



An argument has been advanced that the publicly owned minerals in the watershed of the Boundary Waters Canoe Area Wilderness are necessary for the nation’s transition to a green economy. This argument is misguided. Sulfide-ore copper mining in the watershed would sacrifice the Boundary Waters while producing an insignificant quantity of metals relative to United States demand. In addition to providing only ‘a drop in the bucket’ in terms of demand, the argument is also irrelevant, because the metals would be shipped outside of the United States, most likely to China, for final processing, and then sold on the world market.

The Boundary Waters Canoe Area Wilderness is a [special place that should be protected](#) from the destructive sulfide-ore copper mining proposed on public lands in its headwaters.

- The Boundary Waters Canoe Area Wilderness is uniquely valuable.
- It is the nation’s premier lakeland Wilderness.
- It is the [most visited National Wilderness Area in the nation](#).
- [24% of the Boundary Waters is water](#), and its [watershed is described as ‘extremely clean’ and ‘immaculate’](#) by the Minnesota Pollution Control Agency.

The Boundary Waters Canoe Area Wilderness is uniquely vulnerable.

- [The lakes, rivers, streams, wetlands, and groundwater of the Boundary Waters and surrounding Superior National Forest are vastly interconnected](#), and the extensive interconnectedness is poorly understood, meaning that water pollution could travel undetected for years, decades or centuries, and yet the route by which pollution moves - particularly through fractured bedrock - may not be decipherable.
- Water pollution would spread across the Boundary Waters via [the various pathways of surface and groundwater](#).
- Water degradation/ pollution in the waters of the Boundary Waters [could not be remedied, or mitigated, or fixed because of the vast interconnected landscape and because treatment is disallowed in the Wilderness](#), where no roads or mechanized use whatsoever is allowed.
- The [water chemistry of the Boundary Waters and the surrounding Superior National Forest 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 very acidic; alkaline is a necessary compound that would counteract acid. Acid mine drainage would cause the loss of aquatic life forms. Mine drainage, whether acidic or not, and deposition of air pollution from the mine would cause mercury contamination in fish all who eat fish, both downstream and downwind.

[The Duluth Complex is acid-generating](#) contains low-grade sulfide-bearing ore (1% metals, of which less than 0.2% are nickel).

- 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. [sulfates, sulfides, and heavy metals such as arsenic, copper, zinc, and other toxic metals would constitute the leachate](#).

[Twin Metals deposits 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.

[The proposed Superior National Forest mineral withdrawal area - 225,378 federal acres](#) - would be only a small part of the entire Duluth Complex, and does not affect high-grade Mid-Continent Rift deposits located to the south (outside the Withdrawal Area).

[The Superior National Forest mineral withdrawal area](#) would remove from mineral development four out of nineteen known deposits in the Duluth Complex.

Metals from sulfide-ore mining in the Withdrawal Area are insignificant to United States demand and irrelevant to transitioning to a green economy: The supply chain of metals needed for energy transition are graphite, lithium, nickel, cobalt, and copper. Only nickel, cobalt, and copper are found in the Duluth Complex.

Copper. Copper is abundant throughout the world. United States and world resources of copper are plentiful and growing. The U.S. is among the top five copper producers in the world. The USGS Materials Flow Analysis section assesses a low disruption potential for copper in the U.S. economy.

- The U.S. has only [three active copper smelters](#). They are fully integrated, meaning the companies that own them also own their own copper mines which supply the smelters with enough concentrates to keep them operating at or near full capacity.

- Any new copper-nickel mine (Twin Metals) would send its copper and nickel concentrates out of the U.S. for processing. [Twin Metals' plan is to truck its concentrates to a port facility.](#) (See p. 46).
- [Antofagasta, the owner of Twin Metals, sends its copper-nickel concentrates from its mines in South America to China for smelting and refining.](#)

Nickel. The United States does not have a significant amount of nickel.

- [Canada is a close partner and leading supplier of nickel and critical minerals to the United States. Canada has more than 28 times the nickel reserves as the U.S. and on average its deposits are of double or higher grade than those in the U.S.](#) Canada also is [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 list ([USGS OFR-1127, p. 5](#)).
- The United States has no nickel smelters.
- Any nickel concentrate from mining in the watershed of the Boundary Waters would be shipped overseas, likely to China, for processing.

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 meet 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, the 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 partners. ([USGS OFR-1127, p. 29](#)), 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 U.S. at current demand for more than 270 years. Another deposit, the currently operating Murrin-Murrin mine, has [grades 5 times better than the best Twin Metals could offer](#), and contains 198,000 tons of cobalt, more than 42 times what Twin Metals could produce. [With a Twin Metals mine, the U.S. would sacrifice the Boundary Waters and still need to import 98% of its cobalt needs.](#)

- A Twin Metals mine would produce a very small quantity of cobalt. Cobalt would be a by-product mainly from smelting and refining nickel concentrates.
- Cobalt grades in Twin Metals deposits are among the lowest of all deposits in the world (G. Mudd, Monash Univ., Australia, unpublished data), and production (at least 12-14 years in the future), even if not sent abroad, would be insufficient to meet U.S. demand.
- Smelting and refining of nickel concentrates, and hence cobalt, would occur off-shore, most likely in China (see [Twin Metals Project 2014-10-06 Pre-Feasibility Study, p. 1-25](#)).
- [The U.S. in 2020 exported eighteen times as much cobalt](#) as Twin Metals would produce each year

[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 allies.](#) Our many allies and close trading partners are a source of strength and security ([USGS OFR-1127, p. 5](#)).

- The United States imports other minerals from countries such as Australia, Canada, Finland, Mexico, Belgium, India, Germany, South Africa, the United Kingdom, Austria, Estonia, Japan, South Korea, Malaysia, and Rwanda. Manufacturing improvements, substitution, and R&D investments are key to reducing U.S. import reliance ([Id., p.13](#)).

The [U.S. could dramatically reduce demand for minerals in future decades by investing in a circular economy now- 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 (e.g., cobalt) 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 tailings piles, thus adding to the supply chain.

- It is estimated that there is as much cobalt among e-waste landfills in eastern United States as in all of the Democratic Republic of the Congo, for example.

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