Permitting Discourses of Science and Risk in the Politics of Copper Mining in Minnesota

Erik Kojola
University of Minnesota
Department of Sociology
Kojol002@umn.edu

Abstract
Technological developments and changing global markets are leading to the development of new sites and forms of resource extraction that facilitate corporate profit making but also trigger resistance from local residents, indigenous communities and social movements. The proposed PolyMet copper-nickel mine in Northern Minnesota is an emblematic example of the contested politics around hazardous mining and how these struggles play out in bureaucratic environmental review processes in which stakeholders attempt to shape policy and assert their legitimacy. The PolyMet mine has been embroiled in a controversial over-ten yearlong review and sparked debates around economic development and environmental protection. Newspaper articles, organizational documents and interviews with environmental groups reveal how the mine is contested through a dominant discourse of technocracy, scientism and industrialism in which competing stakeholders, mainly corporations, environmental groups and tribal governments, assert opposing facts in a discourse that presumes a rational and apolitical decision-making process. These technical arguments and discourses are also informed by the particular place-based identities of Minnesota that shape what arguments have cultural resonance and how environmental problems are understood. This dominant modernist discourse is complex and contradictory, as environmental and tribal groups have used expertise and science to highlight risks from mining, which has contributed to delays and increased public attention. Yet, the focus on science and technical issues can legitimize state authority, the possibility for technological solutions to safe mining and the privileged position of experts while ignoring more fundamental critiques of corporate and state power.

Keywords
Environmental governance, discourse, social movements, expertise, mining, risk

Introduction

On a bitter cold Tuesday evening in January of 2014, thousands of people filled the downtown Saint Paul, Minnesota convention center to spend nearly five hours at a hearing and public comment session on an environmental impact assessment for a proposed copper-nickel mine in the Northern part of the state. Buses unloaded packed with people who came three to four hours from Northern Minnesota while the parking lots nearby filled up with people from the Minneapolis-Saint Paul area. After officials from the Minnesota Department of Natural Resources, U.S. Army Core of Engineers and U.S. Forest Service gave overviews of the proposed mine and the regulatory process, hundreds of people signed up to get their allotted two-minutes to speak in front of the crowd. Why were so many people taking time out of their busy lives and braving the single digit temperature to attend a meeting about technical mine engineering, cost-benefit analysis and environmental modeling?

The subject of the hearing was a proposal by the Canadian PolyMet Corporation to operate an open-pit copper and nickel mine near Babbitt, Minnesota that would be the first non-ferrous metal mine in the state but is only the first of many proposed mines in the region that sits atop a large reserve of precious metals. The PolyMet project began as a typical and uncontroversial mining proposal in a historic mining region – the Northeastern Minnesota Iron Range – where, as one member of an environmental organization described, "usually when mines apply they just get permitted and everybody smiles and says oh there is a new mine," (Sara 2014, pers.comm., 12 Sept.). In 2004 PolyMet applied for permits and predicted the mine would be up and running by 2007, but now the earliest possible date for shovels to be in the ground is 2017 (*Duluth News-Tribune*, 2004).

PolyMet's mining proposal would not follow a smooth process as the mine became embroiled in a contested over-decade long review process and emerged as a major political battle in the state that is symbolic of broader conflicts between mining and economic growth with environmental protection and wilderness conservation. Critical attention to the environmental impacts began in 2006 and continued to grow until it would be come, "one of the most controversial environmental projects ever proposed in Minnesota," (Marcotty, 2011). What led to these dramatic delays? How have environmental groups and tribal agencies engaged in the environmental review process to slow-down and contest the mine's approval?

The PolyMet mine struck a nerve in Minnesota touching on core identities and cultural heritages – mining on the Iron Range and being the land of sky blue waters. The PolyMet mine and other proposed projects are near the Iron Range, where iron-ore mining began in the late 19th century and became a leading producer of iron-ore that spurred the growth of mining towns. The region is now struggling with unemployment and population loss as the iron-ore industry has slowed down and mines have closed, but the PolyMet mine brings the prospect of jobs. Industry groups, construction unions and many local and state politicians are pushing for the projects' speedy development.

However, the proposed mines are just to the East of the Iron Range in areas that have not been actively mined and are in the Lake Superior and Boundary Waters watersheds, which raises environmental threats to popular recreation sites and iconic waterways in the historic home of the Ojibwe people who continue to harvest wild rice and catch walleye. The proposed non-ferrous metal sulfide mines use new technologies to extract small amounts of metal from ores that contains sulfides, which creates hazardous sulfuric acid when exposed to air and water. Environmental groups and tribal agencies have framed the mine as a risk to the environment and

questioned the ability of PolyMet to mine safely. An environmental impact statement (EIS) conducted by the Minnesota Department of Natural Resources (MNDNR) was required under state and federal law. Native American tribes have played a unique role in the conflict as they have treaty rights to hunting, gathering and fishing in the region. Therefore, the Chippewa Tribe and the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) were included as Cooperating Agencies with a formal role in the EIS process.

The controversy around the proposed PolyMet copper-nickel mine is emblematic of political conflicts around mining and the role of social movements, Native tribes, science, expertise and identity in environmental decision-making. Accelerating global demand for metals and minerals, exhaustion of higher-quality and more accessible reserves, and technological developments that facilitate new ways of extracting metals, have led to new locations for mining development in often less accessible and more environmentally-sensitive areas. New mining development has sparked resistance by social movements and communities, and opened up public debates over the ecological and socials risks, democratic input, and tensions between economic growth and conservation (Gedicks, 1998; Bridge, 2004; Urkidi and Walter, 2011; Jenkins, 2014). In the U.S these social and political conflicts often play out through regulatory processes under environmental laws that stipulate procedures for reviewing environmental impacts and issuing permits. Thus, how do different stakeholders (such as corporations, environmental organizations, politicians and Native American tribes) engage in environmental decision-making processes and how do they frame issues of environmental risk? How is science and expertise leveraged in ways that shape the policy-making process and how might these strategies and discourses empower communities or facilitate profit making and state legitimacy?

Analytic Perspectives

In this paper I examine the PolyMet mine as a case study in environmental governance of contested resource extraction in the Global North drawing on theories from political ecology and science and technology studies to explore the dynamics of science, expertise, power and culture in environmental policy. I explore how and why the PolyMet mine proposal emerged as a political controversy, particularly the discourses through which environmental organizations, Native American tribes, industry and the state legitimize their actions and frame issues of environmental risks and resource development.

Political ecology is an interdisciplinary field that examines the politics and power within environmental issues in order to understand complex relations between nature and society. Political ecology integrates political economy with the cultural and ideological dynamics of the environment with a focus on contradictions and crises which lead to resistance (Peet and Watts, 1996; Robbins, 2012). Science and technology studies is a related but distinct field that also interrogates the politics within science and policy, examining forms of institutional, economic and ideological power. Forsyth (2003, p. 17) describes the aim of STS to "question the perceived political neutrality and accurate representative of reality offered by 'science,' and instead indicate how scientific statements and scientific institutions may reflect social and political influences of relevance for how we perceive and manage environment and society." From these two fields I specifically use concepts of environmental governance, technocracy, discourse, and place-based identity.

Environmental governance

Environmental governance is defined by Robertson (2004, p. 361), "as the nation-state's project of securing hegemony by regulating ecological relations within its territory so as to

assure the stability of capitalist relations of power and accumulation." The concept of governance points to the complex and contested nature of politics in which multiple stakeholders, discourses and rationalities operate in shaping policy around environmental issues and resource use (Litfin, 1994; Kleinschmit, Böcher and Giessen, 2009). Governance involves formal institutions and laws of the state, but also the norms, politics and discourses that shape how environmental decisions are made and how social actors understand environmental problems and adjudicate competing knowledge claims (Krueger, 2002).

Technocracy is a system and ideology of governance that privileges decision-making by technical experts and bureaucrats which assumes that the best policy on environmental issues will be achieved through rational decisions by experts who can neutrally and apolitically assess facts (Fischer, 1990; Budds, 2009). Thus, policy is removed from democratic control and the messiness of the political arena, masking the power and politics within science (Anderson, 2008). Experts hold a prominent role in policy making as they are able to articulate a vision for society because of their authority and social legitimacy (Salskov-Iversen, Hansen and Bislev, 2000; Lidskog, Soneryd and Uggla, 2005). Technocracy is both a set of institutions (laws, regulatory agencies and practices) and a worldview that privileges rationalistic thinking and positivist science over values, aesthetics and morals (Gedicks, 1998). However, technocracy faces crisis when environmental and social problems persist and are not resolved by state actions. The authority of expertise can produce legitimacy crises when people question the dominance of science and rationality, and the risks raised by new technologies (Habermas, 1984, 1987; Beck, 1994). Thus, some democratic input is often necessary to maintain legitimacy.

Discourse

I use the concept of discourse as developed from French theorist Michel Foucault by researchers in political ecology and STS to explore how language, ideology and knowledge shape the construction of environmental issues in ways that influence policy and political action. Dryzek (1997) explains that discourses are a shared way of understanding the world that is embedded in language and enables people to interpret and make sense of the world. Discourse is enacted and made meaningful through social action in which people use and interpret language, and the institutions in which these actions and interactions occur, such as the state and science. "Discourses construct meaning and relationships, helping to define common sense and legitimate knowledge," (Dryzek, 1997, p. 9). Thus, discourse has power by shaping perceptions, the definition of problems and what knowledge is deemed legitimate, authoritative, and true. Political ecologists have argued that environmental policy is political and ideological because science as a form of knowledge production is created through discourse and power. Claims to expertise and truth take the neutrality of science for granted despite the ways in which knowledge is produced by power, politics and values (Salskov-Iversen, Hansen and Bislev, 2000). Robbins (2012) argues that there is no true nonpolitical knowledge but overtly political knowledge often becomes discredited.

The discourse of scientism is dominant in contemporary politics and reflects a belief that policy is best decided based on scientific reasoning because it is presumed to be objective and transcend subjective values (Gieryn, 1999; Kinchy, Kleinman and Autry, 2008). Beck (1992) contends that in late modernity science is seen as the primary source of knowledge and objectivity, which privileges science over other forms of knowledge. Within the discourse of scientism, politicians, bureaucrats, social movements, industry and other social actors struggle

over truth claims and facts through the discourses of technical expertise and science – what has been described as the "scientification of politics" (Frouws, 1998; Feindt and Oels, 2005). Expertise gains authority to decide issues rather than democratic processes and wider social concerns, which privileges corporations and industry (Dryzek, 1997; Bäckstrand, 2003; Kinchy, 2012). Krueger (2002) argues that the discourse of science achieves a sense of objectivity through abstraction which then places regulatory processes within the realm of science and not politics. However, Dryzek (1997) also describes a discourse of democratic pragmatism in which the state resolves crisis by making decisions more legitimate through public input and the ideal of reasoned debate among equal parties.

Prometheanism and industrialism are other interrelated discourses around environmental politics that assume an abundant and endless supply of natural resources, and the ability of humans to transform nature and resolve any problems through science, technology and markets (Dryzek, 1997; Dryzek and Schlosberg, 1998; McCarthy and Prudham, 2004). Economic growth is presented as an imperative and necessary for societal well being, while technology can resolve environmental impacts. Yet, Promethean discourses have been influenced by rising environmental concerns contributing to a discourse of sustainable development in which environmental protection can supposedly be reconciled with capitalist growth and the language of environmental sustainability is co-opted by industry to legitimize resource extraction (Dryzek, 1997; Bridge, 1998; Bridge and Jonas, 2002; Brown, 2015). Bridge (1998) calls this the "ecological phase" of capitalism that emerged in the 1990s.

The discourse of risk is also common around issues of environmental governance. Both proponents and opponents of environmental protection often articulate environmental policy through a discourse of risk and compete over different risk framings of issues (Nelkin, 1985).

Risk can be an effective mobilizing frame for environmental movements, but also reinforces the authority of technical expertise. Wynne (2001) argues that dominant discourses assume that risk can be managed and controlled, and therefore defining an issue around risk presumes that it can be resolved through objective measurements. While risk assessments have the perception of neutral objectivity, they often do not correspond to actual scientific models and are shaped by values and politics (Bonneuil and Levidow, 2012).

Identity and place

Place, culture and identity also shape discourses around the environment. According to Hajer (1995), how nature is understood and the debates about environmental problems are always shaped by culture and the effectiveness and power of a discourse will depend on the cultural context. Bridge (1998) argues that the discourses around nature, particularly resource extraction, are shaped by the specific histories and cultures of places in which resource conflicts occur. Place is conceptualized by sociologists and geographers as being a particular geographic location with physical and social features, but, importantly, places are made through social meanings – history, values, identities and cultures – that people assign to them (Gieryn, 2000). The history and identities associated with a place shape discourses around how that place is used and how different social actors assert legitimacy and authority in making decisions about the use of natural resources.

Analysis

In this paper I trace the history of the contested environmental review and permitting process and the discourses around the PolyMet mine project. I analyze the different discourses in the public news media and how different stakeholders attempt to legitimize their positions and contest new forms of resource extraction through the use of expertise and science in

environmental governance. Then I consider the implications for social movements and communities of utilizing scientific expertise and engaging in bureaucratic regulatory processes, particularly the tensions between promoting environmental justice and public participation with cooptation and legitimation of industry. I examined newspaper coverage (the two largest state-wide publications, *The Star Tribune* and *The Duluth News Tribune*, and one local NE Minnesota newspaper, *The Mesabi Daily News*) over the history of the issue from 1999 to June 2015, organizational documents (such as websites, blogs, newsletters, press releases and public comments) from environmental groups, tribal agencies and PolyMet, and public documents. I also conducted interviews with members of four environmental organizations who have been closely involved with the PolyMet mine.

Contention around the PolyMet mine review process reveals the frictions in resource extraction development and environmental governance as well as the importance of framing by environmental organizations and native communities in ways that connect risks and science with local culture and identities to heighten public awareness and challenge corporate expertise. Overall, I find that contention around the mine is through three different but interrelated discourses of technocracy and scientism, Prometheanism, and environmental risks, which are all shaped by the place-based identities and cultures of Minnesota.

Technocracy, science and competing expertise

Contention around the PolyMet mine centered around a struggle between competing facts and expertise from different stakeholders, which draws upon discourses of technocracy and scientism, and is indicative of the scientization of politics (Dryzek, 1997; Bridge, 2001; Krueger, 2002). Debate focused on disputes over technical calculations such as modeling water flow and risk calculations. Support for the mine was often articulated through technical assessments of

abundant reserves and environmental modeling that "proved" the mine could operate safely. However, models are often ambiguous and attempts to condense complex issues into quantifiable and absolute conclusions which are shaped by assumptions of researchers and political values (Forsyth, 2003). Yet, calculations by consultants hired by PolyMet were presented as apolitical factual evidence for the feasibility of environmentally responsible mining.

In contrast, stakeholders supporting the mine questioned the factual base of environmental opposition and often portrayed the science of environmentalists as politicized. Environmentalists were supposedly peddling fear and lies in an attempt to smear the project and overlook the "facts," unlike the company and state officials that were making value-free technical assessments. This *Mesabi Daily News* opinion article shows how environmentalists were framed as pushing fear, not fact.

> Yes, some opponents and preservation groups will continue their misinformation campaigns, which are part of an excessive rhetoric fear campaign of damage to the environment. The facts, however, will win out in the EIS and then permitting processes. (*Mesabi Daily News*, 2014)

Meanwhile, environmental organizations and native tribes asserted their scientific authority and that their experts found predictions in the EIS to be flawed, underestimating the potential pollution. Critiques focused on inadequate data and misleading predictions from computer models, which disrupted the assumed neutrality and accuracy of company calculations, as demonstrated in this *Duluth News-Tribune* quote.

> For several years, scientists for tribal natural resource agencies have been telling PolyMet and the DNR that the flow numbers were too low and didn't reflect reality. They said the discrepancy makes computer model predictions about the project's impact inaccurate, from water pollutants to wetland impacts. (Myers, 2014)

Tribal agencies rely on a discourse of scientism to question PolyMet's estimates and claims to technical authority and accuracy, which privileges the role of experts in making decisions. The

critique does not directly contest the neutrality of company science or the role of corporate power, but does expose the uncertainties in environmental modeling and provides a critique through language that is legitimate in bureaucratic decision-making.

The discourse of expertise and scientism is complex and contradictory as it can provide legitimation for extractive industry and state authority, but can also reveal hazards and disrupt development (Bridge, 1998). In the case of PolyMet, environmental groups scrutinized the 3,000 page EIS which revealed that, "experts believe water leaving the project will need to be treated for at least 500 years and possibly in perpetuity," (Myers, 2013a). The number of 500 years became a central symbol for environmentalists who emphasized the long, even perpetual, time horizon of the pollution.

The critiques of environmental groups also received a major boost and legitimation when the national EPA in 2010 issued an unsatisfactory rating of the initial draft EIS citing concerns about acid-leaching from mine tailings and declaring the study to be "inadequate and environmentally unsatisfactory," (Shaffer, 2010). The action forced PolyMet to re-do the EIS in order to address the complaints which attracted headlines and helped to legitimate the critiques of environmentalists and tribal agencies. The amount of newspaper coverage in the state's two major publications, *The Star Tribune* and *Duluth News-Tribune*, spiked in 2010 around the EPA decision and then peaked again in 2013-14 with a new round of public review and state-wide elections (*see figure 1*). The EPA's rare rejection of an EIS – one staff member of an environmental organization claimed only 3% of EISs receive an unsatisfactory rating – demonstrates the tensions within the state, particularly between local and federal agencies. The MN DNR is responsible for facilitating the use of natural resources and may have closer ties to

industry than the national EPA that has a mandate to protect natural resources and is influenced by national politics.

Democratic pragmatism and rational civil debate

Purely technocratic governance often struggles to maintain legitimacy (Krueger, 2002; Adger, W. Neil *et al.*, 2003), and in the contention around PolyMet the discourse of technocracy was interconnected with a discourse of democratic pragmatism in which public input and civic debate around facts, but not emotion and values, could lead to optimal policy outcomes. The review process was framed as a "model for democracy" with different groups working within the system and laws to ensure the best outcomes for the environment and the economy (*Duluth News-Tribune*, 2011). Stakeholders, the news media and state institutions asserted that the decision on PolyMet should be based upon fact, which depoliticizes the conflict as a process of rationally evaluating evidence, as shown in this quote from the MN DNR Commissioner.

> "There's a lot of misinformation being thrown around, which I think is unfortunate," [MN DNR] Commissioner Landwehr said. "We will benefit most if we have an informed, honest discussion about this and what's in the EIS." (*Duluth News-Tribune*, 2014a)

This state official extols the importance of a rational debate based on fact, which reasserts the role of experts who produce the facts while delegitimizing political arguments. The discourse of democratic pragmatism relies on an idealized notion of equal rational exchange of ideas between people, which ignores power and the unequal ability to engage in these formal and technical forums.

PolyMet and pro-development politicians sought to legitimize the mine through the appearance of democratic governance, even encouraging public oversight and transparency. The lengthy review process and public input was framed as demonstrating the rigor of environmental review and potential for sustainable mining. An editorial in *The Duluth News-Tribune* shows

how public input is presented as protecting the environment by making the mine safer, "more voices can lead to the airing of more issues and increase the likelihood of a project done right, benefiting our region while also protecting our lands and waters," (*Duluth News-Tribune*, 2014b). Instead of resisting demands for accountability, PolyMet presented itself as a willing participant who welcomed public input. "'PolyMet will continue to be supportive of the process, which is in the best interest of the community and protecting Minnesota's environment,' said Jon Cherry, president and CEO of PolyMet," (Marcotty, 2013)

Minnesota's strong environmental laws and progressive policies are portrayed as ensuring the PolyMet mine will be safe and the company will be held accountable, which rests on a discourse of technocracy in which laws and expertise can ensure even risky mining is safe. Mine supporters assert that since mining is going to occur somewhere it should happen in Minnesota where the environment, workers and communities will be protected. A *Duluth News-Tribune* quote from an Iron Range resident Justin Mattson, a high school chemistry teacher, demonstrates both the presumed effectiveness of Minnesota's regulations and the necessity of mining.

> Minnesota can better regulate the industry and protect the environment than overseas entities, he said, while also reaping the economic benefits. "If we don't use the minerals that are in Minnesota ... they're just going to be mined somewhere where they don't care about the environment and where they use slave labor." (Myers, 2009)

Minnesota is positioned as being exceptional, implicitly contrasted to Third World countries with slave labor and environmental pollution, and the best place for mining given that extraction is inevitable.

Promethean promise – abundance, growth and technological fixes

A discourse of Prometheanism and industrialism was also common and interwoven with discourses of technocracy and science that framed the mine as a form of progress. The PolyMet

mine was presumed to create jobs, economic growth and tax revenue while mine supporters claimed that technological and engineering solutions could ensure safe mining, ignoring limits to growth and the inherent destruction from open-pit mining. Technical assessments of mineral reserves display the abundance of natural resources and are an attempt to make the environment knowable and calculable, particularly for the logics of capitalist production and regulatory decision-making. Through exploratory drilling and feasibility studies PolyMet quantifies reserves in order to express a monetary value for the earth and to attract investors, as shown in the *Duluth News-Tribune* excerpt.

> "Production at a base and precious metals mine proposed south of Babbitt could be larger than projected, according to a PolyMet Mining Corp. news release issued Thursday. Based on results of a 2005 drilling program, the deposit of copper, nickel, cobalt, platinum and palladium could produce 32,000 short tons of ore per day rather than 27,500 short tons, PolyMet officials said." (*Duluth News-Tribune*, 2006)

The forests of Northern Minnesota become quantified into tons of copper and can be imagined as extracted and consumed but invisible is the destruction brought upon the social and ecological landscape.

Mining was framed as a necessity for communities on the Iron Range and the broader society because the mine would create jobs and provide materials essential to modern society – "[minerals] widely utilized by all of us in our day to day life," describes a local politician in an opinion article (Tomassoni, 2014). Copper, nickel and other metals were necessary because they are used in cars and cellphones, even in renewable energy because solar panels and wind turbines require large amounts of copper. Nearly every newspaper article included claims of job creation and economic growth, and supporters regularly framed the mine as a much-needed source of jobs and revenue for a region struggling with unemployment due to downturns in the iron ore industry. Company estimates of creating "360 permanent jobs, hundreds more spin-off jobs and

more than 2 million hours of construction work," were routinely stated as fact with little evidence or counter-claims (Hanna, 2013). Thus, the PolyMet mine became linked to notions of progress and modernity, which created a sense of legitimacy and inevitability for the mine.

In the discourse of industrialism mine opponents are then positioned as anti-modern and anti-growth, which is unrealistic, harmful and radical. An editorial in the *Duluth News-Tribune* shows how the need for jobs is taken-for-granted and that opponents are positioned as going against common sense.

> Everyone wants the employment PolyMet is promising. Hundreds of jobs that pay well and hundreds of millions of dollars of economic impact hinge on the company's ability to launch mining operations for precious metals near Babbitt. (*Duluth News-Tribune*, 2010)

Industry supporters asserted that environmentalists were anti-mining, which was a threat to the livelihood and lifestyles of communities on the Iron Range, and ignored the legacy of mining in the region. John Cherry, President and CEO of PolyMet, is quoted saying, "There are a lot of people more interested in no mine than in a safe mine," (*Duluth News-Tribune*, 2014a). Thus, environmentalists are being irrational and uncompromising and are against mining as an ideological position, rather than one informed by fact and consideration of what is best for society. Implicit is the image of the middle-class, elite and urban environmentalists who is out of touch with working class communities in Northern Minnesota.

Within this discourse, mainstream environmental groups counter that they are not anti-mining, but rather for rigorous review to determine if and how safe mining is possible. In an interview with a staff member at one of the large environmental organizations showed how these groups worked to position themselves as reasonable and rational, and not fundamentally opposed to mining. "We have been very clear that we are not anti-mining even though some people would say we are. We are for an appropriate mining and we just do not feel that the way Polymet has

proposed is the right way to mine in Minnesota," (Jen 2014, pers.comm., 26 Sept.). Within the dominant discourses of Prometheanism and technocracy, mainstream environmental groups engage in policy-making to push for safer mining but this also reproduces assumptions of economic growth and creates space for PolyMet to counter with evidence of safe mining techniques.

Proponents of the mine assert that mining could be done while protecting the environment through human ingenuity and modern technology. A quote from a representative of PolyMet in a *Duluth News-Tribune* article reflects how technology and expertise were presented as being able to solve potential environmental challenges.

> "The need for long-term resource monitoring and management is not unique to industry or modern society. Landfills, for example, often require long-term management of gases and water," Richardson said in written response to News Tribune questions. "...We have the benefit with today's technology and expertise of knowing what protections must be in place before mining commences and long after it ends to avoid the kinds of issues we may see from historic mining operations." (Myers, 2013b)

In this quote the discourse of modernization is used to counter opposition frames about environmental hazards and present copper sulfide mining as low-risk, not different than older technologies, and controllable by expertise. "Modern technology" is a vague term that calls upon a discourse of technological progress without explanation and relies on the presumed authority of experts to avoid pollution. At other times the company described specific technologies and processes, such as "high-pressure autoclave technology" and "cement deep soil mixing," which are meaningless to the public but convey a sense of authority through the image of technical sophistication (DePass, 2006; Myers, 2015a). Not mentioned is how companies typically resist paying for and implementing the latest and most advanced pollution control technologies.

Environmental risks and threat

Contention around the PolyMet mine was through a discourse of risk, which contributed to the political controversy and extended debate beyond technical issues, but was still shaped by the dominant discourses of scientism and technocracy. Environmental and tribal organizations framed the mine as a risk and a threat to nature and outdoor recreation, which attempted to create skepticism and uncertainty about industry claims of technological solutions. Claims of risk were still largely based upon experts' scientific assessments and questions about the accuracy of ecological modeling. Still, the risk discourse provided an emotional and compelling narrative of corporate accountability and responsibility, threat, and urgency. The risk discourse relied on three major themes – threats to Minnesota's wilderness heritage, the length of pollution, and a new riskier form of mining. Environmental and tribal groups highlighted the length of contamination from sulfide mining, which was a threat to pristine wilderness areas, water and wildlife that are central to Minnesota's collective identity and tribal livelihoods.

In order to distance the PolyMet project from Minnesota's mining tradition, environmental groups framed sulfide mining as new and riskier than iron-ore mining. A common theme in the newspaper coverage and in statements from environmental groups was that the safety of sulfide mining techniques was unproven, as shown in this *Star Tribune* quote.

> Copper-mining operations -- sometimes called "hard rock mining" or "sulfide mining" -- have left scars across the country and acids and sulfides leaching into streams, contaminating rivers and waters, killing fish and leaving dead zones in their wake. While the mining industry claims new technologies can help avert those kind of problems here, skeptical environmentalists have demanded proof and argue that the short-term extraction of mineral wealth poses a long-term threat to the pristine qualities of an area that is dependent on ecotourism, not mining, for its future. (Coleman, 2010)

Industry claims of technological solutions are juxtaposed with environmentalists' critiques that the technology is unproven, and therefore, a risk for "pristine" wilderness and recreation. The

framing of risky technology disrupted the discourse of progress and modernization put forth by mining supporters and inserts skepticism into the infallibility of technological solutions by demanding "proof." Opponents use the discourse of expertise and scientism to highlight the hypocrisies of industry claims of safety that are not substantiated with concrete evidence. However, this framing presents an argument in which competing sides present opposing facts, and allows industry to respond with proof of safe mining.

A powerful symbol in the risk discourse was the need to protect water contaminated with mine tailings for 500 years, which extended beyond the time horizon of any single company or even the history of the U.S. The length of pollution displayed the risks in new mining processes that could not be resolved by technological fixes and questioned the feasibility of mitigating risks when contaminated water had to be protected into perpetuity. The impact to future generations also raised a moral critique of the mine. A quote from a *Star Tribune* column is indicative of the metaphors around time.

> Mining for copper and nickel typically requires monitoring and cleaning of water. The draft environmental report said there could be a need to monitor and treat the water for a minimum of 200 years at the site where PolyMet plans to be digging and a minimum of 500 years at the nearby processing plant site.
> At the risk of stating the obvious, 500 years is a very long time. It was 500 years ago when the Italian diplomat Niccolo Machiavelli sat down and wrote a little how-to book for political leaders called "The Prince." (Lee, 2013)

The number 500 years became a common phrase in discussion of the mine and a way to make the long-term impacts comprehendible through comparisons and analogies.

Another key narrative within the risk discourse was the history of pollution and disasters at copper sulfide mines, which provided concrete and visual evidence for abstract risks and created doubt about the ability to mine safely. A *Duluth News Tribune* excerpt shows how mine opponents used a recent mine spill to support their risk framing.

> Critics noted that the recent Mt. Polley copper mine disaster in Canada, where a tailings basin dike collapsed and sent billions of gallons of contaminated water downstream, shows that even modern mines can cause massive environmental damage, especially in a water-rich environment like Northeastern Minnesota. (Myers, 2015b)

Environmentalists used the narrative of a history of disasters to invoke evidence of the risks from copper mining that provided visual and emotional appeal.

Another central, and related, theme was financial risks and guarantees, particularly given the long time horizon of toxic chemicals compared to the uncertain lifetime of a corporation. Environmental organizations emphasized that the EIS did not stipulate how much financial assurance PolyMet would provide if the company went bankrupt or if there was an accident during operation or closure of the mine. However the notion of financial assurance also rests upon quantifying nature and an assumption that environmental damages can be paid for. The mainstream environmental groups called for greater amounts of financial assurance, not a halt to mining, which according to my interviews was a source of conflict amongst environmentalists as some groups and activists questioned the very concept of financial assurance.

Sustainable development

The discourse of industrialism and technocracy was also shaped by environmentalism as industry supporters drew upon a discourse of sustainable development to address the risks raised by environmental groups and the threats to the iconic lakes, rivers and woods of Northern Minnesota. Sustainable development was connected to discourses of technocracy, democratic pragmatism and industrialism because environmentally sustainable mining was deemed possible because of new technology and rigorous environmental standards. Framing by industry and pro-growth politicians was not purely a Promethean discourse of dominating earth and extracting nature, but portrayed an image of clean and modern mining in harmony with nature. A PolyMet spokesperson claimed that they will, "use the best mining and reclamation practices coupled with

the world's cleanest and most energy- efficient process technology," (DePass, 2007). While a PolyMet blog article demonstrated their embrace of sustainability, " PolyMet will mine sustainably. PolyMet Mining is committed to mining in a way that protects the environment," (PolyMet, 2014). The discourse of sustainability and environmental stewardship shows how industry and supportive politicians attempt to resolve legitimacy and environmental crises by addressing and co-opting opponents critiques (Bridge, 1998).

Place and identity in discourses of environmental governance

The discourses of scientism, technocracy and industrialism are shaped by culture and refracted through place-based identities that affect how authenticity and legitimacy are constructed. The different stakeholders framed their positions in relation to place-based identities of mining on the Iron Range and pristine wilderness in the Northern woods to assert credibility and authenticity. Thus, PolyMet addressed concerns about preserving clean water for fishing and boating, while environmentalists avoided outright opposition to mining and attempted to separate PolyMet's proposed sulfide mine from iron ore in order to recognize the importance of mining in Northern Minnesota.

PolyMet drew upon Minnesota and Iron Range histories to situate the company as part of the community and to produce authenticity and legitimacy for their claims of being concerned about social and environmental wellbeing. PolyMet and supportive politicians emphasized how the project would continue the long legacy of mining that built the region and provided prosperity. In a quote from a PolyMet spokesperson in the *Duluth News Tribune* the company asserts their connection to the region through outdoor recreation and their desire for a clean environment.

> "Our employees live, work, hunt and fish in Northeastern Minnesota -- around and near the St. Louis River and its tributaries. No one has a bigger stake in making sure those

> waters are clean and protected than they do," Richardson told the News Tribune. (Myers, 2015c).

The company and its' employees are framed as part of the community who care about the health of the environment because they spend time outdoors. Conservation and environmentalism are powerful discourses in Minnesota that shaped how PolyMet articulated their position.

The discourses used to legitimize mining are strategically deployed depending on the audience and place. In the local Iron Range newspaper, *Mesabi Daily News*, the pro-mining frames are more often through discourses of Prometheanism and industrialism that are targeted at communities on the Iron Range where mining is a central and unquestioned aspect of local identity and people could get jobs at the mine. In the statewide newspaper, *The Star Tribune*, and in PolyMet's website and blog, the framing is more often around clean production, sustainable development and environmental stewardship. These outlets are targeted at people outside of the Iron Range where discourses of environmentalism and scientism are more dominant and there might be greater concerns about broader environmental threats such as water pollution in Lake Superior.

Environmentalists also called upon a shared Minnesotan identity and presented mining as a threat to places that hold unique meaning in Minnesotan culture, such as "the beloved Boundary Waters wilderness and Lake Superior," (Environment Minnesota, 2013). Outdoor recreation groups drew upon a collective identity around fishing and hunting to describe the threat of run off to the Boundary Waters which is "home to our rich heritage of native inland lake trout," (Minnesota Trout Unlimited, 2013).

Conclusion

Discourses of technocracy and scientism, Prometheanism, and risk have dominated contention around the proposed PolyMet copper-nickel mine in Northern Minnesota. This

displays the scientification of politics and the complexities and contradictions within dominant discourses with the possibilities for social movements and communities to disrupt hazardous development but also reproduce power relations and legitimize resource extraction.

Through dominant discourses of technocracy, scientism and democratic pragmatism, environmental governance is conceived as a rational process of evaluating facts in which competing stakeholders attempt to assert their legitimacy and credibility through experts and science in an informed rational public debate. Thus, mainstream environmental organizations, Native American tribes, industry, politicians and regulators make competing fact claims in ways that legitimize the dominance of expertise, the environmental review processes and the potential for safe mining. Debate around the mine also drew upon interrelated discourses of Promethianism and industrialism in which the mine is framed as necessary for society and local economies, and modern technology could ensure safe and sustainable mining. Mining advocates also engage with the rhetoric of sustainable development, which attempts to address opposition while presenting the company as a steward of the environment and part of the NE Minnesota community.

While discourses of technocracy and scientism overlook issues of power, values and community knowledge, they are also wrought with frictions. Environmental and tribal organizations articulate their claims within these dominant discourses, which reproduces but also reconfigures them, as groups were able to disrupt and slow-down extractive development through the use of expertise and risk framing. Environmental groups and Native American tribes challenged industrialism and modernization by raising skepticism about unproven new technologies and framing the mine as a risk to taxpayers and the environment, particularly waterways and wildlife that have cultural and ecological importance. However, focusing on risks

to wilderness and technical critiques still draws upon dominant discourses and presents only a limited challenge to industrialism that frames the mine as a source of jobs and livelihood for communities on the Iron Range. Contradictions in scientism are also shown by how PolyMet's own analysis produced findings about the longevity of hazardous materials that environmental advocates seized upon to highlight the project's risks. Bureaucrats also delayed the review process because of the company's lack of data and miscalculations while the public review process attracted historic levels of input that slowed-down development.

The ways in which all stakeholders asserted legitimacy is shaped by local cultures and place-based identities, particularly connections to Minnesota's mining history and identity with lakes and outdoor recreation. Therefore, the discourse around the mine is not simply one of industrialism and science but infused with culture and the particular political, social and environmental histories of Minnesota and the Iron Range. As Bridge (1998) contends, discourses around natural resource extraction are not simply modern, but more complex "collages of texts" that draw on place and history. The PolyMet mine case highlights the importance of understanding how local identities and place shape struggles over resource extraction.

Causes of delay and disruption

Environmental organizations and tribal agencies have contributed to turning the PolyMet mine proposal from a typical regulatory approval process into a contentious public issue, disrupting the smooth development of the mine and creating possibilities for greater environmental protection. Krueger (2002) has documented how since the 1990s permitting processes for new mines in the U.S. have slowed down due to political contention and activists' attempts to redefine resource use. In the case of PolyMet I identify three key strategies and factors that led to the mine's delay.

First, the risk discourse of environmental organizations increased popular awareness and political controversy, and transformed official calculations of 500 years of protecting hazardous mining waste into powerful symbols with cultural resonance. Risks to pristine wilderness, wild rice and sky-blue lakes tapped into a powerful cultural frame in Minnesota that helped to turn a potentially low-key local issue into one with statewide and even national attention. The long time horizon of pollution and impacts to future generations provided a compelling narrative of risk that could not be solved by technology and evoked a lack of accountability given that a corporation would not exist for hundreds of years. Sulfide mining was framed as a new type of mining that was fundamentally different than previous iron-ore mining that is widely perceived as relatively environmentally safe and essential to Northern Minnesota's economy. A recent mining disaster in Canada also served as an evocative concrete image for abstract concerns about pollution, which Hajer (1995) argues are key for arousing public outrage and disrupting institutional routines. Examples of catastrophes highlighted the lack of evidence for safe methods of sulfide mining. The MN DNR received 10 times more public comments on the PolyMet EIS (58,000) than any previous project, which is unlikely to have happened if environmental groups had not led an active campaign to mobilize comments and raise public concerns. In response, the company engaged with environmental discourses through a more active public relations effort around the safety and sustainability of the mine.

Second, the U.S. EPA's failing grade for the original EIS in 2010 was both an important symbolic and regulatory action that increased public attention and slowed-down the process. Initial newspaper coverage of the mine had little to no mention of environmental damages, but by 2010 the issue was recieving increased attention (*see figure 1*) and environmental problems were mentioned in most news articles as they became part of the dominant discourse. The

criticisms of a supposedly neutral and apolitical state agency gave credence and legitimacy to environmental and tribal groups' critiques and provided another voice of doubt about the feasibility of environmentally safe mining. The EPA decision forced the company to redo analysis, which delayed the process and gave environmental groups more time to mobilize and scrutinize the proposal. The PolyMet EIS was also delayed by technical complaints by other agencies, for example the MN DNR demanded revised data and models from PolyMet because of flaws and miscalculations. Thus, it appears that the company may have anticipated a quicker and easier review process and was initially sloppy with analysis and preparation of technical documents.

Third, environmental groups and tribal agencies used formal channels and procedures to slow-down the review. The tribes used their official position as cooperating agencies to register environmental critiques and differences of opinion in the EIS document. Their critiques had to be formally considered and meant that additional groups and institutions were involved in the review. Environmental advocates also used regulatory rules and procedures to delay development by requesting extensions, submitting detailed technical comments, and mobilizing the outpouring of public comments. The 58,000 public comments jammed up the process and bogged the MN DNR down in reviewing all of the comments, which they were legally required to do but unprepared for. By engaging with the dominant discourse of scientism, expert consultants hired by environmental organizations were able to raise questions about the modeling in the EIS and company plans for dealing with wastewater that were legitimate and credible in the formalities of environmental governance.

Tensions and possibilities in the use of science and expertise

By engaging in regulatory decision-making and formal bureaucratic processes, environmental groups and tribal agencies participated in reproducing discourses of scientism and technocracy, which legitimizes state authority and dominant power relations. Yet this also creates opportunities to affect environmental decision-making. As Dryzek (1992) has argued, when environmental movements engage in formal institutions of environmental governance and discourses of science and expertise they can undermine industry claims to neutrality and the dominance of rationality in policy-making. However these strategies can also lead to co-optation and focusing resources on technical issues. The PolyMet case shows how contention around environmental governance is not a simple division between cooptation and effective environmental advocacy. The strategies of mainstream environmental groups were able to slow-down the development of the PolyMet mining project and increase public awareness, but did not challenge basic assumptions of industrial growth, technocracy and expert knowledge, which allowed the company to counter environmental critiques with competing facts, plans to mine safely and the necessity of job creation.

Privileging expertise and participation in official procedures can reaffirm dominant ways of creating knowledge by technical experts and devalue community knowledge and decision-making power. Debates on facts and science places greater power with corporations that have more resources to fund scientific studies and hire experts. When the language of contentious politics is focused around science and expertise communities can be disempowered while the ethical, emotional and political dynamics of environmental issues are left out. Anderson's (2004) assessment of the anti-GMO movement shows how debates around the introduction of new technologies and environmental risks is dominated by corporations and experts and that when the

public has input it is typically through the language of expertise and assessment of risk. This process is seen in the case of PolyMet in which public comments on the EIS were restricted to issues about document's technical conclusions and methods, not broader questions about whether sulfide mining should occur in Northern Minnesota or issues of environmental justice or corporate power. In this dominant discourse informal and more disruptive politics become delegitimized. Mainstream environmental groups focused their time and resources on reviewing technical documents in the EIS, hiring experts and raising public awareness, largely through PR campaigns, but not on community organizing or leading demonstrations and protests.

Public input on bureaucratic decision-making can legitimate state authority and extractive industries by providing an appearance of democracy while leaving unequal social relations and power structures intact. PolyMet framed the long review process and large number of public comments as evidence for the rigor of environmental review and stringency of environmental regulations. State agencies then presented themselves as considering public input and closely monitoring potential environmental impacts. Mainstream environmental groups emphasized that they were not anti-mining but rather for a safe and clean mining, if feasible, which was a strategic move in a region with a long history of mining but also shows how the need for growth and increasing extraction becomes common sense. The concept of safe mining also relies on a presumption that environmental laws and technological solutions can resolve environmental problems and allows industry to counter environmental critiques with evidence of safe mining practices.

However, without experts from environmental and tribal organizations reviewing the EIS and translating the documents' findings into non-technical language, the public review process would have been even weaker and more meaningless. Non-experts do not have the time or ability

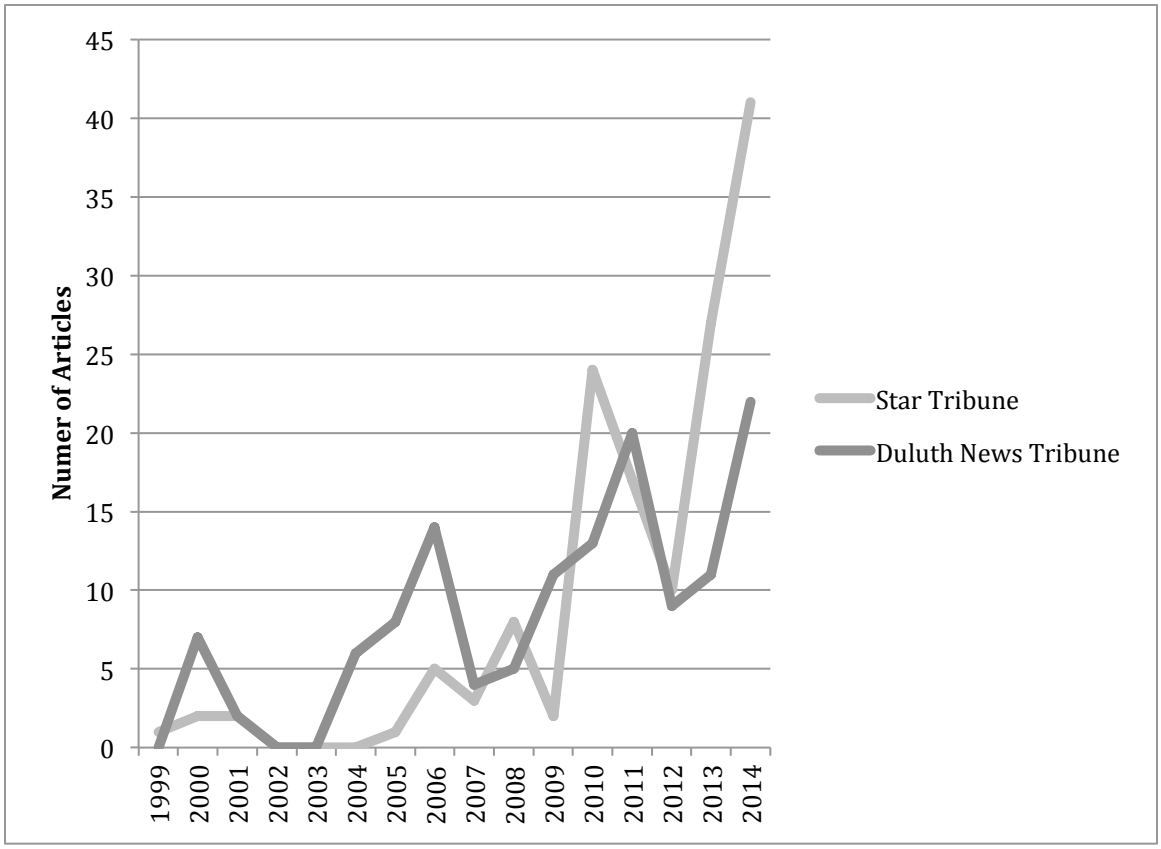
to scrutinize a dense 3,000 plus word EIS document – even hydrologists, engineers and chemists could only understand certain parts of the EIS that drew upon a range of specialized scientific knowledge. Thus the actions of environmental groups increased public scrutiny and public debate about scientific assessments. By questioning risk calculations and the assumptions used in environmental modeling, environmental organizations and tribes revealed the fallibility of company experts and implicitly exposed the politics and values that shape environmental science.

Opposition through scientific, legal and technical discourses provides environmental and tribal organizations with legitimacy and a way to contest development projects in ways legible by state institutions. The discourse of scientism also counters the characterizations of environmentalists as radical, irrational and anti-modern. Indigenous communities are able to leverage their treaty rights and tribal nation status to have a seat at the table, which requires situating their critiques within the discourse of Western science. Yet, engagement in formal processes helped to delay development and led the company to propose further environmental safeguards, although the effectiveness of those measures remains to be seen.

The PolyMet mine shows how the discourse of science and technocracy can create legitimacy crises for industry and the state when the science contradicts corporate claims of safety and reveals the risks of new types of development. While environmental modeling and engineering assessments in the EIS process are shaped by power and politics, there is still a discourse of neutral and apolitical knowledge in which the practices of experts do not perfectly align with corporate interests. For example, the EIS document contained the estimate of needing to protect wastewater for 500 years, which became a key symbol of the risks of sulfide mining.

Corporations do not have complete control over techno-politics as experts within and outside of the state have some autonomous power over science and policy.

Figure 1: Newspaper Coverage of PolyMet Mine, 1999 to 2014



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Author Bio

Erik Kojola is a PhD student in the Sociology Department at the University of Minnesota where he is studying political economy of the environment, labor, work and environmental justice. His research has focused on labor-environment relations and the ways that political economy, social movements, ideology and discourse shape contention around environmental issues. He holds an MA in sociology from American University and a BA in politics from Oberlin College.