Our Water is Our Strength

A SULFIDE MINING BRIEFING BOOKLET

Minnesota Center for
Environmental Advocacy

Our Water is Our Strength

In Minnesota, our water is our strength. It's our pride, our future, the subject of treaty rights and obligations, and the most fundamental resource on which we all rely. Together we are stewards of the headwaters of three famed watersheds — Lake Superior, Rainy River / Boundary Waters, and the Mississippi.

Unfortunately, proposals from foreign mining conglomerates threaten each of these watersheds. Enormous companies like Glencore, Rio Tinto, Teck, and Antofagasta all seek to conduct copper-nickel sulfide mining here, something that has never been done before in Minnesota.

You may be hearing from representatives of these companies — about mining standards, about a changing energy system, and about their promises to respect our waters better than they've respected waters elsewhere.

This booklet is intended to help illustrate the differences between copper-nickel sulfide mining and the existing taconite mining industry in Minnesota, to update you on recent developments in Minnesota's sulfide mining laws, and to help you weigh the validity of the claims you are hearing from an industry whose goals include extracting mineral resources but do not necessarily include protecting our water.

Photo by John Keefover courtesy of Friends of the BWCA

SECTION ONE

How Copper-Nickel Sulfide Mining Differs from Iron Ore and Taconite Mining

The history of iron ore and taconite mining in our state, also known as "ferrous" mining, goes back to the 1880s. But there are big differences between iron ore and taconite mining and the mining of sulfide ores that contain copper, nickel, and other metals — also known as "nonferrous" mining. The rock that hosts the iron ore that Minnesotans are familiar with (esp. the Mesabi Iron Range) is not the same rock that hosts the metallic sulfide deposits nearby that the companies listed here want to exploit (the Duluth Complex).

Mining iron ore near Hibbing, MN, in 1919.

The iron and taconite ores mined in Minnesota are almost entirely **"oxide" ores** — which means that the metal is bound up with oxygen. When iron and oxygen are combined, you get rust. That's why the leftover ore from iron mining is often red. In contrast, the ores that contain copper, nickel, gold, and other metals in Minnesota are **"sulfide" ores** — the target metals are bound up with sulfur in its sulfide form. When these sulfides react with air and water, they create sulfuric acid which can then leach sulfate and heavy metals like arsenic into the water. This is called "acid mine drainage," and chemically, it is basically battery acid. Acid mine drainage, which can persist in the environment for centuries, is particularly damaging to plants, animals, and humans.

Different Pollution

Taconite and iron ore have been mined in Minnesota for nearly 150 years, and the byproduct, oxide ore tailings, can be found across northeastern Minnesota (above). The acid mine drainage pollution associated with sulfide mining (below) is more toxic and chemically similar to battery acid.

The Duluth Complex

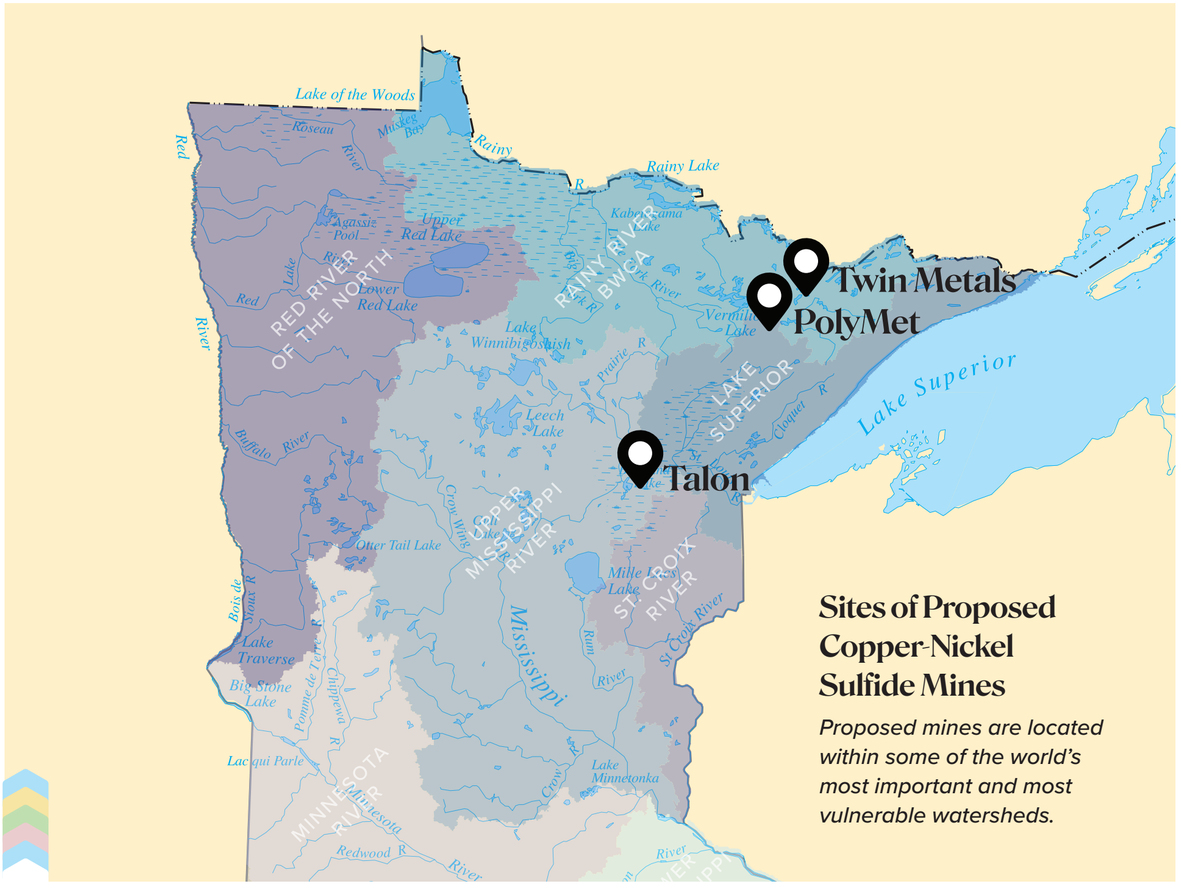
is a geological formation in northeastern Minnesota with low grade sulfide ores — the mining of which would result in extraordinary amounts of toxic waste byproducts.

You might wonder "well, this rock was already there, so why does mining it create pollution?" When the rock is underground it is not exposed to oxygen. Mining blasts the rock, which is then brought to the surface and ground to the consistency of talcum powder, greatly increasing the exposed surface area for reaction with oxygen and water. The powdered rock is then processed to separate out (most of) the desired metals and the rest is left behind as a source of pollution, typically in a tailings basin. Unlike a factory, where the pollution mostly ends when the factory closes, this source of pollution remains for centuries and can even worsen for decades after the mine closes.

A particular problem with sulfide mining in northeastern Minnesota is that Duluth Complex sulfide ore is very low grade. The Duluth Complex is on average less than 1% metal, and 99% waste. That means a lot of acid-generating waste would be left to pollute; for every ton of metal extracted, 200 tons of waste rock are left behind. Sulfide mining is so risky we do not have a single example of a clean mine anywhere in the world.

In fact, every sulfide mine has had problems with pollution. The most famous American example of decades-old mine waste is the Berkeley Pit in Butte, Montana, which is so acidic that migratory birds that land on the pit die within hours. In Canada, the Mount Polley mine continues to pollute downstream and Indigenous communities, as well as sensitive salmon spawning grounds, a decade after its catastrophic dam failure. These are two examples among many.

Today, copper-nickel sulfide mining proposals in Minnesota span the headwaters of three of the most important and most vulnerable watersheds in the world, threatening Lake Superior, the Boundary Waters, and the Mississippi River. In addition to the environmental destruction this type of mining would bring, current proposals have significant implications for treaty rights and obligations. It is critical that any processes and proposals honor treaty rights and obligations and include meaningful formal consultation with sovereign nations.



SECTION TWO

What the Courts Have Said Regarding Minnesota's Sulfide Mining Laws

Mining companies assert that Minnesota has a strong permitting process and that Minnesotans can trust this process to protect our environment, water, and air. But experience has shown that our process suffers from significant flaws, and that mining companies are continuously trying to weaken and skirt the same process they claim is strong.

Minnesota's experience with the recent PolyMet proposal illustrates this. In 2018, Minnesota issued permits for a copper sulfide mine in this state for the first time — the PolyMet proposal (also known as NorthMet or NewRange, owned by Glencore). Since those permits were issued, Minnesota courts have repeatedly found problems with the proposal and violations of state laws and rules, and today, each of the major PolyMet permits has been reversed or sent back to agencies.

SINCE 2018, MINNESOTA JUDGES HAVE RULED:

- A mine cannot have a "forever permit" allowing it to operate without an end date. Instead, a facility's permit to mine must include a fixed term, by the end of which the mining site must be cleaned up. In re NorthMet Permit to Mine, 959 N.W.2d 731 (Minn. 2021).

- A mine cannot pollute groundwater underneath the facility, even if it intends to try to collect and clean that polluted groundwater later. In re NorthMet NPDES/SDS Permit, 993 N.W.2d 627 (Minn. 2023).

- A mine cannot allow millions of gallons of polluted water to leak from a mining waste basin, even if those millions of gallons constitute only a small percentage of the total polluted water within the basin. In re Northmet Project Permit To Mine Application, 2023 WL 8378514 (Minn. Off. Admin. Hrgs. Nov. 28, 2023).

- A mine cannot ignore potential impacts on downstream jurisdictions, including tribal reservations. Fond du Lac Band of Lake Superior Chippewa v. Wheeler, 519 F. Supp. 3d 549 (D. Minn. 2021).

Threatened Landscape
1,000s of acres of sensitive and carbon sequestering wetlands would have been destroyed under PolyMet's overturned permits including those pictured here.

Photo by Rob Levine

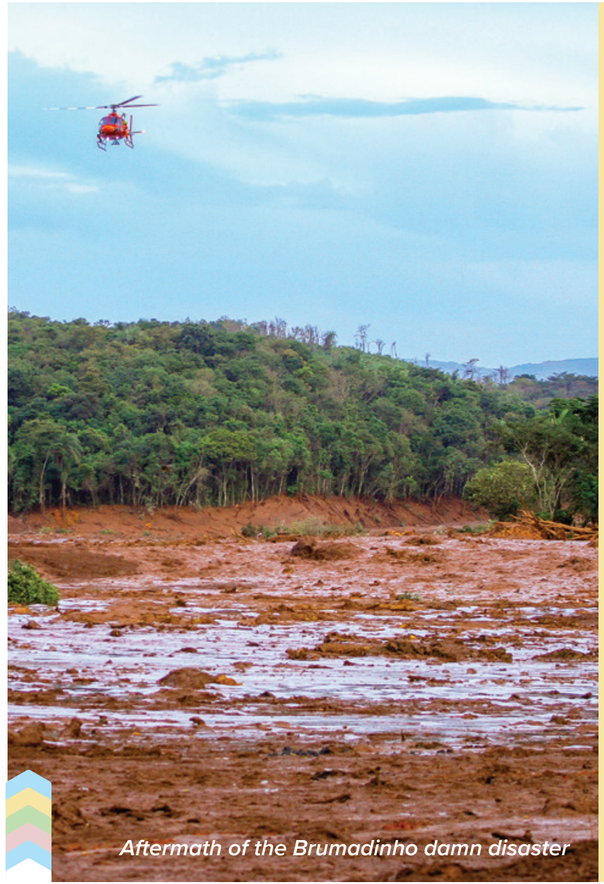
MINNESOTA COURTS HAVE ALSO FOUND THAT STATE PERMITTING PROCESSES SUFFERED FROM SIGNIFICANT FLAWS. COURTS HAVE RULED:

- State agencies cannot refuse to address evidence submitted during the permitting process that indicates a mining company might be misrepresenting the size of the mine it plans to build. In re Air Emissions Permit for PolyMet Mining, Inc., 965 N.W.2d 1 (Minn. Ct. App. 2021).
- State agencies must be transparent with the public about concerns raised about a mining proposal from other regulators like the Environmental Protection Agency. In re NorthMet NPDES/SDS Permit, 993 N.W.2d 627 (Minn. 2023).

In one case, involving actions of the EPA and MPCA during permitting, Minnesota Supreme Court Justice Anne McKeig wrote, "The MPCA and the EPA sought to avoid public scrutiny and to hide the risk of illegal water pollution from the public eye. This secrecy is unacceptable." In re NorthMet NPDES/SDS Permit, 993 N.W.2d 627, 669 (Minn. 2023).

> The state's experience with the flawed Glencore/PolyMet proposal shows that Minnesota's permitting laws and permitting processes, as they stand today, will not protect the health of Minnesota's waters, plants and animals, and people.

We cannot rely solely on the courts to prevent weak permits that allow pollution. The rulings we have to date give us a lot of information about where the laws need improvement, and it will take statutory and regulatory change to bring Minnesota's standards up to date and in line with global best practices for mining.



Aftermath of the Brumadinho damn disaster

Are "Modern Mines" Safer?

When we talk about the long history of pollution, mining companies are likely to point out that many of those mines are older, and mining practices have changed. However, the data do not support this argument. A 2006 study looked at modern mines, primarily those built after 1976 that were subject to modern environmental laws. It found that over 75% of these mines had pollution problems, even though all of them had environmental review documents that predicted that they would not pollute.

Although environmental review is critical to gathering information for the public and decision-makers, experience shows that environmental review often fails to predict all of the water pollution that occurs once most mines are built and operating, and the full severity of water pollution often isn't revealed until years or decades after a mine has closed. Sixteen so-called "modern mines" have gone bankrupt in the United States. To the extent that practices have changed, we still have a long way to go to reverse the history of this polluting industry. (https://earthworks.org/resources/modern_mining/) It's important we keep this track record in mind when we weigh industry claims over our shared waters.

SECTION THREE

Needed Updates to Minnesota's 30-Year-Old Sulfide Mining Statutes and Rules

Minnesota's sulfide mining laws are 30 years old and out of date. Our laws and rules would need to be significantly updated before we could responsibly consider permitting this type of mining in Minnesota. Here are some common sense legislative fixes regarding sulfide mining that MCEA supports:

BAN UPSTREAM TAILINGS DAMS.

The riskiest aspect of a mine is when companies try to contain mine waste, or "tailings," behind an earthen dam. The cheapest and riskiest of these are called "upstream dams." In this type of dam, sections of the dam wall are built on top of the mining waste the dam is meant to hold back. The upstream dam design is the one that has catastrophically failed at mines in Brazil and British Columbia. Brazil, Chile, and Peru now ban or severely restrict this type of dam. Maine prohibits wet tailings basins that require dams altogether. Minnesota should also ban this dangerous type of dam. Notably, the upstream dam design has been a highly controversial component of the Glencore/PolyMet proposal.

REQUIRE CLEARER STANDARDS TO PREVENT WATER POLLUTION FROM WASTE FACILITIES DURING OPERATION.

The legislature should instruct DNR to amend its rules to create clearer standards for mine waste facilities during operations, and to address new technologies that avoid the need for wet tailings basins. DNR's rules should specify standards for liners, covers, collection systems, stormwater management, and groundwater monitoring. Rules also should require mine owners to monitor for and address any leaks or releases of mining waste for as long as the waste is stored.

REQUIRE INDEPENDENT REVIEW OF TAILINGS STORAGE FACILITIES.

In 2015, Montana passed a mining-industry-supported law that requires a permit applicant to hire an independent review panel of licensed engineers who are experts in tailings storage facilities. These engineers must oversee the mine throughout its life, from design to closure. Minnesota law should be amended to include a similar requirement.

Mt. Polley Sulfide Mine Disaster

The contents of a tailings pond are pictured flowing down the Hazeltine Creek into Quesnel Lake near the town of Likely, B.C. on August, 5, 2014.

Photo by Jonathan Hayward/Canadian Press via CBC

REGULAR REVIEW OF MINING PERMITS.

The Legislature should require DNR to review mining permits every 10 years as required for landfills and other waste facilities. Upon review, the permittee should be required to prove it has complied with the permit and meets current/best environmental and engineering standards. The review should include a public process aimed at transparency and accountability, to update the public on the status of the operation, pollution checks, and on key components like dam safety.

REQUIRE MAJORITY SHAREHOLDERS AND OWNERS ON PERMITS.

The use of shell or "junior" mining companies (operating entities with few assets) by large international conglomerates to put a local face on a mine application is a common tactic of the industry. We've seen it here in Minnesota with Glencore (PolyMet), Rio Tinto (Talon), Antofagasta (Twin Metals) — all the sulfide mining proposals currently being discussed. If permits for a mine are issued, Minnesota should require that the parent companies are on the permits so that the entities ultimately profiting from an operation are on the hook when pollution and expenses exceed the amounts predicted. If a corporate acquisition happens after an initial permit is issued — also a common tactic — Minnesota should require a public amendment process to add the acquiring companies to the permits and which includes a clear opportunity for our agencies to reject bad actors.

DISALLOW BAD ACTORS IN MINNESOTA.

Many of the international mining conglomerates (the "majors") who back sulfide mining proposals in Minnesota have extensive records of bribes, corruption, pollution, and bad labor practices in other places. Glencore, for example (owner of PolyMet), recently pled guilty to bribery and market manipulation in the United States and was sentenced to pay $700 million. Minnesota should pass legislation to ensure that any company that has current convictions (fraud, corruption, labor, or environmental) would not be able to do business in Minnesota.

REINSTATE MPCA CITIZENS BOARD.

The Minnesota Pollution Control Agency Citizens Board encouraged transparency and accountability in decision-making and provided a forum for public testimony and participation before it was repealed in 2015 without a single legislative hearing. The Legislature should reinstate the Board to oversee MPCA actions such as permitting. Reinstating the Board would ensure that difficult decisions are made by a group of informed citizens who understand the perspectives of their communities and who are insulated from industry and political pressures.

TAXPAYER PROTECTION ACT.

Minnesota should require mining companies to set aside sufficient funds to cover all mine closure costs, including costs from unexpected accidents or system failures. The Legislature should also instruct DNR to follow recommendations from independent financial assurance experts before approving permits to mine, including recommendations about making the assets liquid and accessible to the state.

NO NEW PERMITS.

Given the pollution that accompanies sulfide mining, the need to update standards, the lag in adoption of best practices, and the lack of policies to promote reuse, recycling, and other alternatives to mining to address supply, Minnesota should consider a suspension of copper-nickel sulfide mining permitting and/or permanent mineral withdrawal while these dynamics take further shape. The Prove it First bill and the Boundary Waters Permanent Protection Bill are two existing approaches to this.

Photo by Chuck Dayton

A Word on "Permitting Reform."

Pleas for less regulation are a time-honored tradition of industry lobbying, and today is no different. Minnesota's statutes and rules regarding sulfide mining do need updating, as we've detailed here. But "streamlining" those laws is precisely the wrong idea. Curtailing our environmental review and permitting processes could be used to hide important information from decision-makers and the public, make pollution more likely due to a less thorough analysis, and make it harder to hold companies accountable for problems that occur. Blaming the permitting and environmental process is an attempt to obscure the reality that when projects are delayed, it is usually because they have serious and perhaps novel issues, not because the process itself is a problem. "Streamlining" is also unnecessary: The vast majority of projects pass through environmental review and permitting expeditiously and without problems. If we are to live up to our idea of Minnesota having strong standards, we actually need to improve them, not undercut them.

SECTION FOUR

Responding to Industry Rhetoric Around Climate Action and Permitting

Despite its long history of pollution, the mining industry today presents itself as a climate solution. According to its representatives, the copper and nickel present in low-grade ores in Minnesota watersheds should be considered a key piece of the clean energy transition. But when delivering this self-serving message, the industry leaves out critical information.

We are in a climate and extinction crisis, and we do expect that more metals will be used in electrification technologies. However, "more mining" is not a planet or climate-friendly solution. All sulfide mines pollute — including, when it comes to the climate, through direct greenhouse gas emissions and destruction of crucial carbon-sequestering wetlands and forests. Mining companies use demand projections to make it appear as if solar, wind, and electric vehicles cannot be built unless we permit many more mines. But projections like these tend to be overly simplified and unreliable, and they fail to account for innovation in which use and technology will shift as the world reacts to the realities of climate change.

To the extent we will need metals for the clean energy transition, though, what are the best ways to source them? Fortunately, there are many ways to approach this question that are far less destructive than new mining.

RECYCLE AND REUSE.

We should start in the most sustainable way possible: by reducing, reusing, and recycling. The average American household has 80 items of e-waste lying around. Of the 266 million pounds of e-waste produced in Minnesota annually, only about 24% gets collected and recycled. That means about $2 billion worth of metals is going into landfills and incinerators every year. Fully capturing this waste would mean enough copper for 155,000 electric vehicles. Nationally in the US, we recycle only 33% of our copper (as compared to 50-60% in the EU). As noted by the International Copper Study Group in its World Copper Fact Book, "if appropriately managed, recycling has the potential to extend the use of resources and minimize energy use, some emissions, and waste disposal." This is because recycling copper uses significantly less energy than new mining.

We can increase supply for copper and nickel first by recycling and reusing more. We can do that through laws that encourage tracing and collection of electronics, incentivize the use of more recycled content in batteries, assign responsibility for ensuring minerals are recycled to producers — like, for example, legislative efforts in Minnesota to create a system to collect 100% of electronic waste.

Even if recycling proves to be only a partial solution, that's okay. Every solution is a partial solution, which is exactly why we need to prioritize the best ones.

SHIFT TO MORE ABUNDANT MATERIALS.

Technology improvements provide an opportunity for a more sustainable and secure supply chain. Here in Minnesota, work is being done on iron-air batteries for grid storage that, in addition to using more plentiful materials, would replace problematic minerals like nickel and cobalt. Meanwhile, new battery technologies like lithium-iron-phosphate, sodium-ion and aluminum-ion show promise in the electric-vehicle market. These are just the examples related to batteries. We've already been

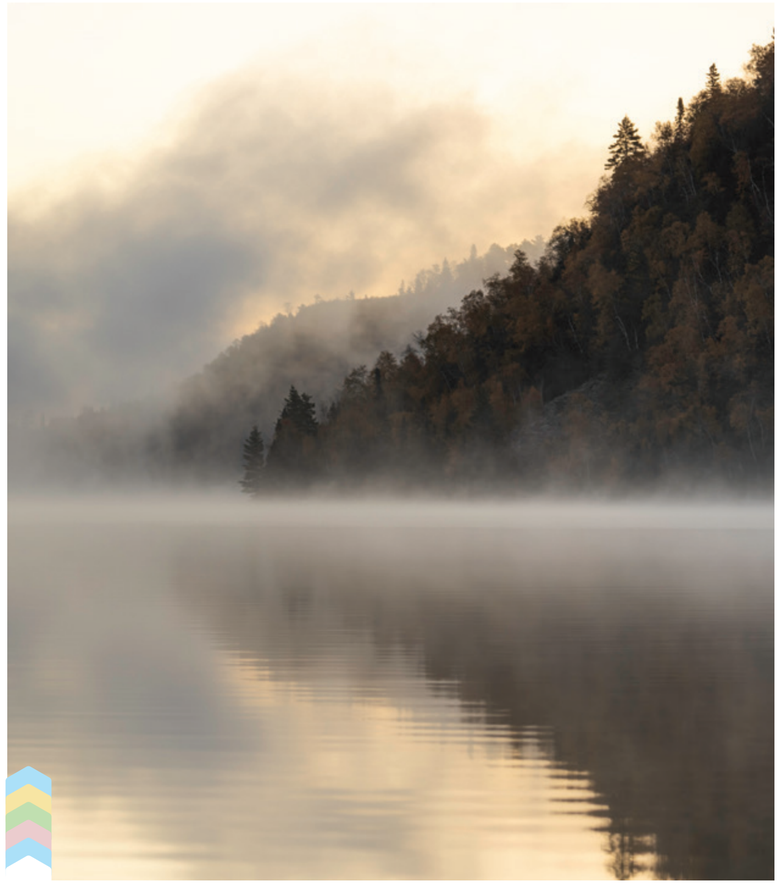


Photo by John Keefover courtesy of Friends of the BWCA

substituting away from copper for decades — including via the use of polyethylene piping in homes and fiber optic cable in telecommunications.

Through technological improvements and incentives, we can use materials that are more abundant and less problematic than copper and nickel. Materials substitution is already happening through private investment, and if we make it a priority for public investment and research as well, we can go further.

DIRECT NEEDED MATERIALS TO ESSENTIAL USES.

Did you know that the slice of the global pie of copper and nickel that goes into cleaner energy technologies is actually relatively small? According to the International Copper Study Group, 74% of end use copper goes into construction, transportation, industrial, and consumer goods, and 17% goes into power and telecommunications infrastructure. From the Nickel Institute, 65% of end use nickel goes into stainless steel, and 16% is used in batteries. Despite the enormous amount of attention climate-related uses are receiving in the conversation currently, these uses are actually dwarfed by overall consumption.

This reality presents another opportunity. If the supply of copper and nickel is essential or critical, then we should treat it as such and point the needed materials to the most essential uses. The most direct way to do this is through financial incentives. This is not a radical idea; Americans have done this before.

ENACT POLICIES TO REDUCE THE AMOUNT OF NEEDED MATERIALS.

It is possible to use less copper and nickel in general, which, given the impacts of new mining to our water supply, needs to be on the table too. Public policy options for accomplishing this are numerous, including supporting development of lighter and less material-intensive vehicles and other products, incentivizing more energy-efficient homes, and supporting transportation alternatives to driving alone — like transit, ridesharing, walking, and biking.

The bottom line is, we need an overall strategy for conserving and recovering minerals. If we do not prioritize these solutions above mining, we will end up with more of the same — more polluting mines — with most of the metals ending up in items that have nothing to do with clean energy, and ultimately in landfills.

Each of the policy alternatives described here would help better align the costs of our day-to-day needs with impacts to the environment. And each would be far less destructive than new mining in sensitive Minnesota watersheds.

Our Water is Our Strength.

As we navigate the complex policy environment before us, our goal should be no new mining, especially sulfide mining — it's bad for Minnesota and the planet. We can reduce the need for materials through smart policy that benefits all Minnesotans, and any proposals for copper-nickel sulfide mining in Minnesota should be considered only after our laws have been significantly updated to protect our environment. As the chief executive of the Mille Lacs Band of Ojibwe wrote recently, "we can find a better way forward, one that respects the deep connections among our communities, our resources and our shared future."

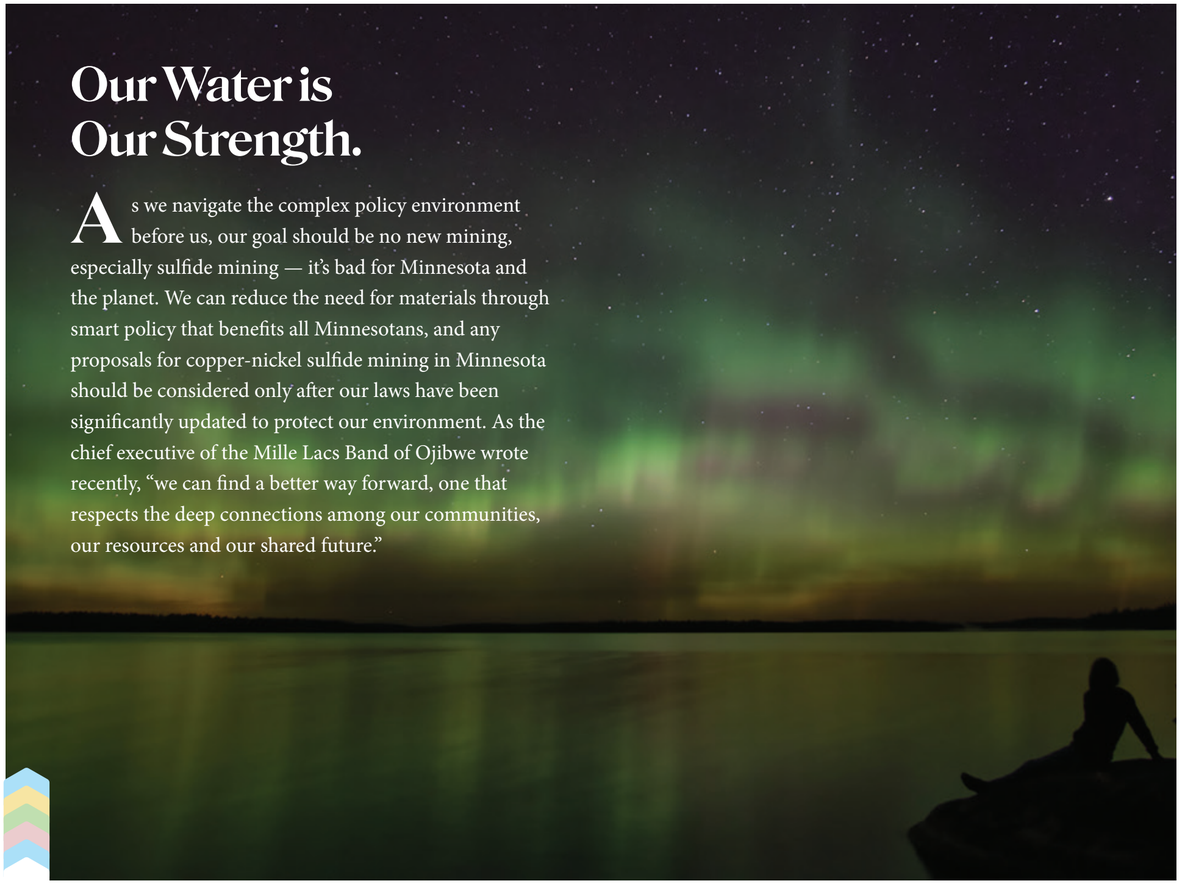


Photo by Andrew Mahowald courtesy of Friends of the BWCA

PREPARED BY

Minnesota Center for Environmental Advocacy

FOR MORE INFORMATION, CONTACT:

JT Haines, Northeastern Minnesota Program Director
Aaron Klemz, Chief Strategy Officer
www.mncenter.org

PARTNERING ORGANIZATIONS:

Friends of the Boundary Waters

Minnesota Interfaith Power & Light

Sierra Club North Star Chapter

Keep it Superior
Duluth for Clean Water