Minnesota at fault for the destruction of its own natural wonders…and our climate's future??

The world is full of little magical havens of nature. Places that root us to the natural world, and amaze us, while making us feel right at home. Places that fuel us and make us feel connected with nature, like we belong there. For me, a little lake in Minnesota we call lake 14, bordered by the Iron Range, is a place of consistency and a second home that I am so drawn to, and absolutely love to return to every summer. Here the wind rustles the enchanting leaves with its gentle strength, and the sun envelops you with its warm, welcoming touch, and nature just *is.* I can't imagine losing this place.

We live on an Earth full of life and amazing plants, animals, forests, lakes and streams; an Earth that revolves around the sun, the seasons, and the air and water that keep us alive. But we live in a society full of materialism; a society that revolves around money, and values productivity, and financial success and stability above all else. As our society works to stabilize our economy and fill our lives with an excess of commodities and comforts that consumers are constantly told they need to live well, the natural world around us has never been less stable. Ecosystems are being torn apart, waters are being infected with toxic chemicals, the air is being poisoned with dangerous pollutants, biodiversity is diminishing, and carbon emissions are pushing global warming barreling ahead a lot quicker than it was before. The Earth is losing its

footing. Climate change is an urgently critical global issue that requires our attention, care, and change in motion to combat. While environmental activists and those driven to save our wonderful Earth are working toward a hopeful future, there are industries that are holding this possibility back with tons of force. One of the largest contributors to the global climate issue, is the mining, and production thereafter which dominates much of Minnesota's industrial activity. The effects of mining are continuously harming our precious environments, and the significant volume of CO_2 emissions from leading industries such as iron ore and taconite mining in Minnesota are putting our natural world at greater and greater risk. And the lack of preventative or progressive measures for the environment is coming back full circle to hurt the wildlife and wonders of nature that compose Minnesota's natural identity.

Mining in Minnesota dates back to the 1800s, and ever since the take off of iron ore extraction over 100 years ago, mining is one of the largest industries in the state. To this day, iron ore extraction is still the most prominent, accounting for the majority of the industry's activity in the state. The mining of this metallic mineral resource took off particularly in the Iron Range area, with over 40 million tons, the most out of anywhere in the world, extracted annually from this stretch of land that borders the natural paradise I return to each year (Kaul, Kiprop). There is such a stark contrast between the graceful integrity of the beautiful world around us, and the anthropogenic industrialization that has made its way up to the top of the priority ladder, and to the center of our society. I remember being on the way to the serene nature of the cabin, and peering through the backseat window as we drove past the mines; past the intimidating, plain buildings, the towering cylinders and mammoth expanses of metal pipes that exhaled a long, haunting, slowly reaching cloud of gray smoke. "Pollution," my mom informed me. I knew from a young age that pollution was bad for the air, but I did not think about the direct impact this pollution could have on the beautiful lake I called home, or the fish I gave

breadcrumbs to in the early afternoons, or the lilypad and tigerlily filled wetland I admired in my little kayak, or the friendly loon who called out to us in the morning. I didn't know that this kind of pollution was harming the nature I thought of as so comfortingly constant, or that resource extraction is speeding up significantly (Watts). Luckily, there is some awareness of the issue, and people trying to protect the natural land. Multiple prospective new mines have ceased to move forward because of the environmental concerns of those in opposition (Kiprop), and Minnesota citizens have risen up to protest against the construction of other, potentially harmful pollution sources in their state. However, the problem of environmentally destructive mining is far from resolved.

The extraction of iron ore, and the production of steel, which approximately 95% of this resource goes toward, are very harmful to the environment and climate, and Minnesota is the biggest producer in the U.S. (Mining in Minnesota), responsible for three fourths of the iron ore produced in the country. The mining of this mineral emits dangerous air pollution in multiple forms, including carbon monoxide, carbon dioxide, and nitrous oxide, and injects natural waters with heavy metals and acidic pollution that can continue thousands of years after the mining activity is over. In 2022 alone, steel mining has already resulted in over 51.7 tons of wastewater globally. Steel production, which happens after the initial extraction, comes with its own set of highly detrimental impacts on the environment. It emits more carbon dioxide than any other industrial activity on the planet, contributing to global warming significantly by sending more than 3.3 million tons of CO2 into the atmosphere each year. The process of producing steel also requires a lot of energy, about 75% of it from the burning of coal; approximately 3.6 tons per ton of steel produced. Coke, the form of coal required for steel production, has very destructive effects, producing extremely toxic wastewater, and emitting dangerously toxic air pollution during the coal burning process that can cause cancer. Unfortunately, steel production is increasing annually, and so is resource extraction. Globally, steel production more than

doubled between the years 2000 and 2018, and we are producing nearly ten times more steel annually than we were in the 1950s (Larson and Bjerring Olsen). And resource extraction is happening three times faster than it was 50 years ago (Watts). The world of consumerism and materialistic culture is only increasing, and the chance we have of holding onto Earth's amazing and beautiful nature and protecting its future is diminishing by the day.

Today, responsible mining standards are in place thanks to the Clean Water Act. Guidelines have also recently been released and backed by hundreds of environmental groups worldwide, in a collaborative effort by EarthWorks and Mining Canada to reduce the environmental destruction resulting from the mining industry. However, these federal and ethical standards and regulations are not being met by all mines, and Minnesota taconite mines in particular are far behind in regards to environmentally responsible modern mining standards (Keough and Hansen). The mining of taconite, a low-grade iron ore, has caused a lot of conflict in the past, and still in the last few decades. A few mines in Minnesota and Michigan have been the perpetrators of critical acid drainage problems, sending unregulated amounts of discharge into Minnesota streams for decades and damaging miles of river as well as killing miles of aquatic life. According to a Minnesota DNR report in 2003, taconite mining follows coal power plants as the second highest mercury emitting source, and wildlife in lakes is taking the fall for those emissions, fish and other animals being poisoned from the contamination. In a span of under ten years from 2004-2012, ten major taconite mines in Minnesota and Michigan have collectively acquired over 10.5 million dollars in fines, stipulations and clean up orders, for ignoring water and air quality standards and requirements, and violating them by the dozens (The Environmental Track Record of Taconite Mining…). It is upsetting to me that these mining facilities are showing so much disregard for the environment surrounding them, and prioritizing maximum profit and productivity at the cost of the natural world willingly. It is also disappointing

to learn that Minnesota is not doing their part in living up to the kind of care required to combat the ongoing damage to nature and wildlife, and see a bright future for our environment. Not a single taconite mine in Minnesota is meeting the water quality standards that the federal Clean Water Act requires. The effects of pollution are spreading across water and land, accumulating algae and toxic mercury in lakes and killing off fields of grass, particularly wild rice, and fish and other small aquatic life are dying due to contamination and dissolved salts from mining (Keough and Hansen).

One of the most beautiful and valuable natural wonders of the little Lake 14 and surrounding land of the Iron Range area is the flourishing wetland. Filled with tiger lilies and long grasses swaying in the wind, and lily pads floating gracefully upon sun glittered waters, the world around me sat peacefully still, aside from a gentle current that rocked my kayak like a sweet, comforting lullaby. The world around me sat quietly, yet so alive. I would paddle out to the furthest point in the lake that I could go, (before getting stuck in the narrower, thicker, marshier parts), and just sit in awe. I'd gently submerge my kayak paddle into water, cutting through the silk surface like an angel cake, and feel the pull of the strong water beneath me as I watched the sparkling, reflective surface, so secure in itself and its home here. I remember the subtle, welcoming magic of that spot that lured me in. It felt like I was being called there, and it was just me in nature with the trees and the sunset and the glistening waters, and the friendly ducks who would meander their way over, as one. I felt at home here too.

Wetlands are home to an abundance of wildlife, and have been compared to coral reefs and rainforests because of their biodiversity (Benefits of Wetlands). Species ranging from amphibians to birds, especially migratory, to forest dwelling mammals to endangered species are all grateful to call wetlands home. In fact, wetlands are vital to approximately a third of endangered and threatened species in the U.S., who rely on these environments to live. Along with the shelter and habitat that these flourishing, biologically diverse, natural havens provide,

they also provide vital nutrients for wildlife, plants, and fish, as well as reduce flood and storm damage and risk, and they naturally purify the water! (Why are Wetlands Important?) Sadly and concerningly, pollutants and development by humans, which includes the mining industry, is harming wetland quality and contributing to the loss of wetlands altogether. This is largely caused by changes in water levels from draining and filling, and in result, takeover of invasive plant species (The threats to Minnesota's wetlands). While another superpower of these areas is actually reviving and rehabilitating waters and the surrounding environment, by enhancing the quality of mine originating waters as they pass through, and plants working to revegetate mine tailings in these environments (O'Sullivan, McCabe, Murray, and Otte 1), the purifying and filtering processes that wetlands take on can become overwhelming and degrade them, and if human impact overloads and impedes upon them, the existence and success of these essential habitats and naturally thriving ecosystems are at risk, and naturally, so are the wonderful benefits like water quality that wetlands provide to us and for the homes to animals who depend on them (The threats to Minnesota's Wetlands).

The largest, and most pressing issue that the mining industry is leading to, is global warming. On an important but more local scale, the effects of CO2 emissions are circling back to interrupt habitats and threaten creatures like the birds who inhabit Lake 14 and the magical Minnesota forests around it. Species such as loons, a bird whose call and presence feels like such a constant to me, and who is so a part of this environment, bringing so much life and the feeling of wilderness to the place, are at risk of losing their current habitats, and even facing extinction. This is because the changing weather patterns and increasing temperatures make it much more difficult to find food and reproduce for birds. This impact is putting local bird populations at risk, but as time goes on, continent-wide populations as well (How Climate Change Will Affect Minnesota's Birds).

On a global scale, the environment and wildlife meant to thrive within it are at urgent and significant risk in the impending future. Physics fundamentals have proven that CO2 emissions will grow in their negative weight as time goes on, leading to rising sea levels, floods, droughts, food production suppression, higher danger of extinction to rare species, and significantly greater warming of the planet (Alley 181). Resource extraction is causing 80 percent of biodiversity loss, and 50 percent of the carbon emissions in the world, mining and processing of other metals accounting for over a quarter (Watts). This simply cannot be ignored. We have no chance of saving our planet's future without making responsible changes within the mining industry to meet environmental standards, and reducing this activity that is leaving such a heavy carbon footprint. We do not need to be extracting the volume of resources that we are. While the population from 50 years ago until now has doubled, resource extraction increased disproportionately, tripling in this time frame. Our worldwide consumption is increasing at a rate of 3.2 percent annually, consequently demanding more mining and more production to meet the demand of consumers (Watts). While at one time, up until 2000, the argument of economic benefit could be made in strong favor of mining, there has actually been a diminishing return rate for the economy since then; resources are now scarcer, more expensive to extract, and it is coming at the cost of damage on the environment that's becoming more blatantly wreckless to ignore (Watts). "The global economy has focused on improvements in labour productivity at the cost of material and energy productivity. This was justifiable in a world where labour was the limiting factor of production. We have moved into a world where natural resources and environmental impacts have become the limiting factor of production and shifts are required to focus on resource productivity,"Watts quotes from Global Resource Outlook's study. Additionally, in Minnesota in particular, despite how large and prominent the mining industry is here, it is only making up approximately 0.2 percent of jobs in the state, and under 3 percent of Minnesota's GDP, or economic output (Kaul). Another economic factor that is definitely not in our best interest to overlook, is the substantial financial value of wetlands, which is being put at

risk and diminished due to land destruction and degradation from industrial activity. The many benefits of wetlands all over the world, including flood protection, clean drinking water, for our generation and for future generations, the resources wetlands carry, and the pollution control they can provide, add up to an estimated value of 14.9 trillion dollars, according to an assessment of natural ecosystems, as provided by Costanza et al. 1997 (Economic Benefit of Wetlands). A stand could also be taken for those who make a living from the mining industry. However, the impacts of mining have shown to have serious health implications on people, and especially those working in such close quarters with the mines. 20 percent of impacts on human health from air pollution are caused by metal mining and their primary processing (Watts), and in addition to the impacts on the environment and aquatic ecosystems, taconite mines have been shown to correlate with serious health risks for those working in them. In 2003, 17 workers were diagnosed with Mesothelioma, a vicious and uncommon cancer, and the Minnesota Department of Health conducted a study. Within three years, 25 more diagnoses were confirmed. In 2008, the MRHAP, Mineral Resources Health Assessment Program of the University of Minnesota brought data to light from their study of the health and causes of death of taconite mine workers. They found that current and previous taconite mining workers were 2.4 times more likely to get Mesothelioma than others within Minnesota's general population (Scoll). This work isn't safe for humans *or* sustainable for the Earth and its wildlife.

When the world of industrial activity we have constructed begins to threaten the very foundation of our world, we must reflect on what's important, and recognize the value of the life and nature around us. Is anyone really winning anymore? Perhaps if we do not think about the wellbeing of the future, or what *nature gives to us,* we can live without a conscience, and pretend the problems will fix themselves, or that *because something isn't putting us in imminent danger, it isn't a big deal.* But even if the visible damage and increased health risks from waste and pollution, displaced and endangered animals, and hurting environment do not directly

impede upon our everyday living right now, what about our children someday, and future grandchildren? Don't we want them to experience clear streams and sparkling bodies of water rushing toward the sand? Experience birds singing happily in their homes as they're meant to be? What about the species of animals that we hold the responsibility to either look out for, or let die? What about the fact that we owe it to our world to give it a bright future? It is people who have created the damage, and *it's only us who can save our Earth.* Mines must make a much better effort to meet standards, and we must work toward a greener future with reduced mining and emission producing production. While some of this requires stronger government enforcement, and conscious accountability and willingness as well as effort to change from these industries, I believe the first step is the people's awareness and will to see change. If we do not feed into the environmentally harmful culture of thoughtless or oblivious consumerism, and if we join with one another in advocating for change, and raising awareness about both the damage being done, and the much worthwhile pay off of reducing this detrimental activity and working toward a safer, more sustainable future, we have immense power. We must learn how to thrive *together*, humans and animals and nature of our Earth, in harmony, before it's too late. *We depend on the Earth with every breath and step we take* to give us life, and now, more than ever, *the Earth depends on us.*

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