Spring 2021

The Permitting and Public Relations of Controversial Projects in Mining

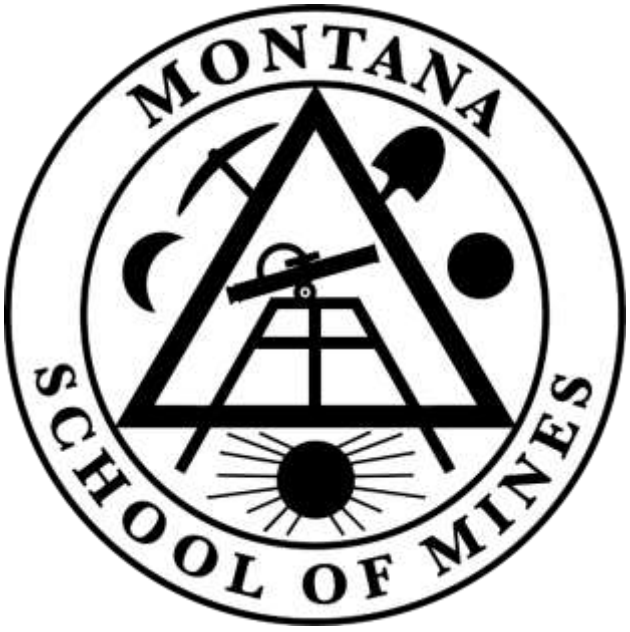
Madison Akers

The Permitting and Public Relations of Controversial Projects in Mining

A publishable paper submitted in partial fulfillment of the requirements for the degree of:

Master of Science, Mining Engineering

By
Madison L. Akers
April 2021



Contents

Table of Figures

Table of Tables

Abstract

Modern mining consistently faces controversy. Public sentiment impacts the permitting and development of mines, so a quality public relations (PR) program for mining companies may improve society's impression of the mining industry. Developing mines face more permitting challenges than operating mines, which stems from a lack of societal trust given the history of mining and its impact on the environment. Two case studies were selected based on the type of public controversy they face to demonstrate how pervasive permitting issues are in industry. Both Pebble Mine, owned by Northern Dynasty Minerals (NDM), and Black Butte, owned by Sandfire Resources America Inc (SRA), experienced difficulties with their water permitting due to potential risks their mine developments posed to local fish populations.

Pebble has, to date, failed in all of their attempts to become permitted due to concern for the water and the fish. Black Butte dealt with the same problems, on a smaller scale, but was able to become permitted. These two mines will be discussed in detail including local history, mine setting, mining history in America, prevalent culture groups, technology development, and intercultural communication competence (ICC). The mining industry needs to evaluate its ICC skills since ICC directly determines the effectiveness of PR. Based on Barna's Stumbling Blocks for intercultural communication, methods for improving the mining industry's PR will be suggested in the hope of easing the permitting process for future mines by developing ICC.

Introduction

To understand why the average American views mining with trepidation, historical context must be established as a framework for interpretation and PR improvement. What does the average American really think of mining? Most citizens view mining as a threat to nature based on the industry's history. Culture is impacted by nature from the food we eat to the minerals we mine (Rogers & Steinfatt, 1999), and this mutual connection is termed natureculture (Okrusch, 2010). The natureculture that developed around mining relies on the historical image of the industry which reinforces the misperception that mining and environmental stewardship are mutually exclusive. PR in modern mining struggles to present the new standard of mining and show the public why mining is essential. *Figure 1* illustrates the vast mineral demand that mining strives to meet for each American (MEC, 2020), but this demand has been overshadowed by mining's environmental history.

Figure 1: Mineral Demand for Every American (MEC, 2020)

The mining industry has changed both technologically and culturally. These changes have been slow, and the slowness of this shift encourages many to continue viewing mining and environmental consciousness as mutually exclusive. This popular perception of mining makes modern mining engineers into marginalized men (persons), which will increase the difficulty of effective communication since the marginalized man lies outside of his adjacent culture groups (Ellemers & Jetten, 2012) (Rogers & Steinfatt, 1999). View *Figure 13* in the appendix and its explanation for details on the concept of marginalization and how it relates to this issue. This controversial dynamic will be analyzed through two case studies: Pebble Mine and Black Butte.

Origins of a Controversial Industry

Mining has a long, complex history that has been fraught with controversy and discord. There is a rich history of mining that predates the events discussed in this paper, and while those historical events pertain to this information, they are not necessary for the framework of interpretation for mining in the United State of America (USA). This section focuses on mining in North America beginning in the 18th century, specifically as it relates to the states of Alaska and Montana. At this time, reclaiming mined land was not a consideration, and federal regulations for mine permitting and reclamation bonding were not established until the 1970's (EPA, 2021). Mining has a history of interpersonal controversy as well since conflict enveloped early American mining as people fought for power, influence, and wealth.

Alaskan Mining

Russians traveled to Alaska and began a booming fur trade early in the 1700's. Sea otter fur was their gold, and during their exploration they encountered Alaska Natives using copper knives and utensils. The indigenous people used caribou horns to dig along riverbanks extracting copper from placer and alluvial deposits as early as 1741. The mineral wealth of Alaska now attracted the Russian explorers' attention and increased interest to search for more resources (Rickard, 1932).

It was not until 1832 that gold was struck along the Kuskokwim River and Alaska's history of mining truly began (Alaska Miners Association, 2021) (Rickard, 1932). Coal was also discovered on the Kenai Peninsula, and mines were developed to access that fuel. In 1867 the USA negotiated the purchase of Alaska from Russia, which opened Alaska for the northward migration of American settlers. In 1896, just as copper mining in Butte was expanding, gold was discovered in the Klondike region (Alaska Miners Association, 2021), and this discovery spurred the Alaskan Goldrush (Rickard, 1932). Alaska was flooded with people eager to get rich, but it was an arduous journey to Klondike with a volatile social setting (Alaska Miners Association, 2021). The active mining areas from the Klondike Goldrush as well as the travel route are shown in red in *Figure 2* (Lee, 1897).

Red Dog was discovered in 1968 along with oil on the north slope, but it did not open for production until 1989. Fort Knox began production in 1996 and Pogo Mine commenced operations in 2005 (Alaska Miners Association, 2021). Alaska's mining legacy is shorter than Montana's since the state did not see major mining developments until the 20th century, a full century after Montana had a developed mineral industry (Alaska Miners Association, 2021). Red Dog was discovered just before the standardization of environmental laws through the Environmental Protective Agency (EPA), and all three mines were not developed until after the EPA provided federal environmental regulation (EPA, 2021) (Rinde, 2017). Mining is part of Alaskan culture, and mining operations are ongoing in state on both a commercial and individual level (Alaska Miners Association, 2021).

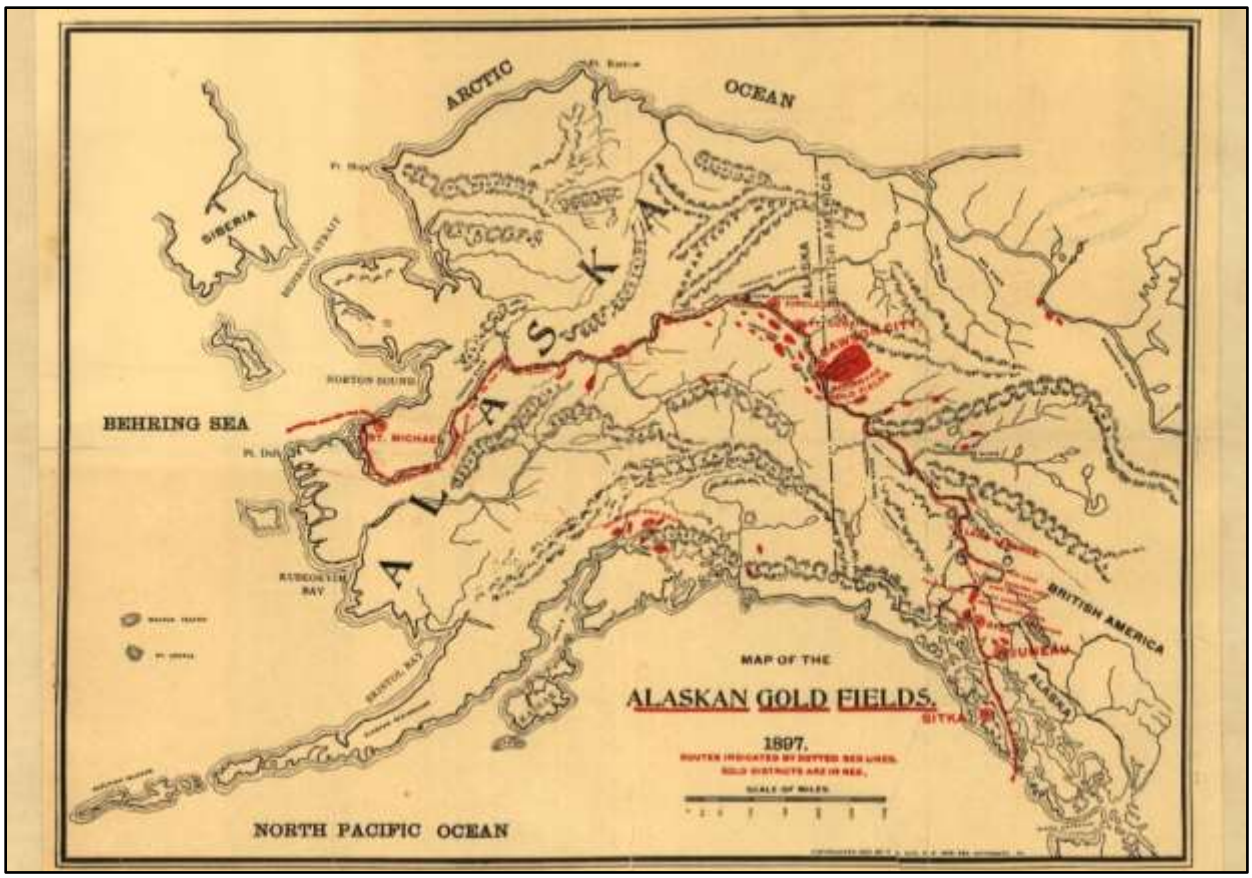


Figure 2: Map of the Alaska Gold Fields in 1897 (Lee, 1897)

Montanan Mining

Montana's complex mining history shaped the development of metal mining in the USA. Gold was first discovered near Yellowstone in 1852, but no one attempted to mine the site until 1858. In 1858 the Stuart brothers lead a mining expedition to the site which ended in bloody conflict with the local Blackfeet Indians. Another gold deposit was discovered near Yellowstone, and William Fairweather took a small group of miners to begin working the area. This mine site was on Crow Indian territory, and it led to a fatal conflict between Fairweather and the Crow in which Fairweather lost two of his men (Rickard, 1932). Francois Finely found float gold in Gold Creek in 1852, and his discovery led to more prospecting in the area in 1856 by Robert Hereford and his group of miners. Others heard about the gold strike at Gold Creek and flocked to the area. The first largescale sluicing attempt in Montana occurred in 1860, but it was relatively unsuccessful since the labor cost per ounce of gold was too high for the current market. Two years later, Granville Stuart successfully established the first largescale sluicing operation in Montana on May 8, 1862. Only four months after beginning the sluicing operation, most of Gold Creek's mining developments were abandoned in favor of other rich gold strikes such Alder Gulch, Last Chance Gulch, and Grasshopper Creek. Mining on Alder Gulch led to the development of Virginia City as well. Mining in Butte

began around 1864, but gold production declined in 1867 prompting many prospectors to abandon their claims (Montana DEQ, 2021).

Silver was found near Butte later in 1867, which encouraged more mining and rich silver ore was stuck in 1868 which spurred even larger mining development. The mineral wealth of Butte attracted more and more people which increased the local metal production. Permanent mining and mineral processing infrastructure were built to meet the needs of Butte's growing mineral industry. William Clark finished building a silver smelter in 1876, the same year that Marcus Daly came to Butte (Rickard, 1932). Marcus Daly swiftly immersed himself in the mining industry by purchasing large shares in the Alice Mine (Rare Gold Nuggets, 2018) (Rickard, 1932). In 1881 when silver concentrate from Daly's mine was being smelted, he saw a visible amount of copper in the silver concentrate. More copper was discovered which prolonged the life of Butte's mining industry, and established Butte as the mining hub the United States. The railroad reached Silver-Bow County in 1893 and facilitated the area's economy by bringer better transportation for the mined materials and bringing more people to Silver-Bow County (Rickard, 1932). By 1895, the Anaconda Company emerged as a major mining entity (Anaconda Company, 2016). In the early 1900's, especially between 1900-1930, mining was at such a fevered pitch that deaths were frequent in the mines and murder was a constant newspaper headline (Rickard, 1932).

Mining continued at a fevered pitch for decades until the Berkley Pit was the last running mining operation (Rare Gold Nuggets, 2018). A three-dimensional map of the extent of abandoned mining shafts and drifts in Butte is shown in *Figure 3*. There were over 10,000 miles of tunnels that were simply left to be refilled by groundwater (Pit Watch, 2013). The Berkley Pit is visible in the upper righthand portion of the figure, and pit's outline can be seen in the topography.

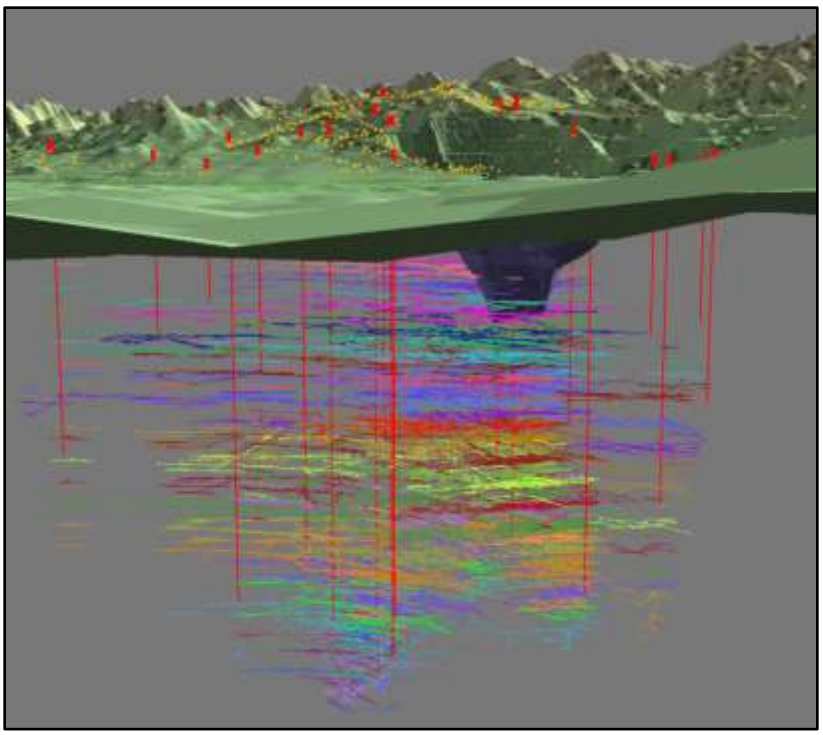


Figure 3: Montana Bureau of Mines and Geology Map of Butte with Mine Workings (Pit Watch, 2013)

Negative Public Image

The Berkley Pit, shown in *Figure 4*, began mining in the mid-1950's (Anaconda Company, 2016) and ceased operations in 1982 (Obscura, 2013). It is currently the USA's largest superfund site (EPA, 2021), and as such, receives persistent media attention which reinforces the collective cultural conscious perception of mining as consistently yielding environmental disasters. The most recent major media attention the pit received was in the December 2016 when a large flock of migrating snow geese landed on the pit. Audubon Society initially estimated that the flock was approximately 10,000 birds, but later estimates ran as high as 25,000. Thousands of the birds died from kidney failure after ingesting heavy metals from the acidic pit water (Opar, 2016). This event was national news, and this is sadly the news that people expect to hear about mining. Derogatory aspects of mining history are better known and more publicized than responsible mining and successful reclamation. Consistent reminders of mining's historical character taints the lens through which society views and understands the modern industry, which presents numerous challenges for mines striving to create and maintain positive PR.

Figure 4: The Berkley Pit in Butte, MT (Obscura, 2013)

Proactive Approach

The negative side of the mining industry's history makes it easy for many to overlook mines and companies who demonstrate best practices. Stillwater Mine, which is currently owned by Sibanye Stillwater, is an underground platinum and palladium mine that has been operational in Montana since 1986 (Montana DEQ, 2021). The mine is located near the Stillwater River which connects to Yellowstone River as shown in *Figure 5* (Stillwater Mining Company, 2016). Without any legal or regulatory obligation, Stillwater created a legally binding Good Neighbor Agreement (GNA) with those adjacent to the active mine site to uphold best mining practices regarding personnel and environmental safety (The Local, 2017) (Sibanye Stillwater, 2021).

Stillwater created their first GNA in 1998 (Company Histories, 2021), which holds the mining company accountable to a higher standard of environmental practice than is set forth in the law to "proactively address issues that may impact the livability and safety of the neighborhoods" this business operates in (The Local, 2017). The GNA shows that Stillwater heeds the public's concerns and knows the importance of environmental stewardship (Sibanye Stillwater, 2021) (The Local, 2017). While GNAs are relatively common in other businesses and industries, Stillwater was the first company to apply this type of contract in the American mining industry (The Local, 2017). It has worked wonders for their PR and facilitated their permitting for continuing development and operations (Sibanye Stillwater, 2021).

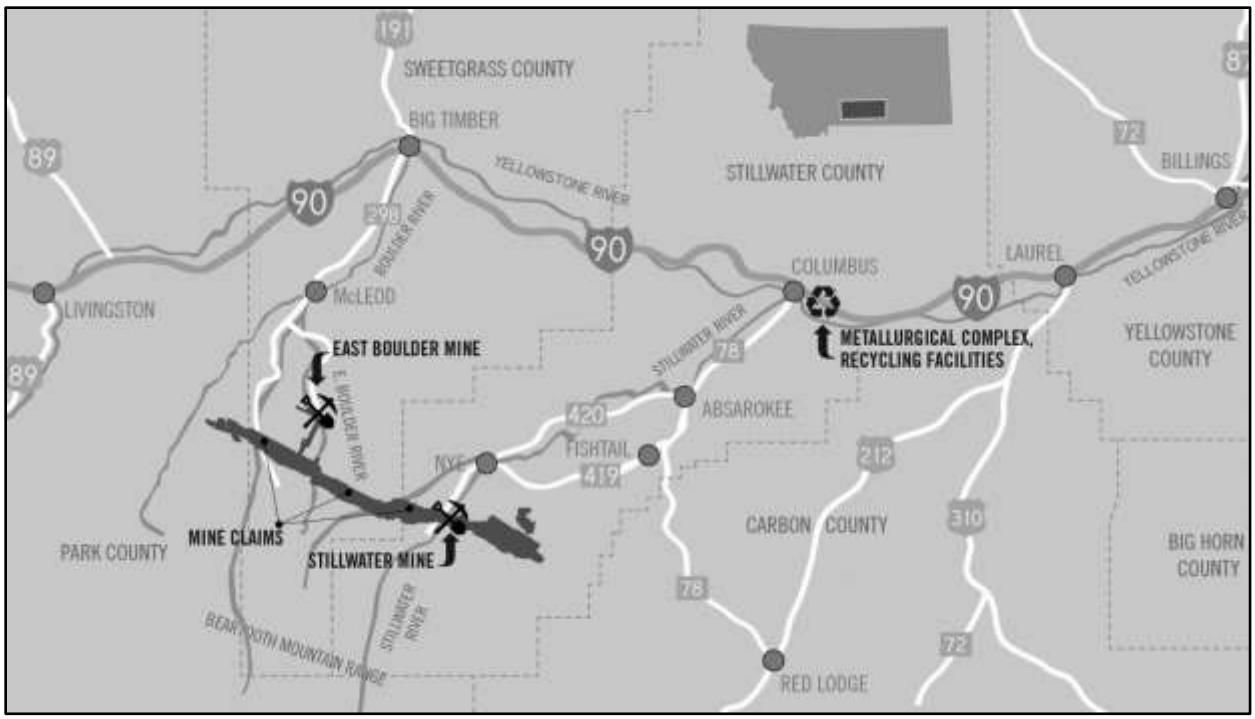


Figure 5: Map of Stillwater Mine and Adjacent Bodies of Water (Stillwater Mining Company, 2016)

Another excellent example of the modern mining culture is Perpetua Resources, formerly Midas Gold. The company is going above and beyond federal and state regulations in their environmental practice as shown in their proposed mining development in central Idaho, the Stibnite Gold Project. The Stibnite site is a historical mining area that suffered from the negative consequences of poor historical mining, but Perpetua worked restoration into the initial mining phases as well as planning for closing reclamation. Perpetua plans to reclaim the area by fixing obstructed waterways, reducing historic mine drainage, and treating soil affected by high arsenic and antinomy concentrations (Perpetua Resources, 2020). This project demonstrates how well mining and environmental stewardship go together, and it shows that fish and mining projects can coexist. Companies like Perpetua and Sibanye are setting a new standard for the mining industry, and their current work practices are expressions of the modern culture in the mining industry.

Cultural and Communication Shifts

Growth of Environmental Consciousness

Acid mine drainage is a common side-effect of abandoned metal or coal mines with sulfurous host rock, and this has proven especially troublesome in Silver-Bow county. The county is still dealing with the Berkley Pit and will continue mitigating this mining disaster into perpetuity (EPA, 2021). Many smaller mines have been abandoned throughout Alaska and Montana since mine abandonment was essentially viewed as mine closure from the 18th century into the late-20th century (Alaska Miners Association, 2021) (Montana DEQ, 2021). Historic miners did not consider sustainability or the

ramifications of their actions on future generations of miners. The magnitude of this problem today continues to depict mining as environmentally irresponsible despite the enforcement of modern EPA regulations as part of best practices.

Standardized environmental regulations did not appear until 1948 when the Federal Water Pollution Control Act, which was later revised as the Clean Water Act (CWA), was passed (EPA, 2021). Roughly two centuries of poor environmental practice had its effect on water in America, and when this pollution control act was passed, only one third of the waters in the USA were considered clean water. Waterways in industrial areas and near mines were becoming increasingly polluted between 1956 and 1966 (EPA, 2016) (Rinde, 2017). The EPA was officially formed in 1970 (Wisman, n.d.), and it immediately took action to change the national landscape and cater to a "grass roots movement to "do something" about the deteriorating conditions of water, air, and land" (Rinde, 2017).

This shift in America was a response to natureculture's demand for action. Pollution of America's waterways occurred in the ecosphere, but the ecosphere is twined with semiotics (EPA, 2016) (Okrusch, 2010). Semiotics are signs and symbols with meanings, and semiotics collectively form the semiosphere. The semiosphere shapes culture and "is an integral part of the ecosphere." This interaction is essential for showing how nature, the lifeworld, forced a culture shift; it also provides context for interpreting culture clash surrounding mining projects (Okrusch, 2010).

The EPA enacted approximately 1500 rules per year during its first five years, including revisions to old regulations, such as the CWA, that had been ignored or presumed obsolete. As a federal agency, the EPA establishes the minimum standard for all 50 states, but the states have authority to make environmental regulations stricter than the EPA's base rules as they see fit. While the EPA works with many organizations, one of their primary partners is the United States Army Corps of Engineers (USACE) (US Army Corps of Engineers, 2021). The USACE was established in 1802 and their mission statement revolves around "engineering solutions, in collaboration with our partners, to secure our Nation, energize our economy, and reduce disaster risk." They provide technical analyzes on projects regarding environmental safety, especially projects that might impact navigable waters (US Army Corps of Engineers, 2021). The USACE had been active in evaluating the Pebble Mine permitting process (Pebble Limited Partnership, 2021), but they were not involved in permitting for Black Butte (Ronald, Evans, & Williamson, 2020).

Communication Platforms

Understanding environmental history is essential for providing framework to interpret the case studies, but to see how PR and ICC have developed, we also need to look at technology growth. Black Butte and Pebble were officially discovered in the 1980's (Gaunt, Lang, Ghaffari, & Hodgson, 2021) (Ronald, Evans, & Williamson, 2020), and the non-face-to-face modes of communication at the time were limited since the internet did not yet exist (Aspray & Ceruzzi, 2008). When the internet was invented, it permanently changed the semiosphere. The internet took decades to develop before

becoming publicly accessible. Research began in 1958 into developing a non-telephone dependent mode of communication and was funded by the Advanced Research Projects Agency (ARPA), a branch of the US Department of Defense. The project was dubbed APRANET, and it took the project team through the sixties to create the first functioning form of the internet. In October 1972, the internet was demonstrated to a group of specialists and the project was approved for continued funding and development. Basic use rules for ARPANET were established in 1983, but the internet was not made available to nongovernment users until 1995, which was the same year the government relinquished their ownership of the internet's backbone (Aspray & Ceruzzi, 2008).

With the increasing popularity of the internet, social media developed in the early 2000's and has continued to grow since then as shown in *Figure 6* (Aspray & Ceruzzi, 2008) (Chaffey, 2021). The overall volume of social media users increased in 2020 as people were forced to physically distance themselves from one another due to Covid-19. People thrive on human connection and interaction, so the year 2020 saw a 13.2% increase in the number of social media users as people resorted non-face-to-face modes of communication to feel connected (Chaffey, 2021).

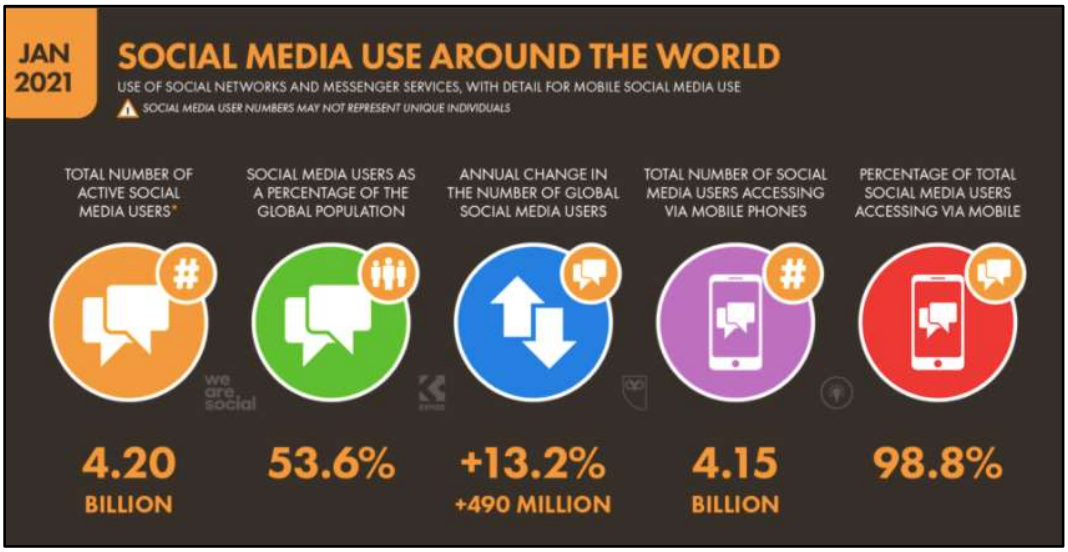


Figure 6: Social Media Usage Statics (Chaffey, 2021)

Social media platforms are intended to facilitate interpersonal connections, but these platforms rapidly became news sources as shown in *Figure 7*. Using social media as a primary news source facilitates the spread of misinformation (Vosoughi, Roy, & Aral, 2018). While these platforms provide diverse means for mining to communicate and develop PR, they also increase the volume of opposing sources. Public exposure from individuals can impact how mines are perceived even if the mine has a social media presence. Studies showed that false information spread faster than factual information via social media (Vosoughi, Roy, & Aral, 2018), and by shifting interpersonal interactions to the digital realm there is further room for miscommunication since common social ques, such as body language, voice, and tone are removed (Chaffey, 2021). This negatively impacts the permitting process for developing mines since people share the

collective cultural consciousness that mining practices have not changed from those of the past. This perception haunts the modern industry, and its effects are visible in the permitting and public relations of controversial projects as shown through Pebble Mine and Black Butte.

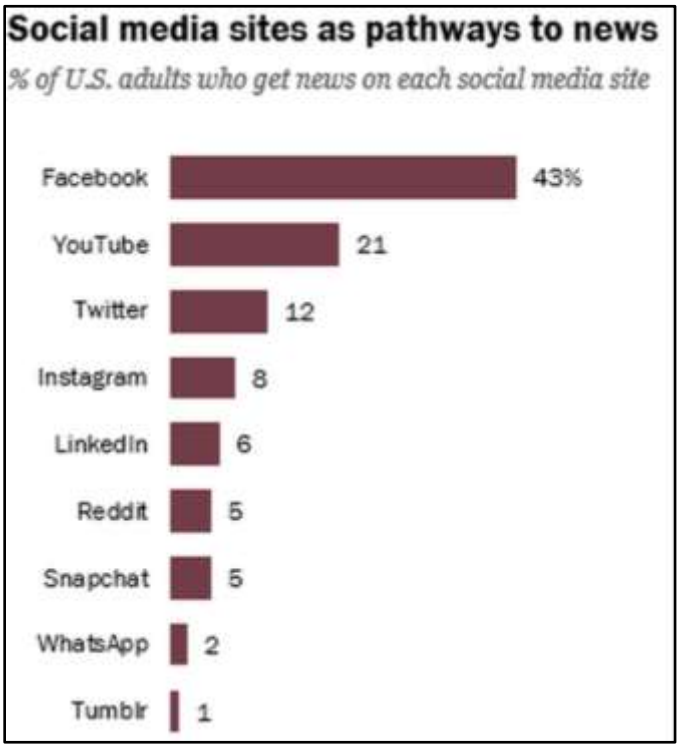


Figure 7: PEW Research Center on Social Media as a Primary News Source (Martin, 2018)

History of the Case Studies

Case Study Selection

The two case studies used for this paper are the Pebble Mine, which is owned by Northern Dynasty Minerals (NDM), also referred to as the Pebble Partnership (PLP), and Black Butte, which is owned by Sandfire Resources America (SRA). These two projects were selected since both are categorized as in development copper mines and both projects face environment backlash for risk to adjacent fish populations (Gaunt, Lang, Ghaffari, & Hodgson, 2021) (Ronald, Evans, & Williamson, 2020). The current permitting progress for each mine is this paper's ultimate metric of each project's success. After providing further historical information to established the communication framework around each case study, this paper will take a deep dive into the PR for both mines to provide suggestions for best practices in mining PR.

Pebble Mine

The Pebble deposit history traces back to 1984 when "Cominco Alaska discovered the Sharp Mountain gold prospect near the southern margin of the current property'" (Gaunt, Lang, Ghaffari, & Hodgson, 2021). A pilot flying near the Sharp Mountain Range noticed geologic discoloration which led to drill sampling and the official discovery of Pebble in 1989. The mine is in southwest Alaska, north of Lake Iliamna as shown in *Figure 8*.

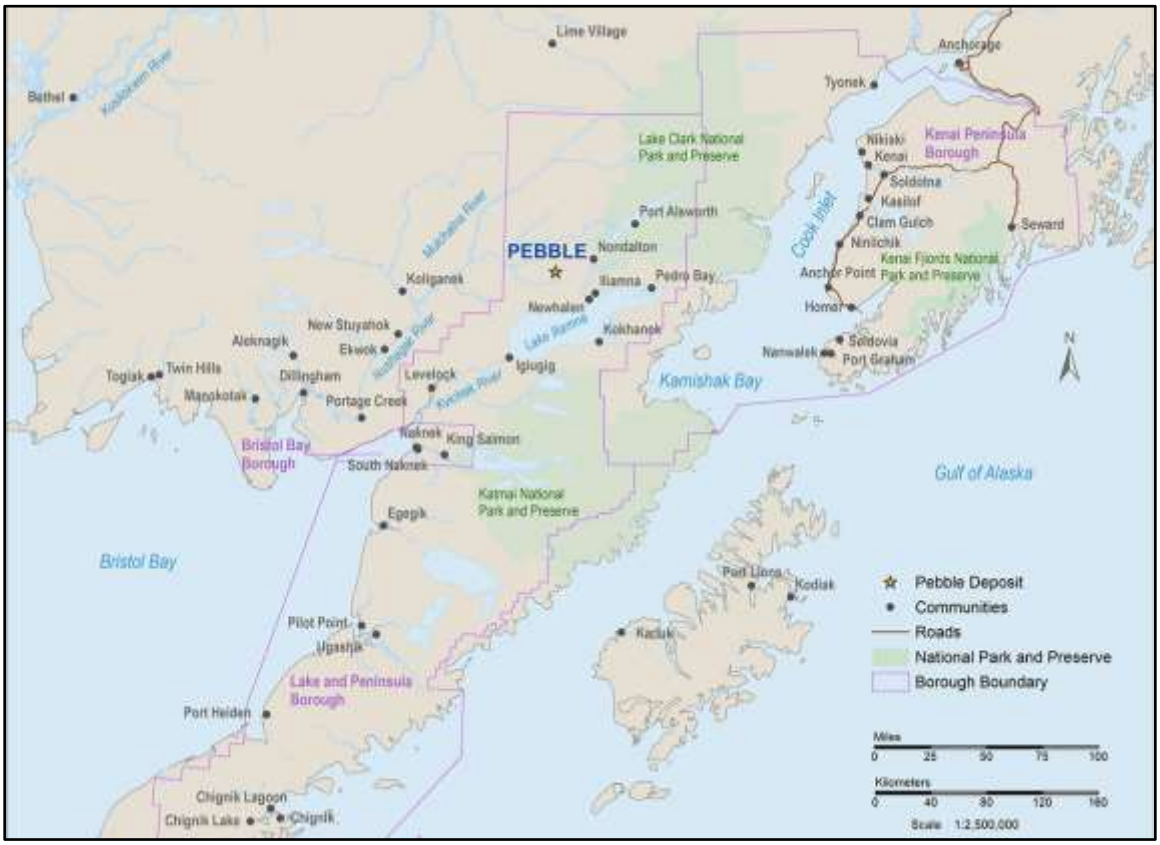


Figure 8: Pebble Deposit Location in Alaska Map (Northern Dynasty Minerals, 2021)

The deposit is massive, and based on the current development plan it would mine an estimated 1.5 billion tons over 20 years via open pit mining methods (Pebble Limited Partnership, 2021). The scale of the prospective mine caused both the public and the environmental agencies to balk, forcing PLP to redesign their first mining phase. PLP applied for permitting with the smaller design on December 22, 2017, but EPA denied the permit application citing the 404c in the CWA Regulations. Input from the USACE was instrumental in this decision, and following this verdict, PLP appealed the permitting decision. The USACE requested an Environmental Impact Statement (EIS) from Pebble on January 8, 2018. A preliminary site assessment was completed in 2011, but to ensure information accuracy, Pebble issued a full EIS per EPA regulation and request of the USACE. The EIS draft was issued early in 2019, but the final EIS was not released to the public until July 24, 2020 (Gaunt, Lang, Ghaffari, & Hodgson, 2021). The most recent permit application was denied again by the USACE, and Pebble is continuing to fight the verdict with a request for appeal against the USACE on January 21, 2021 (Pebble Limited Partnership, 2021). Ownership details for Pebble from its discovery to the formation of PLP are detailed in *Table 1*.

Table 1: Pebble Limited Partnership Ownership History (Gaunt, Lang, Ghaffari, & Hodgson, 2021)

Cominco (Teck Resources)	Northern Dynasty Minerals
Held initial ownership after discovering Pebble in 1984	Detailed environmental assessment begins in 1997 but is not completed until 2013
Uses their Alaskan branch, Hunter Dickinson Group Inc. (HDGI), to hold interest in Pebble deposit lands	In October 2001, NDM acquires part of the property from Cominco through HDGI
Pebble East is discovered in 2004	Pebble East is discovered in 2004
Teck Resources sold their 50% interest in the exploration lands	NDM purchases Teck Resources' exploration lands at Pebble for $4 million [USD]
HDGI sells their 20% interest in Pebble in 2006; Cominco no longer holds any interest in the area	After acquiring the last of HDGI's ownership in Pebble, NDM has complete ownership of the deposit
All information is this table is sources from Pebble's 43-101 (Gaunt, Lang, Ghaffari, & Hodgson, 2021)	Unable to fund 100% ownership, NDM forms the Pebble Limited Partnership through a joint venture with Anglo American

Black Butte

Black Butte is a mine being developed by SRA near White Sulfur Springs, Montana as shown in *Figure* 9 (Ronald, Evans, & Williamson, 2020). The movement to develop this deposit formed when local ranchers noticed indicator minerals on their property and learned about its potential. They contacted geologist Jerry Zieg who was born and raised in White Sulfur Springs (Sandfire Resources of America Inc., 2021). After some investigation and testing, Zieg and his team officially discovered the Johnny Lee deposit in 1985 (Ronald, Evans, & Williamson, 2020).

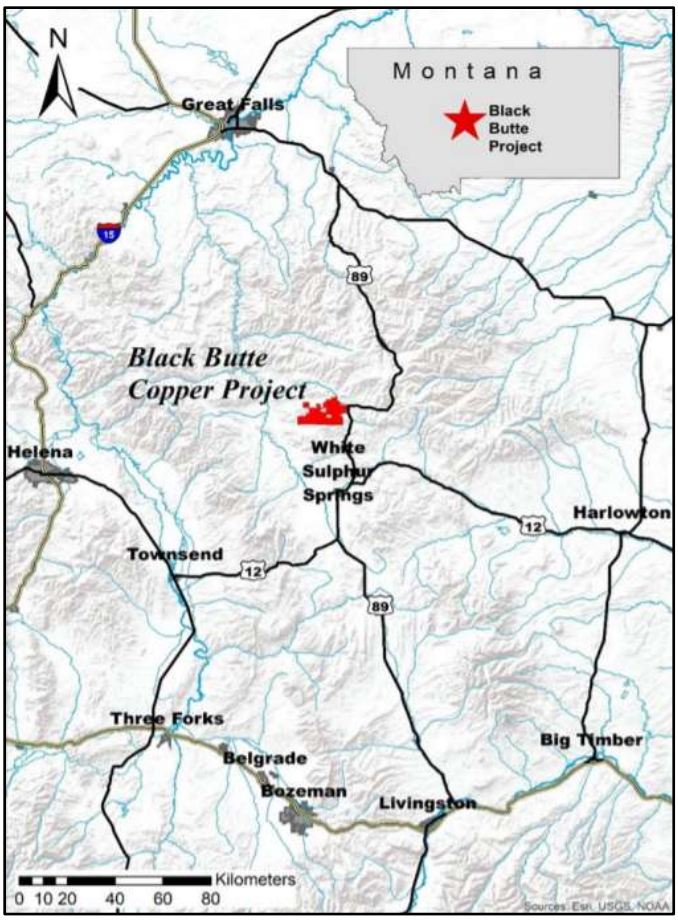


Figure 9: Black Butte Copper Project Location (Ronald, Evans, & Williamson, 2020)

The Black Butte site has a long history of unsuccessful attempted mining. The earliest known attempt was in 1894 when two local ranchers sunk a 30 meter (m) shaft 500 m west of the current deposit. They encountered heavy copper oxidation which halted any serious mining development at the time. They periodically tried continuing their efforts, but oxidation prevented further development. Another homesteader, Johnny Lee, settled directly over the deposit in 1906, and in 1910 he sank a 15 m shaft over the deposit which he worked intermittently until 1922. Like the other two ranchers, Lee encountered a large amount of oxidation that deterred serious mining endeavors. The Black Butte Mine named the deposit after Johnny Lee since he mined directly over the deposit (Ronald, Evans, & Williamson, 2020).

The Anaconda Company held mineral rights from 1977 to 1984 for the Johnny Lee deposit area (Ronald, Evans, & Williamson, 2020), which was during the same time that the Atlantic Richfield Company (ARCO) acquired the Anaconda Company as a subsidiary (Anaconda Company, 2016). Cominco America Inc. (CAI), the company that discovered the Pebble deposit, held mineral leases near the Johnny Lee deposit from 1984 until 1990 when the price of copper dropped (Ronald, Evans, & Williamson, 2020). Tintina Resources gained a controlling interest in the deposit's mineral rights by 2010, and then "Sandfire Resources NL acquired a controlling interest in Tintina

Resources Inc. in 2014". By 2019, Sandfire Resources NL rebranded their American branch Sandfire Resources America Inc (Ronald, Evans, & Williamson, 2020).

SRA currently holds three leases in the area that encompass all the Z Bar tract as mapped in *Figure 14* in the appendix, and all three leases are valid until 2040 with options to renew every ten years (Ronald, Evans, & Williamson, 2020). In spite of obstructions to mine development, SRA achieved mine permitting for Black Butte on the Johnny Lee deposit (Schlepp, 2021). "The first mine operating permit application was submitted to the Montana Department of Environmental Quality in December 2015," and it underwent three revision phases before the final mine operating permit was issued in August 2017. When the technical report NI 43-101 was published on December 10, 2020, 13 permits already approved, but there were 27 remaining permits to be completed prior to mining (Ronald, Evans, & Williamson, 2020).

With the current permit status, Black Butte aims to begin production early in 2022 and have already begun surface infrastructure development. Pending the approval of additional permits, which are listed in *Table 2* in the appendix, SRA will develop their portal for underground mining (Schlepp, 2021). A draft EIS was submitted March 2019, and the final EIS was submitted one year later and approved by the regulatory agencies (Ronald, Evans, & Williamson, 2020).

Fundamentals of Miscommunication

Tying it Together

The unifying factor between these two mines is the fish: people rallied against both of these projects to protect fish in semi-adjacent waterways (Pebble Limited Partnership, 2021) (Sandfire Resources of America Inc., 2021). PLP never moved past the USACE review of their EIS (Pebble Limited Partnership, 2021), but they faced more vocal dissent than SRA since Alaska's economy is significantly more dependent on fishing than Montana's economy (Earth Justice, 2021). The actual location of both mines is generally misunderstood by many opposition groups and their supporters. This is expressed through semiotic association such as Black Butte mine being called the 'Smith River Mine' (Montana Trout, 2021) as well as Pebble opposition groups using the rallying cry of 'Save Bristol Bay' (Save Bristol Bay, 2021). Black Butte is 19 miles by stream from the Smith River (Sandfire Resources of America Inc., 2021) and Pebble is 230 miles from Bristol Bay by stream (Pebble Limited Partnership, 2021).

People promote anti-mining messages based on their expectations of mining from its historical, industrial precedent of pollution and conflict. This mentality inhibits many from seeing the necessity and benefits of mining. It takes time for mining PR to build trust with the public, especially when mining companies are forced to remake the face of the mining industry. Mining companies are not the only groups publishing information about their mine(s), which increases the difficulty of clearly expressing modern mining industry practices to the general public. The variety of information sources, especially with the influence of social media, makes it challenging for the public to determine what is factual about these projects.

In this complex web of modern communication, what are some of the most pervasive issues for mining PR? Barna's stumbling blocks of intercultural communication are at play between the mining industry culture and those outside the mining industry. Using the stumbling blocks of language differences, preconceptions and stereotypes, tendency to evaluate, and high anxiety (Barna, 1994) obstructions to developing ICC in mining will be analyzed, and ways to mitigate these problems to improve PR will be suggested.

Language Differences

As both case studies are mines in the USA, the primary spoken language is English. However, just because two people, or groups, are speaking English does not mean that they are using the same language. This is especially noticeable in mining. People who specifically work with mining PR are not necessarily engineers, but they must communicate with engineers to get the pertinent information for PR (Schlepp, 2021). Engineers are notorious for their poor communication skills, which exacerbates ICC issues since engineers focus on technicalities that people outside of mining cannot readily interpret. This leaves project information poorly contextualized. People outside of mining will provide their own context through the lifeworld instead, since that is the best framework they can establish, even though this is based on historical natureculture which is not expressive of modern mining.

This issue stems from poor communication between mine design engineering components and the laymen's interpretation of the same design components. Mining is a unique discipline with a unique culture; mining culture has a different set of norms and sensory perceptions (Barna, 1994), so what people in mining perceive as significant will be different from what people outside mining view as significant. To most people outside of the industry, mining is a foreign concept that is rudimentarily understood as digging a hole to obtain ore. Mining companies tend to be clandestine regarding details of their mining methods, which is understandable since this is private company information in a competitive industry.

Save Bristol Bay, an organization that is vocally anti-Pebble, published the graphic shown in *Figure 10* (Save Bristol Bay, 2021). In this graphic, they took an outline of Pebble's design and pasted it over the city of Anchorage, Alaska. Superimposing the mine site over the city makes the mine appear larger and more imposing. It also relates the size of the mine to an area most Alaskans are familiar with. People need context to interpret information, and while this puts the mine in perspective for people unassociated with the mining industry it encourages misinterpretation.

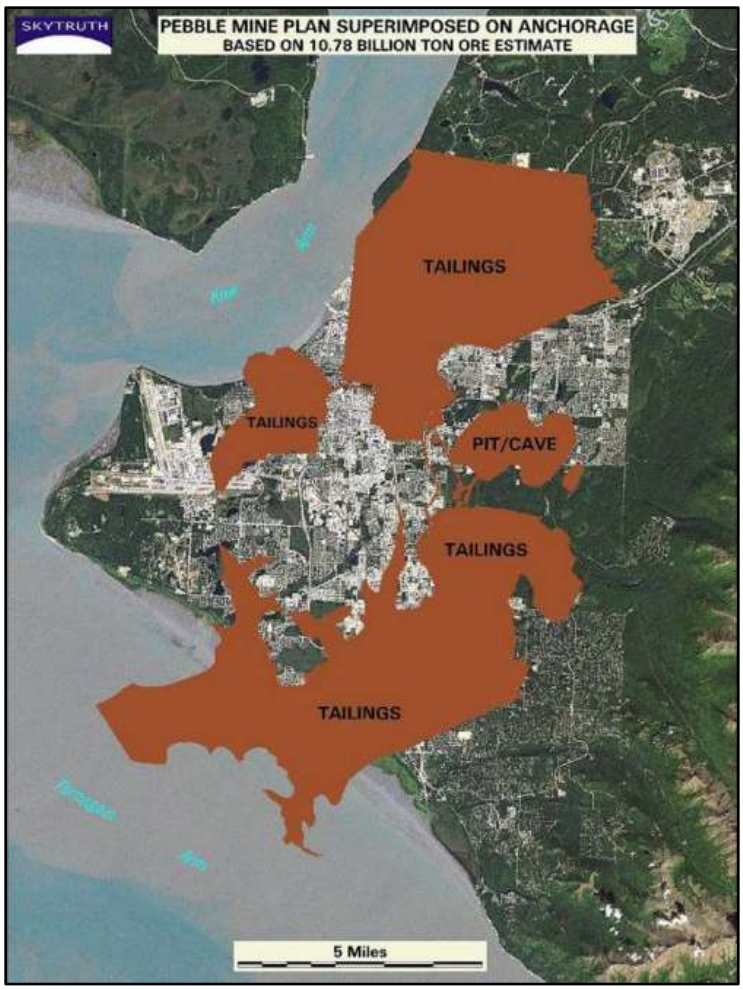


Figure 10: Misinterpreting Mine Design (Save Bristol Bay, 2021)

To anyone in mining, this comparison, based solely on footprint, is absurd since miners know that open pit mining on this scale requires a large amount of space. So, while miners view this as a proportionally typical open pit mine, anyone unfamiliar with mining has nothing to objectively compare with *Figure 10*. Improper context alters interpretation of this design, and this is just one of many examples of misinterpretation due to language barriers in mining.

Preconceptions and Stereotypes

Preconceptions and stereotypes are based on expectations formed from past experience, or as Barna (1994) put it "Stereotypes are overgeneralized, second-hand beliefs that provide conceptual bases from which we "make sense" out of what goes on around us, whether or not they are accurate or fit the circumstances." The public's preconceived notions about mining are based on the historical face of mining as a bad environmental actor, and this does not account for federal regulation or mining's culture shift.

One group protesting the SRA's development of Black Butte has the graphic shown in *Figure 11* on their website homepage (Save Our Smith, 2021). The photograph

and the text are significant for communicating the perceived threat of mining based on stereotypes. The picture is a beautiful shot of the Smith River, the surrounding cliffs, the forest, with two fishermen by the river. The sky overhead is cloudy, as if trouble were brewing which when paired with the main caption "Save Our Smith" written in large, bold, all capitalized text, provides a rallying cry to protect the picturesque place shown under the text in *Figure 11*.

Figure 11: The Home Page Graphic on Save Our Smith (Save Our Smith, 2021)

The subtext in *Figure 11* states, "…another failed mining experiment" which is a clear expression of how this group expects mining to act according to their preconceptions of the mining industry. It assumes that Black Butte has already failed to show environmental stewardship just as historical mining failed, but it does not look at the modern examples of mines using good practices, like Sibanye Stillwater and Perpetua Resources. Preconceptions tend to ignore examples that contradict someone's expectations in favor of "new information that corresponds to the image held" (Barna, 1994). News about the Berkley Pit's snow geese incident in 2016 (Obscura, 2013) is a prime example of the preferred negative publicity for mining since it reinforces mining preconceptions and stereotypes. Mining PR is challenging since public perspective is steeped in stereotypes which prevents an objective approach to project evaluation.

Tendency to Evaluate

Human beings will evaluate something rather than attempting to understand the other side's perspective (Barna, 1994). This is especially true of the American public's reaction to mining projects. Mining is such a politicized topic that it encourages the tendency to evaluate by demanding immediate action as shown in *Figure 12*. While this example was taken specifically from *Stop Pebble Mine*, these types of semiotics are a unifying theme between the most vocal groups protesting in both case studies. If someone new to the Pebble controversy sought to learn about the mine, they might find this Stop Pebble Mine before they find PLP's official webpage and feel forced to make an immediate evaluation and decision without adequate background information.

Figure 12: Call to Action from Stop Pebble Mine (Stop Pebble Mine, 2021)

As emotions become more involved in an issue, the tendency to evaluate escalates (Barna, 1994). Both Pebble and Black Butte are issues with deep emotional engagement, which causes an abrupt communication cutoff (Barna, 1994). The public views mining and environmental stewardship as mutually exclusive, which is not the case, but this perception taints PR attempts from developing mines. The permitting process is more difficult for developing mines since they have no way to demonstrate trust by practicing environmentally responsible mining methods, so it is easier for people to condemn mining rather than to extend their trust to the industry.

High Anxiety

Fear and stress contribute to creating a high anxiety environment (Barna, 1994). These are more likely to appear when there is conflict (Barna, 1994), and as mines are controversial projects, high anxiety inevitably envelopes the surrounding interculture communication. Mining is perceived fearfully by the public, and each group protesting Pebble and Black Butte's development is united in fear and anger at the potential risks, but with the historical face of mining is it any wonder that people fear this industry? There would be no need to rally to "Save Our Smith" or "Stop Pebble Mine" if there was not a prevalent fear of everything that could go wrong. This social and environmental anxiety seeps into the individual lives of others and continues to negatively impact attempts at PR from the industry.

Recommendations for Developing Intercultural Communication Competence

Improving Communication

Social risk ranks high for developing mines, as shown in *Table 3* in the appendix. In the past two decades, mines have been better about addressing social risks factors, but the industry could still improve. The largest contributing factor is the underlying fear and high anxiety that links Barna's stumbling blocks together (Barna, 1994). Mining has been approaching PR from a standpoint that tries to combat centuries of poor mining practices when this issue would be easier to address by highlighting best practices in modern mining. The best way to integrate this into mining PR is to illustrate modern mining methods in a way the average person unassociated with mining can understand, and there are several components to this process.

Mining is not a normalized part of society even though it is the backbone of modern life (MEC, 2020). Hashtag appropriation would help mining companies develop better PR by creating a larger social media presence. Hashtags are ubiquitous tags for creating associations (Moe, 2020), so mining can use hashtag semiotics to recreate the face of the mining industry. For instance, environmental hashtags connected to environmental stewardship and sustainability could be used by mining companies' PR campaigns to reach more people and show the public that mining and environmental stewardship are not mutually exclusive.

Some current hashtags mining companies are using include *#WhyMiningMatters*, *#choosemining*, *#modernmining*, *#miningmatters*, and *#CriticalMinerals*. The most searchable mining social media posts used these hashtags, but there were no common hashtags connecting mining and sound environmental practices. Midas Gold rebranded themselves as Perpetua Resources to create a new company image which reflected their environmental practices (Perpetua Resources, 2020), but their social media presence has not adopted appropriate hashtags to reinforce that connection.

With modern technology and its impact on communication, mines must have an online presence to make their voices heard, and if mining wants to reach the younger

generations, then mining needs social media influencers in the industry. By presenting a clearer image of what occurs in mining and reclamation, mines will facilitate the initial permitting phase for future start-up mining operations. This will break down the walls of stereotypes and barriers of language differences.

Case Study Analysis

Looking through the information on SRA's website for Black Butte and NDM's website for Pebble, there is plenty of information about both projects available. There are significant differences in the proposed mine site locations and mining methods that make case study comparison difficult, but Black Butte succeeded in their permitting and public relations since it was grassroots movement that accounted for the needs of the people from the people by the people (Sandfire Resources of America Inc., 2021). With Pebble, NDM was an external entity that swept in and acquired mineral tenures for the deposit and surrounding lands. NDM has done local outreach to facilitate communication with locals, but they are perceived as an outsider which obstructs communication (Gaunt, Lang, Ghaffari, & Hodgson, 2021).

Both mines are politicized controversies, but Pebble has been dealing with larger-scale, more vocal opposition (Stop Pebble Mine, 2021). So, while both mines followed good practices and held public comment periods regarding their EISs, Pebble inevitably received more backlash (Pebble Limited Partnership, 2021) (Sandfire Resources of America Inc., 2021). Pebble published quality video content that strives to explain mining to an outsider (Pebble Limited Partnership, 2021), but they do not have a strong enough social media presence to gain the support of others. Even if a mine is not a grassroots movement like Black Butte, it needs to connect with the locals by listening to their concerns.

Conclusion

The modern mining industry is slowly, but surely, working to change the cultural face of mining, but to do this the industry needs to show the public that mining has itself changed. Mining needs to show that environmental stewardship is truly a part of mining's culture so that reoccurring harm from historical mines does not continue to damage the modern industry, and all the tools to promote this message are available via the internet and social media. Mines can demonstrate their goodwill, by establishing a good neighbor agreement policy like Sibanye Stillwater and taking a proactive approach like Perpetua Resources to environmental stewardship. These policies preemptively mitigates issues with the locals by showing them that mining can listen to and respect the needs of adjacent communities. Connecting mining and the public through interculturally competent communication will facilitate PR and the mine permitting process.

References

Alaska Miners Association. (2021, April). *History of Mining in Alaska*. Retrieved from Alaska Miners Association: http://www.alaskaminers.org/mining-history-in-ak

Anaconda Company. (2016, July 26). Retrieved from Encyclopedia Britannica: https://www.britannica.com/topic/Anaconda-Company

Aspray, W., & Ceruzzi, P. (2008). *The Internet and American Business.*

Barna, L. M. (1994). *Stumbling Blocks in Intercultural Communication.*

Chaffey, D. (2021, March 11). *Global Social Media Research Summary 2021*. Retrieved from Smart Insights: https://www.smartinsights.com/social-media-marketing/social-media-strategy/new-global-social-media-research/

Company Histories. (2021). *Stillwater Mining Company*. Retrieved from Company-Histories.com: https://www.company-histories.com/Stillwater-Mining-Company-Company-History.html

Earth Justice. (2021). *Alaska Bristol Bay Pebble Mine*. Retrieved from Earth Justice: https://earthjustice.org/features/alaska-bristol-bay-pebble-mine

Ellemers, N., & Jetten, J. (2012, August). *The Many Ways to Be Marginal in a Group.* Retrieved from Research Gate- Pub Med: https://www.researchgate.net/publication/230599166_The_Many_Ways_to_Be_Marginal_in_a_Group

EPA. (2016). *The Clean Water Act Fact Sheet.* Retrieved from Environmental Protective Agency: https://www.epa.state.oh.us/

EPA. (2021, April). *EPA*. Retrieved from Environmental Protective Agency: https://www.epa.gov/

Gaunt, D., Lang, J., Ghaffari, H., & Hodgson, S. (2021). *NI 43-101 Technical Report on the Pebble Project, Southwest Alaska, USA.* Anchorage: Northern Dynasty Minerals.

Kohn, J. (2020, June 7). *Conservation Groups Sue to Block Black Butte Copper Mine Near Smith River*. Retrieved from Missoula Current: https://missoulacurrent.com/outdoors/2020/06/black-butte-copper-mine/

Lee, T. S. (1897). *Map of the Alaskan Gold Fields*. Retrieved from World Digital Library: https://www.wdl.org/en/item/13496/

Martin, N. (2018, November 30). *How Social Media Has Changed How We Consume News*. Retrieved from Forbes: https://www.forbes.com/sites/nicolemartin1/2018/11/30/how-social-media-has-changed-how-we-consume-news/?sh=6829f1033c3c

MEC. (2020). *Mineral Usage Statistics*. Retrieved from Minerals Education Coalition: https://mineralseducationcoalition.org/mining-mineral-statistics

Moe, P. S. (2020, March 5). *The Rise of Social Movements Through Hashtags*. Retrieved from http://www.changemag-diinsider.com/blog/the-rise-of-social-movements-through-hashtags

Montana DEQ. (2021). *Abandoned Mine Lands*. Retrieved from Montana Department of Environmental Quality: https://deq.mt.gov/Land/abandonedmines

Montana Trout. (2021, March). *Smith River Protection*. Retrieved from Montana Trout: https://montanatu.org/smith-river-protection/

Northern Dynasty Minerals. (2021). *Pebble Project History and Location*. Retrieved from Northern Dynasty Minerals: https://www.northerndynastyminerals.com/pebble-project/history-and-location/

Obscura, A. (2013, September 30). *Butte's Berkeley Pit Is a Lake of Toxic Waste With Possible Anti-Cancer Properties* . Retrieved from Slate: http://www.slate.com/blogs/atlas_obscura/2013/09/04/berkeley_pit_in_butte_montana_is_a_lake_of_toxic_waste_with_possible_anti.html

Okrusch, C. (2010). *Pragmatic Visions of Nature Culture.* Eugene, OR: Univeristy of Oregon. Retrieved from https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/11445/Okrusch_Chad_Michael_ph2010wi.pdf?sequence=1

Opar, A. (2016, December 7). *Thousands of Snow Geese Die After Landing in Poisonous Mine Waters*. Retrieved from Audubon: https://www.audubon.org/news/thousands-snow-geese-die-after-landing-poisonous-mine-waters

Pebble Limited Partnership. (2021, April). *Pebble Partnership*. Retrieved from Pebble Partnership: https://pebblepartnership.com

Perpetua Resources. (2020). *Perpetua Resources*. Retrieved from Perpetua Resources: https://perpetuaresources.com/

Pit Watch. (2013, September 20). *Pit Watch*. Retrieved from Pit Watch: https://pitwatch.org/computer-model-shows-berkeley-pit-butte-mine-tunnels/

Rare Gold Nuggets. (2018, March 4). *Copper Mines of Butte, Montana: The Richest Hill on Earth*. Retrieved from Rare Gold Nuggets: https://raregoldnuggets.com/?p=2956

Rickard, T. A. (1932). *A History of American Mining.* New York: McGraw-Hill.

Rinde, M. (2017, June 2). *Richard Nixon and the Rise of American Environmentalism*. Retrieved from Science History: https://www.sciencehistory.org/distillations/richard-nixon-and-the-rise-of-american-environmentalism

Rogers, E. M., & Steinfatt, T. M. (1999). *Intercultural Communication.* Long Grove, IL: Waveland Press.

Ronald, E., Evans, B., & Williamson, P. (2020). *Feasiblity Study Technical Report NI 43-101.* White Sulfur Springs: Sandfire Resources of America Inc.

Sandfire Resources of America Inc. (2021, April). *Black Butte Copper*. Retrieved from Black Butte Copper: https://blackbuttecopper.com/

Save Bristol Bay. (2021, April). *The Pebble Proposal*. Retrieved from Save Bristol Bay: https://www.savebristolbay.org/pebbleproposal

Save Our Smith. (2021, March). *Save Our Smith*. Retrieved from Save Our Smith: http://www.saveoursmith.com/

Schlepp, N. (2021, January 22). Black Butte Copper Project. Sandfire Resources of America Inc.

Sibanye Stillwater. (2021, April). *Sibanye Stillwater*. Retrieved from Sibanye Stillwater: https://www.sibanyestillwater.com/

SME. (2016, September 7). *SME Releases 2016 Minerals Baby*. Retrieved from American Geosciences: https://www.americangeosciences.org/geotimes/sme-releases-2016-minerals-baby

Stillwater Mining Company. (2016, February 22). *Filings by Day*. Retrieved from Get Filings: http://www.getfilings.com/sec-filings/1602/

Stop Pebble Mine. (2021, March). *Stop Pebble Mine*. Retrieved from Stop Pebble Mine Now: https://stoppebbleminenow.org/

The Local. (2017, December 11). *Sibanye-Stillwater Good Neighbor Agreement*. Retrieved from United Steelworkers: https://usw11-0001.org/articles/sibanye-stillwater-good-neighbor-agreement

US Army Corps of Engineers. (2021, April). *Mission and Values*. Retrieved from US Army Corps of Engineers: https://www.usace.army.mil/About/Mission-and-Vision/

Vosoughi, S., Roy, D., & Aral, S. (2018, March 9). *The Spread of True and False News Online*. Retrieved from Science: https://science.sciencemag.org/content/359/6380/11462018

Wisman, P. (n.d.). *EPA History (1970-1985)*. Retrieved from EPA Archive: https://archive.epa.gov/epa/aboutepa/epa-history-1970-1985.html

Appendix

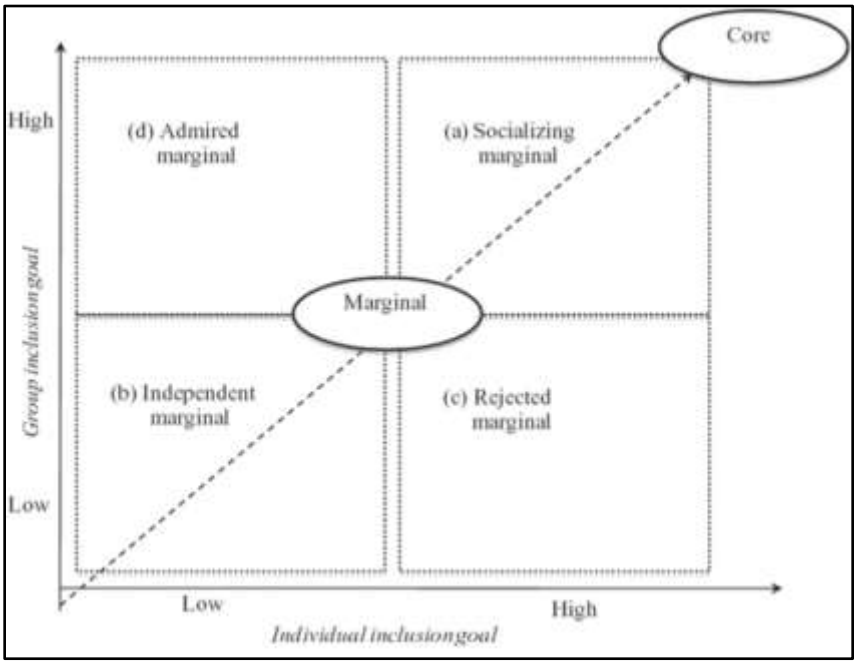


Figure 13: Marginalization (Ellemers & Jetten, 2012)

Figure 13 depicts the concept of the marginalized man in terms of group inclusion goal, shown on the vertical axis, and individual inclusion goal, shown on the horizontal axis (Ellemers & Jetten, 2012). A marginalized person is "an individual who lives in two different worlds-and is a stranger in both" (Rogers & Steinfatt, 1999). Each of the four quadrants shows how the degree of marginalization relates to various group inclusion (Ellemers & Jetten, 2012). The degrees of separation that make someone a cultural stranger need only be perceived by one person in order for a concept to apply (Rogers & Steinfatt, 1999). This applies to individuals on both the mining and environmental side of this controversy.

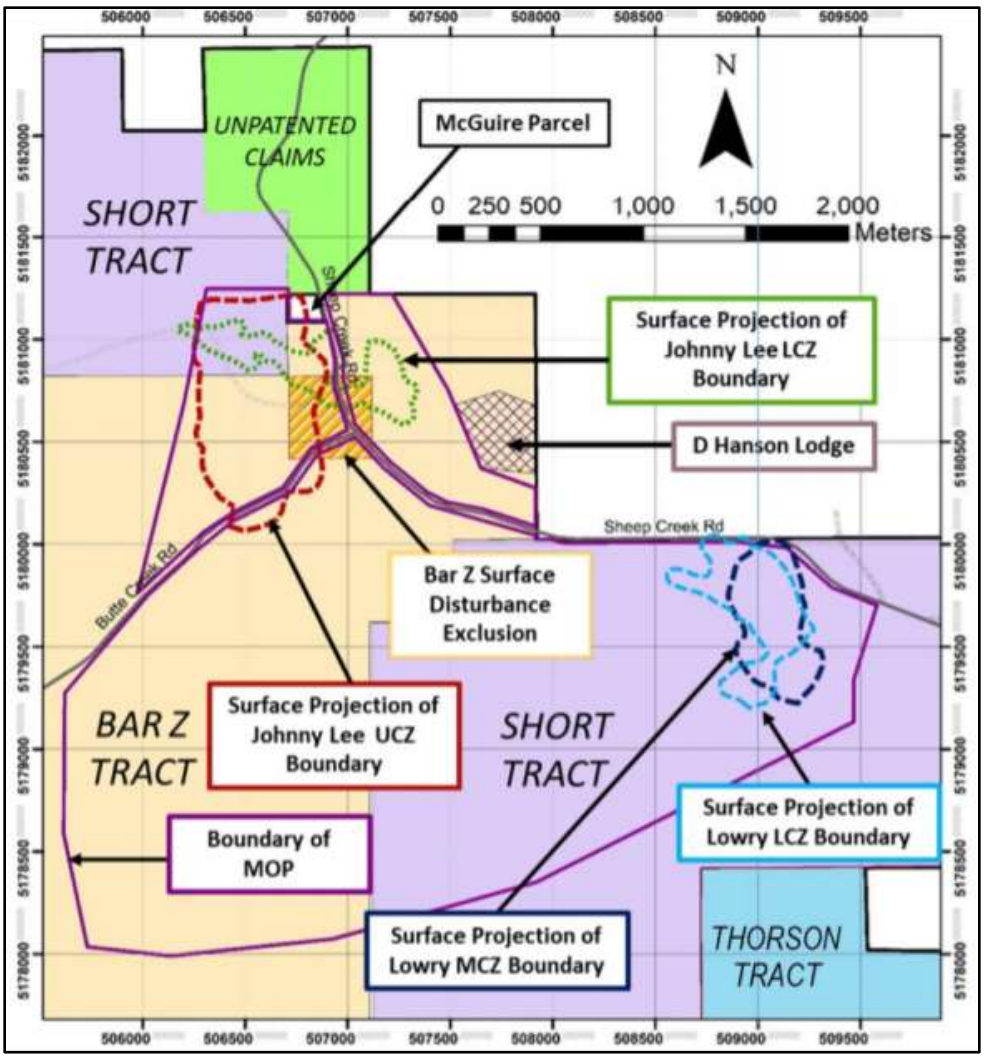


Figure 14: Land Tracts Around Black Butte (Ronald, Evans, & Williamson, 2020)

Table 2: Permits and Plans for Black Butte and Their Legal Status (Ronald, Evans, & Williamson, 2020)

	Permit/Plan	Agency	Status
Mine Operating Permit	Exploration Licence	MDEQ: Air, Energy and Mining Div, Hard Rock Mining Bureau	Approved
	Environmental Impact Statement – Record of Decision	MDEQ: Air, Energy and Mining Div, Hard Rock Mining Bureau	Approved
	Hard Rock Mining Operating Permit	MDEQ: Air, Energy and Mining Div, Hard Rock Mining Bureau	Approved
	Full Project Reclamation Bond	MDEQ: Air, Energy and Mining Div, Hard Rock Mining Bureau (Increment 1 Approved 8/14/2020)	In Progress
Water Quality	Montana Pollution Discharge Elimination System Permit	MDEQ: Water Quality Div., Water Protection Bureau	Approved
	Montana Groundwater Pollution Control System Permit	MDEQ: Water Quality Div., Water Protection Bureau	Approved
	General Permit - Storm Water Discharges Associated with Const Activity	MDEQ: Water Quality Div., Water Protection Bureau	Approved
	Spill Prevention, Control and Countermeasures Plan	MDEQ: Permitting and Compliance Div., Waste and Underground Tank Management Bureau	Submitted
Water Rights	Certificate of Water Rights/Groundwater Appropriations	MDNRC, Water Rights Bureau	In Progress
Water – Other	Public Water Supply Permit	MDEQ: Water Quality Div., Public Water and Subdivisions Bureau	Not Initiated
	Sewerage Disposal	Meagher Country Health Department	Not Initiated
Wetlands Streambeds	Clean Water Act Section 401 Permit	USACE, MDEQ: Water Quality Div., Water Protection Bureau	Approved
	Clean Water Act Section 404 Permit	USACE	Approved
	MT Streambed Preservation Act 310 Permit	Meagher County Conservation District, MDEQ: Water Quality Div., Water Protection Bureau	Approved
	MT Streambed Preservation Act 318 Permit	Montana Fish, Wildlife and Parks, MDEQ: Water Quality Div., Water Protection Bureau	Approved
Aquatics	Aquatics Monitoring Program	MDEQ: Air, Energy and Mining Div, Hard Rock Mining Bureau; Montana Fish, Wildlife and Parks	Submitted
Dam Safety	Dam Safety/Hazard Evaluation	MDNRC, Water Resources Div., Dam Safety Bureau	In Progress
Tribal Communications	Associated with 404 Permit	US Army Corps of Engineers	Completed
Air/Noise	Air Quality Permit	MDEQ: Air Quality Bureau (Amended on August 10, 2020)	Approved
Hard Rock Mining Impact	Hard Rock Mining Impact Plan	MT Department of Commerce, Community Development Div., Hard Rock Mining Impact Board	Approved
Power Transmission Line	Mt Major Facilities Siting Act	MT Public Service Commission	In Progress
Invasive Vegetation	Weed Plan	Meagher County Noxious Weed Management	Approved
Cultural Resources	Historical Preservation Act	MT State Historical Preservation Office	In Progress
Emergency	Emergency Response Plan	MDEQ: Air, Energy and Mining Div, Hard Rock Mining Bureau State Fire Marshal	Submitted
Mining Operations	Notification of Commencement of Operations	US Mine Safety and Health Administration	In Progress
	Hazardous Waste ID	US Environmental Protection Agency, US Department of Energy	Not Initiated
	FCC Radio Licenses	Federal Communications Commission	In Progress
	Explosives Permit	Bureau of Alcohol, Tobacco, Firearms and Explosives	Not Initiated

Table 2 details permit/plan categories, permit/plan name, agency, and the permit/plan approval status as of December 2020. Since this information was accurate in December 2020, parts of it are most likely inaccurate now as the permitting process progresses for the mine. This was the most detailed information available for all of these legal documents. Estimated dates of approval were not published.

Table 3: Black Butte Copper Project Risk Assessment (Ronald, Evans, & Williamson, 2020)

AREA Subarea	Risk	Comments
RESOURCE		
Drilling	Medium	Additional drilling needed in UCZ for metallurgy.
MINING		
Geotechnical	High	Fair-Poor Ground. Good grade control procedures during UG mining required for successful execution (short rounds).
Dewatering	High	Unknown if VVFZ and Fault 1 Faults are water conductors or not. Process plant and mining operations to rely on water recycle plant for UG service water.
METALLURGY/PROCESS		
Geo-metallurgy	High	Blending of feed and even concentrate will be key to plant performance for saleable concentrates.
INFRASTRUCTURE		
Water Supply	High	Water availability from underground as new raw water for makeup will be critical.
Water Management	High	System requires large number of ponds and a complex water balance/treatment/discharge system that will require good monitoring and operational management.
SOCIAL		
Litigator Groups	High	Legal challenge to MDEQ's ROD to prevent/impair project. Such litigation can increase costs and cost delays.
MARKET RISK		
Concentrate Sale Contract	Medium	Need to negotiate sales contract for the concentrate which may have undesirable impurities.
OPERATIONAL RISK		
Recovery underperformance	High	Will affect revenue. Blending of problem ore zones with good ore zones and LCZ mineralization will be critical.

Table 3 details risks for the Black Butte Copper Project and their corresponding potential for harm. Risks with lower scores were identified, but nothing below a medium score was shown in this table (Ronald, Evans, & Williamson, 2020).