nov. 27, 2021, from <https://www.twin-metals.com/why-minnesota/>.

mining only 6.5% of the ore altogether. The actual production of a Twin Metals mine would be a drop in the bucket of United States mineral demand. For purposes of the Superior National Forest Mineral Withdrawal analysis, the amount of metal that could theoretically be mined in the proposed Superior National Forest Withdrawal Area is significantly smaller than Twin Metals' numbers seem to suggest. (see discussion below about the FLPMA Superior National Forest Mineral Withdrawal)

Eighty-eight percent of a grain of sand is still less than a grain of sand. Twin Metals focuses on percentages of U.S. reserves, but U.S. reserves are small in comparison with U.S. consumption. U.S. reserves are also small in comparison with the reserves of our allies and close trading partners, Canada, Australia, and Norway, among others. For example, the U.S. hosts 0.7% of world cobalt reserves, while in pre-Covid 2019 claimed 8.7% of world consumption⁸. Similarly, the U.S. hosts 1.3% of the world's PGM (platinum + palladium) reserves, while in 2019 claimed 32.2% of world consumption⁹. And finally, the U.S. hosts just one tenth of one percent (0.1%) of world nickel reserves, while in 2019 claimed 8.3% of world consumption¹⁰.

These details are important because without knowing the basis for a percentage, that percentage can look misleadingly impressive. Looking at the specific minerals a Twin Metals mine could produce:

Copper. Copper is abundant throughout the world. The United States and world resources are plentiful and growing. The United States is among the top copper producers in the world. The U.S. Geological Survey Materials Flow Analysis section assesses a low disruption potential for copper in the U.S. economy.¹¹ For the foreseeable future, foreign mining companies would continue to ship metal concentrates to low cost smelters in Asia, after which metals are sold on the world market. Antofagasta's plan for a Twin Metals mine calls for transporting metal concentrates to a port facility for shipping outside the United States. Antofagasta sends its copper-nickel concentrates from its mines in South America to China for smelting and refining.¹²

⁸ U.S. Geological Survey (2021c). *Mineral commodity summaries. Cobalt*. U.S. Dept. of Interior. <https://pubs.usgs.gov/periodicals/mcs2021/mcs2021-cobalt.pdf>.

⁹ U.S. Geological Survey (2021d). *Mineral commodity summaries. Platinum group metals*. U.S. Dept. of Interior. <https://pubs.usgs.gov/periodicals/mcs2021/mcs2021-platinum.pdf>.

¹⁰ U.S. Geological Survey (2021b). *Mineral commodity summaries: Nickel*. U.S. Dept. of Interior. <https://pubs.usgs.gov/periodicals/mcs2021/mcs2021-nickel.pdf>.

¹¹ Nassar, Brainerd, et al. [Evaluating the mineral commodity supply risk of the U.S. manufacturing sector](#). Science Advances. 2020.

¹² [Antofagasta reaches early copper supply deals with China smelters](#). Reuters. July 2nd, 2020.

Nickel. The United States does not have a significant amount of nickel. Its close trading partner, Canada, is a leading supplier of nickel (and other critical minerals) to the United States. Canada has more than 28 times the nickel reserves as the United States and on average its deposits are of double or higher grade than those in the United States.¹³ Canada is also eager to supply more metals to the United States. Other major trading partners for nickel include the countries of Norway, Finland, and Australia, all of which are on the Department of Defense's Security of Supply countries.¹⁴

Cobalt. A Twin Metals mine would produce a very small quantity of cobalt. Cobalt would be a by-product from smelting and refining nickel concentrates, which would be done off-shore, most likely in China. *Cobalt grades in Twin Metals deposits are among the lowest of all deposits in the world* and production, even if not sent abroad, would be insufficient to dent U.S. demand. At most, a Twin Metals mine might meet 1.5% of the U.S. annual demand for cobalt (based on 2019 annual consumption). As U.S. consumption rises, this percentage would decline. By contrast, the United States currently imports 57% of its cobalt needs from Canada, Norway, Japan and Finland, all close U.S. allies and trading partners¹⁵. Australia alone has 83 deposits containing cobalt, 55 of which are of double or higher grade than the Duluth Complex deposits in the Boundary Waters watershed. For example, one of those deposits alone, if mined, has enough contained cobalt to supply the United States at current demand, for more than 270 years. Another Australian deposit, the currently operating Murrin-Murrin mine, has grades five times better than the best a Twin Metals mine could offer¹⁶ and contains 198,000 tons of cobalt, more than 42 times what a Twin Metals mine could produce. With a Twin Metals mine, the United States would sacrifice the Boundary Waters and still need to import more than 98% of its cobalt.

A steady and reliable supply chain for critical minerals exists and can be strengthened without risking the Boundary Waters

Despite fear-mongering by Twin Metals boosters Russia is not a major supplier of minerals to the US. In fact the United States can and does secure its supply chain of critical minerals by importing them from a reliable and diverse set of trading partners, many of them long-time

¹³ [U.S. Geological Survey. 2022](#)

¹⁴ [Investigation of U.S. Foreign Reliance on Critical Minerals—U.S. Geological Survey Technical Input Document in Response to Executive Order No. 13953 Signed September 30, 2020.](#) P. 5

¹⁵ [Investigation of U.S. Foreign Reliance on Critical Minerals—U.S. Geological Survey Technical Input Document in Response to Executive Order No. 13953 Signed September 30, 2020.](#) P. 29

¹⁶ Mudd, G M, 2009, Nickel Sulfide Versus Laterite : [The Hard Sustainability Challenge Remains](#). Proc. "48th Annual Conference of Metallurgists", Canadian Metallurgical Society, Sudbury, Ontario, Canada, August 2009.

allies such as Australia, Canada, Norway, Finland, Mexico, Belgium, India, Germany, South Africa, the United Kingdom, Austria, Estonia, Japan, South Korea, Malaysia, and Rwanda.¹⁷

Furthermore, The United States could dramatically reduce demand for minerals by investing in a circular economy¹⁸ – including recycling, reuse, manufacturing improvements and substitution that would create jobs domestically while not putting places such as the Boundary Waters at risk of toxic mining.

Many minerals identified as critical are discarded as waste material and are not recovered during smelting and/or refining. Stronger laws, regulations, and standards could compel the recovery of minerals from existing mines, waste, and tailing piles, thus adding to the supply chain.

The Biden administration has also taken the right approach to strengthening our critical minerals supply chain by expanding domestic production where it makes sense, building up manufacturing capacity, and investing in new technologies to lessen our dependence.

None of these strategies require us to sacrifice the world's greatest canoe country Wilderness and the thousands of jobs it creates and sustains.

Twin Metals admits the mine is risky to the uniquely valuable and vulnerable Boundary Waters ecosystem

Both the Boundary Waters and Voyageurs National Park are a uniquely valuable place that should be protected from destructive sulfide-ore copper mining proposed on public lands in its headwaters. The Boundary Waters is our nation's premier lakeland National Wilderness Area and the most visited of all such areas. A defining characteristic is water: twenty-four percent of the Boundary Waters is water, and these waters are described by the Minnesota Pollution Control Agency as extremely clean and immaculate¹⁹. In an interview Twin Metals Chief Regulatory Officer Julie Padilla could not promise the mine would not pollute the Wilderness. The Star Tribune wrote:

¹⁷ [Investigation of U.S. Foreign Reliance on Critical Minerals—U.S. Geological Survey Technical Input Document in Response to Executive Order No. 13953 Signed September 30, 2020](#). P. 5

¹⁸ Dominish, E., Florin, N., Wakefield-Rann, R., (2021). [Reducing new mining for electric vehicle battery metals: responsible sourcing through demand reduction strategies and recycling](#). Report prepared for Earthworks by the Institute for Sustainable Futures, University of Technology Sydney.

¹⁹ Minnesota Pollution Control Agency. [Protection rather than restoration is priority for two Boundary Waters watersheds](#). August 2021.

...[I]t's surprising that a simple query at the end of an editorial writer's interview seemed to catch Padilla off-guard: Can Twin Metals say there's zero risk to the BWCA? After a pause, Padilla responded, "That's not a fair question."²⁰

Federal law prohibits any water quality degradation in the Boundary Waters. Therefore Padilla's admission that Twin Metals cannot guarantee the protection of these waters is legally disqualifying.

The Boundary Waters and Voyageurs National Park are uniquely vulnerable. The waters of the Boundary Waters, the surrounding Superior National Forest, and Voyageurs National Park are vastly interconnected – lakes, rivers, streams, wetlands, and groundwater – and the extensive interconnectedness is poorly understood, meaning that water pollution could travel undetected for years or decades or centuries, and the route by which pollution moves – particularly through fractured bedrock – may not be decipherable. The water chemistry of the Boundary Waters, the surrounding Superior National Forest, and Voyageurs is poorly-buffered, i.e., low in alkaline or base compounds, meaning that newly introduced acid mine drainage would cause the pH of the waters to become acidic; alkalinity is necessary to counteract acidity. Mine drainage, whether acidic or not, and deposition of air pollution from mines in the watershed would cause mercury contamination in fish and all who eat fish, both downstream and downwind. Acid mine drainage would cause the loss of aquatic life. Because the degraded waters would be in a vast lakeland national wilderness area, the damage could never be remediated, mitigated, or fixed.

The EPA has determined that the Duluth Complex, which underlies the watershed of the Boundary Waters, is acid-generating²¹. It also contains very low-grade ore. Waste from mines in the Duluth Complex will be vast – roughly 99% of the ore body. Mine waste would be a source of water degradation for hundreds of years. Leachate from mines in the Boundary Waters watershed would include sulfates and heavy metals such as arsenic, copper, zinc, and other toxic metals.

Sulfide-ore deposits that Twin Metals Minnesota, owned by Antofagasta, seeks to develop are located in an intensely water-rich area on the shores of and beneath the South Kawishiwi River and Birch Lake, and immediately adjacent to the Boundary Waters. The surface and groundwater from this area flows north directly into the Boundary Waters and Voyageurs National Park.

²⁰ Star Tribune. [Not this mine. Not this location.](#) November 23, 2019.

²¹ Environmental Protection Agency. [Technical Document: Acid Mine Drainage.](#) 1994.

