

An Evaluation of Local Government Environmental Regulation
Focusing on Taconite Mining in Minnesota and Wisconsin

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Abstract

Throughout the history of environmental policy there has been a shift in environmental regulation from the local level to higher levels such as state and federal. While these changes have resulted in uniform environmental standards across the nation, local governments encounter the difficulty of protecting themselves from environmental harms, and they find themselves bearing the costs of environmental injustices. The purpose of this study is to evaluate Wisconsin mining policy to determine if the development of the Gogebic Taconite mine in the Penokee Range will be detrimental to the surrounding areas. The economic benefits of increased employment and generation of money in the surrounding counties is contrasted with the severe environmental damage and potential health risks to the local residents. What can be concluded from taking into consideration these factors and the current mining law in Wisconsin is the lack of adequate protection for both the environment and the public health of Ashland and Iron county citizens.

Introduction

Northwestern Wisconsin's Penokee range consists of a 25-mile landscape home to a wide range of habitats that support a diverse group of plant and animal species. Over 71 miles of river flow through this range, ultimately emptying into nearby Lake Superior. Portions of these rivers have been designated as exceptional resource waters, meaning they are among the highest quality rivers in Wisconsin. (The Nature Conservancy 2013). This outstanding water quality is vital to the lives of those who depend on the Penokee range for their source of drinking water living in Ashland, Mellen, Highbridge and several other surrounding counties.

Gogebic Taconite has recently threatened the natural habitat and pristine waters of the Penokee range with the proposal of a new mining operation in this

area. The proposed mine, which has the potential to become the largest in the world, would be four and a half miles long, one and a half miles wide, and up to 1,000 feet deep (Sierra Club 2013). The process of extracting Taconite, a low-grade iron ore, would result in negative effects on human health as well as the Penokee environment. Although Wisconsin has been known for its stringent laws and regulations on mining, recent legislation by Governor Scott Walker has resulted in new mining law, favoring business.

Ashland and Iron counties in particular would be heavily impacted by the implementation of the Gogebic Taconite mine, and as a small government they encounter the difficulties associated with environmental justice and effective protection of local health and resources. Determining the effectiveness of local environmental protection is important to more successfully solve future pollution issues and ensure the health and safety of our citizens. The purpose of this thesis is to analyze cases involving taconite mining to illustrate both local and centralized environmental governance, determine stakeholders, and form a conclusion on the successes and shortcomings of local governments to protect their constituents and their environments.

I. Literature Review

History of Environmental Policy:

Prior to industry and urbanization, there was little need for environmental protection in the United States. However, as the nation's population began to grow so did concerns for the quality of our air and water. Rural areas began to urbanize, people started living closer together, and consumption of goods increased. In order to keep up with the demand of consumers, industrial production was also on the rise. This industrial era greatly expanded the U.S. economy and was essential for the development of our nation.

Post WWII, the concentration of population growth was in cities, and this urbanization put extreme pressure on the environment. Families could now afford a wider range of products involving high-energy use in the manufacturing,

transportation and operation stages. Additionally, urban consumption put raw materials such as lumber, coal, oil, minerals, and agricultural products in high demand. Another issue that emerged was an increased distance between consumption and its environmental consequences. What was once a visible connection between consumption and its effects became an expansion of consumption with little to no thought to the environmental impacts. The increasing demands for higher quality of life quickly began to conflict with the desire to live in a clean environment, removed from any factory production.

With emerging concerns about environmental quality, how to address these pollution issues became an imperative question. Our nation as a whole was experiencing uniform pressures of increased population and economic growth but there was not uniform policy addressing the consequences of these pressures. Throughout this time period, primarily the 1960's, different regions competed for economic growth and this resulted in a varying level of environmental protection across the country. This inconsistency led to a building sense that federal intervention was necessary to adequately address pollution issues, and from this, environmental federalism emerged.

Federalism in the United States entails the federal Government working in coordination with smaller state governments to create, implement, and interpret laws (Donald 1985). This intergovernmental relationship, focused on balancing state and federal government authority, defers a majority of its law implementing responsibility to the states. This idea of cooperation between the local and federal government holds true when looking at environmental issues across the nation.

The 1970's in particular were a promising time for the environmental movement. With the United States Congress passing the groundbreaking legislation of the Clean Air and Clean Water acts, there began to be dramatic changes in the way the American Government handled environmental issues. With the previous lack of regulation and control, the new series of laws showed potential for a combination of centralized and local environmental governance to adequately address pollution issues at any scale. The idea was to allow the EPA to grant states primacy in implementing and enforcement of environmental policy (Durant, Fiorino & O'Leary,

2004). However, as the laws were put into operation and a higher level of responsibility was shifted to the states, questions began to rise on the effectiveness of delegating implementation and enforcement to states to be handled at a local level.

As an element sometimes viewed in federalism, subsidiarity has its focus on decentralization and solving matters at the lowest level of authority in a government system (Adler 2005). This idea fits with environmental policy when looking at the differences in ecosystems, climates, values, and interests across the country. The main idea of this theory rejects federal environmental policy as a “one size fits all” plan that doesn’t necessarily fit different regions. The idea behind this theory is that local knowledge and expertise is necessary to develop proper solutions to environmental problems.

An example of subsidiarity is in controlling and regulating ozone precursors. Each city varies in its mix of stationary and mobile pollution sources, and the federal government has not shown in the past ability to obtain the amount of data necessary to make judgments that properly reflect the technical requirements of individual locations. For example, while congress continues to refuse to raise efficiency requirements on automobiles to reduce greenhouse gas emissions and address global warming, California has passed legislation in emission cuts aimed at fighting global warming.

According to the New York Times, the California Air Resources Board of 1967 requires a cut in carbon dioxide auto emissions that is considered the “most significant step ever taken to control heat-trapping gases in the United States.” Fred Kropp the president of Environmental Defense agrees that California is a role model in a movement towards reducing our greenhouse gas emissions. Although Chrysler and General Motors challenged California’s zero-emissions standard on the basis that only the federal government can set emission standards, due to California’s regulations that predate the Clean Air Act, Congress found it acceptable for California to set their own emission standards (Durant, Fiorino & O’Leary, 2004).

The aspect of subsidiarity can be applied when looking at the community interests in both the Reserve and Gogebic mining cases. Residents in both Duluth

Minnesota and Wisconsin's Penokee Hill's area have invested interest in the success of these mining operations. The nearby towns surrounding these mines are generally economically depressed and are welcoming to the prospect of employment the mine promises. Although the waste discharged from the mine may violate federal environmental standards, it may be in the best interest of the communities to encourage the mine.

Discussion of Relevant Laws:

Prior to the Clean Water Act, most states had adopted their own administrative programs to control water pollution that proved to be generally weak. Then in 1972, two years after the Clean Air Act, the Clean Water Act (CWA) was established. Since its implementation, the CWA has been the main contributor to improved water quality in the U.S. over the last four decades. Although the initial goals of the CWA to completely eliminate all effluents into our nations water bodies in one short decade have yet to be met, we have still benefited through increasingly cleaner water. Under the Clean Water Act, point sources are regulated with a National Pollutant Discharge Elimination System (NPDES). Through this system, point sources must obtain a NPDES permit prior to discharging any waste into a water body. The CWA defines a discharge of pollutant as "any addition of pollutant to navigable waters from any point source" (EPA 2014). The permits granted to point sources are good for five years, and then are reevaluated and renewed. Permits may also be revoked if found in violation of the CWA. Generally states are responsible for issuing permits to polluters if they have the capability, otherwise the U.S. EPA will issue the permits (Salzman & Thompson, 2010).

The three general categories of mining regulated by the EPA under the Clean Water Act include hard rock, non-metal, and coal. For this particular evaluation I will be focusing on hard rock mining as taconite falls under this category. Because of the environmental and public health hazards associated with hard rock mining, section 402 of the CWA requires all point source discharges from mining operations be authorized under a NPDES permit (EPA 2014). The process of hard rock mining is especially detrimental to waterways, forests, and wildlife habitats. The

destructive nature of these operations is a result of the high waste-to-product ratio associated with hard rock mining, in particular taconite.

According to the Webster Dictionary, taconite is a flint-like rock high enough in iron content to constitute a low-grade iron ore. In the early 20th century when there was a high abundance of high quality iron ore, taconite was actually viewed as waste rock. Following WWII, the United States had depleted the majority of its high-grade iron ore, and mining for taconite became prevalent. Because taconite is considered a low-grade form of iron ore, there is a high percentage of material leftover that was used to recover the taconite. This waste is in the form of tailings, a slurry produced in the beneficiation stage consisting of between 40-70% liquid and 30-60% solid waste. These tailings are usually disposed of in an on-site impoundment such as a tailings pond (Potential environmental impacts 1997).

One consequence of mining associated with the extraction of taconite is acid mine drainage, or AMD. As a result of the oxidation of metallic sulfides after coming in contact with air and water, acid mine drainage is a concern for any type of open-pit mine. Generally when mining operations open, there is great scientific uncertainty with the potential for mines to develop AMD. Proponents of taconite mining argue that only sulfur mines can produce this toxic drainage, however this has proven to be untrue. Serious AMD from iron-ore mines has been found in both Dunka Pit Mine in Minnesota and Dober and Buck mines in Michigan (The environmental track 2013). This is because oxide ores can contain the same sulfide materials such as pyrite that cause AMD. In fact, both the Wisconsin Geological survey and the United States Geological Survey reported that the Tyler Shale formation layer of rock, which lies over the Penokee Range, is comprised of black pyrite, shale, and slate. It is pyrite that when broken down and put in contact with air and water forms sulfuric acid leaching arsenic, mercury, and selenium into the environment. It is estimated that just one cubic kilometer of waste rock from this site could contain the pyrite equivalent of 10 billion gallons of sulfuric acid. (The environmental track 2012). Therefore, the claims that taconite mining is somehow safer than non-ferrous mining is false and these two categories of mineral extraction should not be treated any differently under law.



Figure 1: Example of the effects of acid mine drainage

Because of the dangers associated with AMD, the Mining Moratorium Law of Wisconsin passed in 1997 requires proof of a sulfur mine within the U.S. or Canada borders that has not polluted the surface or groundwater during or after the completion of the mining operation. Because this has not yet been accomplished, this “Prove it First” law has been called a threat to the global mining industry. Although mining for metallic sulfides and non-metallic sulfides can both lead to AMD, only metallic sulfide mines are restricted under this law. This allows for the implementation of mines such as taconite despite the threat they too have in regards to surface and groundwater pollution (“Potential environmental impacts,” 1997).

Wisconsin state law in particular is important to focus on as it has changed recently in March of 2013, and will determine the outcome for the Gogebic proposal. In Wisconsin, the Department of Natural Resources requires authorization before a person may engage in any of the three stages of the mining process. These include the initial stage of exploration, then sampling, and finally, mining. Public hearings and periods of expression of opinion in review of an environmental statement are then necessary in approval of the operation. Signed by Governor Scott Walker in March 2013, the ferrous mining act: Wisconsin Act 1 has changed the way mining law deals with ferrous versus non-ferrous materials. Ferrous materials, which are simply minerals that contain iron, are now easier to mine than non-ferrous minerals. With the expedition of the approval and permitting process as well

lowered taxes for mining companies, there is a push towards iron mining in Wisconsin now more than ever.

The prior law required a person to obtain a prospecting permit before engaging in prospecting of a potential mine site. This permit included an environmental impact statement as well as requirements for reclamation. Under the Wisconsin Act 1, the requirement of a prospecting permit has been completely eliminated for ferrous mining. (Wisconsin act 1, 2013). This allows the potential miner to skip to bulk sampling and submit a permit for this as the first step.

The overall process of obtaining a mining permit in Wisconsin was previously estimated to take about two and a half years; even longer if the project was large or complex. According to the new law, the DNR is required to either issue or deny a proposed mining permit no more than 420 days after the application is submitted and deemed complete. The new ferrous mining act reduces the time span of the permitting process by more than half. This approval timeline also requires the DNR to approve or deny any environmental and natural resource permits within the same 420-day deadline (Konopacki 2013).

In addition to an expedited approval process the new law will also weaken environmental regulations. An example of this is the increase in the groundwater pollution sacrifice zone. Under current law, pollution is allowed up to 1,200 feet from the mine. The new law doubles the boundary for ground water contamination allowing up to 4,200 feet of pollution from all directions of the mine. This does not directly increase the effluent allowed but will increase the amount of water affected by mining pollution (Gedicks 2013).

EPA vs. Reserve Mining Co:

From 1955 to 2010, the United States Department of Justice has defended the Environmental Protection Agency in approximately 2,500 cases (U.S. GAO). The amount of time and money that goes into upholding EPA regulations and seeking out and persecuting regulation violators is also immense. One monumental case that stands out in the realm of environmental law is the EPA v. Reserve Mining Co.

According to the EPA, the process by which the Reserve Company produced their iron was concerning for the aesthetic and ecological value of Lake Superior as well as for the potential negative effects on human health. The Reserve factory located at Silver Bay Minnesota produced 10,700,000 tons of iron pellets yearly, and dumped 47 tons of tailings into Lake Superior every minute. The process of mining the low-grade taconite at the site was harmful as it involved using 71 tons of water, and generating 2.3 tons of waste in order to produce only one ton of iron pellets (Lazarus & Houck, 2005). This waste that was being dumped into the lake at an exorbitant rate was unknown in its effects on human health, but was known to contain asbestos-like fibers that were being ingested through drinking water by citizens of Duluth Minnesota.



Figure 2: Tailing dumping into Lake Superior from Reserve Co.

Looking into this case, several stakeholders can be identified. The polluting party, Reserve Mining, is invested deeply into their operation and relies on being able to simply dump the tailings as a way to increase profit. Creating a new on-land disposal system would increase costs for the company, and therefore is not in their interest. This also poses an interesting point because implementing a recycled water system as a way to reduce the amount of hazardous waste polluting the lake would have actually improved the quality of iron pellets, benefiting Reserve Co. (Lazarus & Houck, 2005).

The mining venture began in 1947 after the state of Minnesota willingly granted operating permits to Reserve. The eagerness to grant Reserve the rights to

pollute is an example of the state acting in a self-interested manner. Local politicians wish above all to benefit their own constituents while disconcerting any negative externalities that may arise while doing so. The prospect of opening a new mining business is seen as a way to create jobs for the local people and gain the economic advantages that come with higher employment.

Furthermore, states are also competing with each other for economic growth and without federal government to set more stringent pollution standards, states are likely to have looser standards to encourage industry. States with more rigid pollution standards are faced with the potential of losing the business of factories that will relocate to an area with more flexibility in emissions and discharge. This results in a “race to the bottom” effect with inter-jurisdictional competition leading to increased environmental degradation across the country (Oates 1999).

In conjunction with the race to the bottom, a phenomenon known as the “Prisoner’s Dilemma” arises. According to this theory, states will refuse to cooperate and tighten pollution standards even if the result of implementing tighter standards would ultimately benefit them by improving air and water quality (Elliott 1985). For these self interested reasons it is clear that Reserve Mining would prefer its pollution standards be decided at the local level where there is more opportunity for economic growth, and more opportunity to pollute.

With a proposed Gogebic Taconite mine in the Penokee Range, Wisconsin is also experiencing the race to the bottom as it demolishes environmental mining safeguards to allow for this new company to establish itself in the pristine northwestern range. The political beliefs and economic interests of Governor Scott Walker are that of increasing jobs through the development of this mine. The Wisconsin Mining Moratorium law, also known as Wisconsin’s “Prove It First” law, required finding an example of a metallic sulfide mine that has not polluted surface water or groundwater before issuing any permits to mine. There have not yet been any examples where water was not polluted (EcoWatch). The new mining bill signed by Governor Walker creates less stringent requirements in order to appeal to companies in an effort to bring more business, and jobs to Wisconsin.

This apparent preference for local governance by Reserve can also be noted when considering the process by which this matter was dealt with in court. The litigation for the case lasted five years, and the Eighth Circuit released its en banc opinion on March 14, 1975. The conclusion was that the mining waste did contain asbestos like material that presented a danger to human health, and the potential consequences were severe. Although the court recognized the potential danger of the tailings waste, the Eighth Circuit did not require immediate action to be taken to remedy the issue. They announced the pollution was to be abated on reasonable terms and Reserve was to have a reasonable time to discontinue the discharge of its waste. By failing to issue an injunction, the Minnesota court allowed for continued pollution by Reserve into Lake Superior, with no definite end in sight.

Greater action was taken when trial Judge Edward Devitt ordered that Reserve pay \$1,300,000 in water filtration costs, fines for permit violations, and sanctions for misconduct in discovery. The Eighth court upheld all of Devitt's orders. Negotiations between Reserve and the government continued, and finally on March 16, 1980, Reserve's dumping in Lake Superior ended (Lazarus & Houck, 2005).

Five years after the en banc opinion, action was taken to stop this detrimental mining process. The inefficiency in the state alone as a means to solve this issue can be seen in the length and cost associated with this case. An eleven-year time span had elapsed from when the community first became concerned with the issue until the dumping was finally stopped.

As important as our natural systems are to the world, an environmental pollution issue really enters the political limelight when public health is at risk. Although these perceived health issues directly affect the local community, state government once again falls short in protecting its citizens from harm. At the root of environmental regulation, a question of how much health risk we should accept is considered. An issue that arises with allowing local governments to decide how much pollution, or in other words, how much risk they are willing to endure is the lack of expertise at this level. For example, the Clean Air Act and Clean Water Act of 1970 rely on the EPA to set the national environmental quality standards for different pollutants. The complexity of environmental issues such as pollution

output is a problem that is best solved at the federal level, by experts. The method by which the EPA sets pollution limits for water is by reflecting what level of treatment can be achieved with the given technology, and reflecting the level of control needed to meet standards of quality for a particular water body (Guerrero, 1995). This research is carried out at the federal level through the EPA, and then state governments are given the primary responsibility to monitor and enforce the regulations.

In the case of the EPA v. Reserve Mining, the complexity of scientific uncertainty for health risk is put into play. In this case, the mineral in taconite, cummingtonite-grunerite, is asbestos-like in nature and had been linked to cases of stomach cancer in Japan at the time of the Reserve case. Although the known effect of asbestos is the result of lung cancer and mesothelioma when inhaled, at the time of this case, little research had been done to determine the relationship between drinking the cummingtonite-grunerite and any possible health risks. Taking this into consideration, knowing exactly when and how public health is at risk poses the issue of scientific uncertainty in environmental law.

Once the connection between Reserve's taconite waste and asbestos was established, the federal trial team went to work making a case against reserve. Several steps were needed to combat the scientific uncertainty and to make a viable case against the mining company in the interest of public health. At the local level within the state of Minnesota, lack of funding and conflicting interests within the economy would not allow for such extensive studies to take place. The federal government proved the tailings were in the Duluth water supply, and that epidemiological studies of asbestos workers showed higher rates of gastrointestinal cancer.

The ignorance regarding the harm that Reserve is placing on human health is just another external cost of running their operation that is absorbed by society. A way to shift the responsibility to the polluting actor would be a requirement to conduct research and report to the public on the externalities from their actions. However, this is usually not in the interest of the company for several reasons, therefore remaining ignorant to the harmful byproducts is the preferred method.

Direct costs with conducting safety research, lack of market benefits, and lack of certainty from the possible research all contribute to the disincentive for actors to investigate their negative externalities (Wagner 2004).

II. Methods

In order to successfully determine the effectiveness of the local governments in the Penokee Range, an evaluation of Wisconsin Act 1, the economic benefits of the implementation of the Gogebic Taconite mine, and the environmental harms associated with opening this mine must be considered. The results for this evaluation were obtained by an accumulation of data sources including economic and environmental impact statements, along with testimonials from the stakeholders in this situation.

The steps used to evaluate these factors and form a conclusion include defining the problem, establishing evaluation criteria, and evaluating the economic benefits in conjunction with the environmental and health risks. Carrying out an evaluation of Wisconsin Act 1 will yield results indicating the successes and shortcomings of the policy, and determine how effective the Act will be in protecting the local people from harm associated with the implementation of the Gogebic Taconite mine.

Problem Definition:

The problem in its most basic sense is one of promotion of industry versus environmental protection. The conflicting viewpoints here pose the question of what is most valuable to the state of Wisconsin, and policy changes reflect those values. Because of the heavily industry-based economy in the state of Wisconsin, the problem leading to the implementation of Wisconsin Act 1 was the stringency of current mining law. To address this issue, Wisconsin Act 1 offers leniency in the form of this new mining policy, favoring business.

Evaluation Criteria:

How I will evaluate Wisconsin Act 1 is based on criteria that will showcase both economic benefits of the Act and potential environmental consequences associated with policy implementation. These criteria include; Interests of stakeholders, economic benefits associated with mine implementation, and potential health risks and environmental hazards as a consequence of Wisconsin Act 1. This information will be generated by the means of data mining, from a variety of sources. These sources include news articles, testimonials from stakeholders, legal documents and laws, and environmental and economic impact statements. The data will then be evaluated to form a conclusion on the success and shortcomings of the local governments to protect their environments and constituents from harms associated with the mine.

III. Results

Interests of Stakeholders

To begin, an important factor to consider when understanding and evaluating new laws are the interests of all stakeholders. In this particular situation the main stakeholders include Wisconsin politicians, local politicians of surrounding counties, and constituents affected economically and environmentally from the mine. Determining their opinions and interests in the situation will help to better understand the role of the local and higher governments.

As discussed previously, state leaders hold a high interest in improving the economies of their individual state to better compete with surrounding states for business. Although this may not always be the case, Governor Scott Walker has made it clear increasing business is where his priorities lie. After signing in the new mining bill, Walker announced, "This sends a message, not just to those in the mining industry, but to everyone that we are going to find a reasonable way to break down barriers that have made it hard to create jobs in the past. We are going to make it easier to create jobs and economic opportunity in the future" (Bergquist 2013). The language he uses here such as "break down barriers" refers to the demolition of the mining safeguards that were in place under previous law.

Local leaders such as mayors of the affected cities are also highly invested in increasing the economic opportunities for their citizens, however at the local level there is more concern for the negative externalities associated with increasing economic activity, as those people will directly face any burdens. Prior to the implementation of Wisconsin Act 1, a press conference was held by local leaders to address the controversy surrounding the bill. Ashland Mayor at the time Bill Whalen spoke for the group when he said, "This is not a Native Sovereign issue versus the state of Wisconsin. This is a water and legislative issue that affects us all." The main concern that was addressed at this press conference was that of protection of local water sources. Another Ashland city council member stated, "We are 100% united in defense of the water" (With 2013).

From the numerous press conferences held by the local leaders in these affected counties, it is clear there is an overwhelming opposition to Wisconsin Act 1 and the development of the mine in this region. The leaders do not believe the law adequately protects their environment and the mine will lead to pollution of the water that all of their constituents consume. This alone is a reason for concern that local leaders are trying to address.

Finally, perhaps the most important stakeholder when looking into new policy implementation is the collective group that will be directly affected by both the positives and negatives of the law. In this particular scenario, all people located in the economic impact area of the mine (which includes 12 counties) are to be considered. Using polls and testimonials from residents of these counties the opinions of residents can be identified. University of Wisconsin-Superior conducted a poll of residents of Ashland and Iron counties and found results indicating a general disapproval of Gogebic Taconite. Of the survey sample, 62% of people were against the mine, 13% were neutral, 14% generally support the mine and a mere 11% are in full support of the mine. Those in support of the mine gave reasoning indicating a desire for increased jobs and economic growth that would develop in the area as a result (Hamilton 2013). In fact most of the people agreed that there would be a positive effect on the economy and local businesses and employment opportunities.

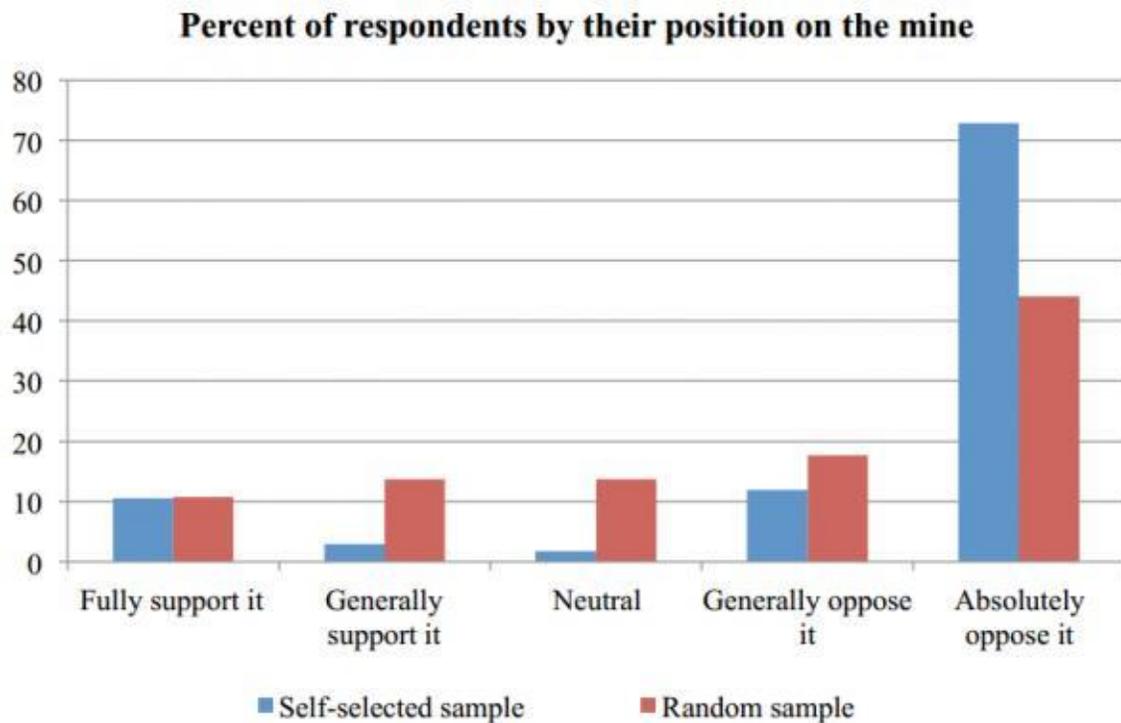


Figure 3: UW-Superior study

This figure shows the percentages for the mine approval in both Ashland and Iron Counties. This study was conducted by professor Zamira Simkins in the summer of 2013. Out of the nearly 10,000 households in the two counties, 200 were randomly selected for a phone survey. Out of these 200, 102 complied and answered the survey completely (Hamilton 2013). The self-selected sample represents respondents who completed the same survey online by choice. For the purpose of this thesis I will be addressing the random sample as it more accurately represents the entire population.

A more recent demonstration of the attitudes and opinions towards the opening of the mine can be seen through the April 14th 2014 Wisconsin Conservation Congress hearings. Together, the Madison Action for Mining Alternative, the Wisconsin Network for Peace and Justice, and the Sierra Club-John Muir Chapter worked to develop resolutions to be voted on in counties throughout the state. (Wisconsin Gazette 2014). Results from these hearings indicate statewide

support for increased mining safeguards and majority opposition to the proposed taconite mine. Over the course of the hearings, three resolutions were approved by 2:1 margins across the state.

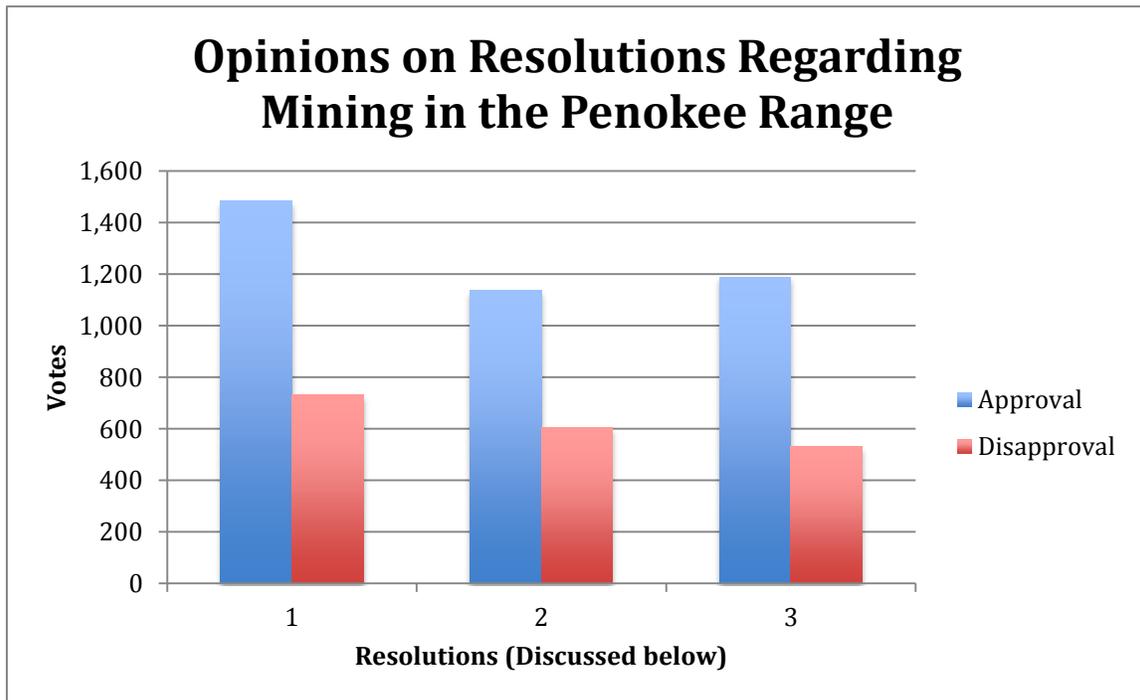


Figure 4: This bar graph shows the number of votes in favor and against the three mining resolutions voted on during the Wisconsin Conservation Congress hearings.

The first resolution that was voted on was opposing development of the proposed open pit iron mine. The resolution was approved in 28 of the 32 Wisconsin counties where it was introduced and the total vote count was 1,485 in favor of opposing mine development and 732 against opposing mine development. This results in a 67% approval for opposition of mine development.

The second resolution voted on was in support of the repeal of Wisconsin Act 1. This was approved in 19 of 24 counties and the vote count was 1,138 in favor of repealing the act and 606 against repealing the act. Therefore 65% of votes indicate an approval of repealing Wisconsin Act 1.

The third resolution voted on was to direct the Department of Natural Resources to regulate cancer-causing mining pollution to protect public health. Approved in 23 of 25 counties with a vote of 1,190 in favor and 533 against, there is a 69% approval for this resolution (Wisconsin Gazette 2014).

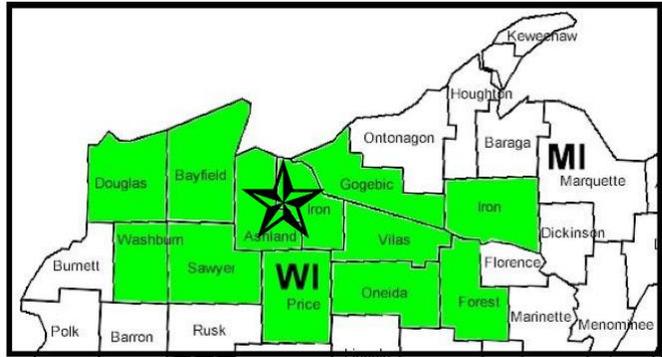
Dave Blouin is the Wisconsin state mining chair for the Sierra Club and with the results of the votes has stated, “The people have spoken and the results demonstrate overwhelming opposition to open pit iron mining and support for public health protections for sand mining. Support for repealing Gogebic Taconite’s iron mining law is strong and growing”. Michelle Heglund a citizen of Ashland County stated during a news release, “Just because Ashland County residents want jobs, that doesn’t mean we’re willing to give up our clean water, clean air, and quality of life. The state has not properly engaged the residents of Northern Wisconsin to find out what we want” (Wisconsin Gazette 2014). It is clear when looking at the results of the votes that these concerned citizens speak for the majority of their peers when voicing opposition of the mine.

Economic Benefits

The economic impact of constructing the Gogebic Taconite on the northwestern Penoque Range would be immense. The area primarily affected has suffered high unemployment rates and population decline over the past several decades. The National Mining Association’s most recent report indicates the high to degree to which mining employs our nation. For example, in 2011, U.S. mining directly and indirectly generated 2.11 million full-time and part-time jobs.

To illustrate the economic impact area this map (figure 5 and 6) from Gogebic Taconite and NorthStar Economics Inc. highlights the surroundings of the mine that in some way are affected by the mine economically. Other than the economic activity that occurs within the construction zone of the mine such as Ashland and Iron counties, the surrounding counties benefit through increased circulation of money being spent by both Gogebic Taconite as well as its employees. The surrounding counties would provide goods and services needed to keep this

mine running and use their increased income on other goods and services within their communities.



NorthStar Economics

Figures 5 and 6: Economic impact area of mine implementation

NorthStar Economics Inc. has also released an economic impact report regarding the economic benefits associated with the opening of this mine. The economic impact is calculated for this report using an IMPLAN input/output model capable of determining the overall economic impact by estimating direct effects, indirect effects and induced effects of mine implementation. This model is widely used in the United States to calculate economic impression.

In this report, both short term and long term effects are highlighted in regards to jobs created and money generated. The total impact area would encompass 12 counties in both Wisconsin and Michigan, however for the purpose of this study I will look at the 10 counties in Wisconsin in particular. The following chart exemplifies the current employment condition in the affected region compared to both the state and national averages.

Figure 7: Unemployment Rates July 2013

10-Country Region	Wisconsin	National
7.9%	6.8%	7.4%

(Department of Workforce Development 2013)

The affected 10-county region has a higher average unemployment rate than both the state and national level. This signifies potential motivation to introduce a new industry such as mining to alleviate the higher unemployment in that area.

Short-term economic benefits that would result from the development of the Gogebic Taconite mine would be primarily related to mine construction. The construction period lasts two years, and NorthStar economics predicts the creation of 3,175 jobs each year over the two-year period, with a \$20 million dollar yield in state and local sales and income and property taxes during this time. However this is only a one-time benefit, and after the mine is constructed these jobs will no longer be needed. There will however be continued both direct and indirect job opportunities available throughout the duration of mine operation.

According to NorthStar the total number of job created from the implementation of this mine would be 2,853. This number includes both indirect and direct jobs (NorthStar 2011). Examples of direct jobs include mining, management, and transportation. Indirect jobs include jobs that arise in the local communities as a result of increased flow of wealth as a result of the mine such as retail, education, and private enterprises. President of Gogebic Taconite Bill Williams stated, "Everyone knows Wisconsin workers need these jobs. Wisconsin suppliers and manufactures need the business and our communities need the vital tax revenues created by Gogebic Taconite" (Wisconsin Business 2011).

Not only would there be increased employment, the income level is presumed to be higher than the combined average of private sector jobs according to the National Mining Association. Metal Ore Mining salaries in 2011 were \$85,400 on average. This is 78% higher than the national average for all industries. The

economic impact study suggests that the average labor income for Gogebic Taconite jobs in particular would be \$82,984, 87% above the Wisconsin state average.

With the possibility of increased jobs in the area, plus the tax revenue associated with the mine, the estimated total economic impact would be \$604 million dollars annually with the mine operating at a level of 8 million tons of ore. Doubling the level of operation, the mine has the potential to generate 1.2 billion dollars per year (NorthStar 2011). This would overall boost the economy and improve unemployment not only in this region, but also in the entire state of Wisconsin. It is for this reason the state government of Wisconsin is interested in going through with the mining proposal.

Health Risks and Environmental Harms

On the other hand, local governments do not feel as strongly about implementing this mine. Throughout this paper I have explained many of the threats to public health and the environment that the Penokee Range is being threatened with, and here is an overview of some of the main concerns: A recent discovery of asbestos material, gruerite, at the site by the Wisconsin Department of Natural Resources is threatening the health of local residents. Although since the Reserve case it has been established that there is no direct link to increases in cancer through the ingestion of asbestos, there is still the danger of inhalation to workers and anyone with direct contact to the mining operation.

Another direct threat that was discussed previously is that of Acid Mine Drainage. Because the rock formation in the Penokee Range is comprised in part of pyrite, the risk of open-pit mining here is a direct threat to the waters in the region. According to a report by the Sierra Club of Wisconsin, there have been numerous independent geological studies done that confirm black pyrite, shale and slate make up rock that is directly adjacent to the ore. (Environmental track record 2013). Currently, Gogebic Taconite has no intention to stop any movements forward with the mine despite this potentially harmful discovery.

Since 2004, taconite mines in the United States together have faced environmental violations totaling 2.1 million. The amount of money put into

cleanups is over 10.5 million. The parent company of Gogebic Taconite itself, Cline, has been cited 25 times at its other operations for exceeding water quality standards. (Environmental Track Record 2011). All taconite mines in the United States are polluters and they are charged with numerous air and water pollution violations. Bringing a taconite mine to Northwestern Wisconsin will be a cause of concern for both the environment and health of the citizens in the Penokee Range.

IV. Discussion

Expected Results

After looking at both the economic impacts that will be brought on as a result of the mine in conjunction with the health interests of the local residents and the potential environmental destruction, it can be concluded that despite general disapproval, the local government is not able to effectively protect their constituents and environment from harms associated with this mine. Wisconsin Act 1 is not effectively addressing the environmental and health concerns that will result once mine construction is underway, and the local people are deprived of their say in the situation. This results in the consequence of environmental injustice as a negative externality of the implementation of this mine. Due to lack of power and influence of the local government, the citizens of the counties most impacted by the opening of the mine will see the greatest adverse health effects from pollution, acid mine drainage, and general environmental destruction.

Ambiguity

Although it is without a doubt that these citizens will face the greatest health and environmental risks from the mine this question of inadequate local government protection cannot be fully answered without a discussion of the ambiguity of the results. One way these results prove to be ambiguous is the overall uncertainty of the extent of both the economic benefits and environmental destruction and health hazards associated with the mine.

Although using similar previous cases such as Reserve Mining Co. the general outcomes of implementing and running a taconite mine at this scale can be observed, because of the uniqueness of each situation only time will tell how Gogebic Taconite affects the people and the environment. Some major differences when comparing Reserve to Gogebic include time period, policy, size of the operation, and location. All of these add to the ambiguity of the situation and make it difficult to predict future outcomes for the environment and health of the citizens in Wisconsin.

Policy Recommendation

After evaluation, it can be concluded that the potential health and environmental risks associated with the Gogebic Taconite mine outweigh the estimated economic benefits. Although the proposed mine will be environmentally destructive, with improved policy the associated risks can be minimized. Creating and introducing less harmful policy will benefit the surrounding environment and minimize health risks.

Because Wisconsin Act 1 has already been signed off on and implemented, monitoring and evaluating the results of this particular act would be part of a future, longitudinal study on how this particular mining act has impacted the people and natural environment it has affected.

Future Applications

When presented with the situation of opening a huge mine in an economically depressed region, it is often difficult to recognize the severity of environmental damage and risk to public health, and value these against economic gains. This thesis is important to showcase some of the disadvantages local governments face when dealing with large companies and how the economic gains do not necessarily compensate for the destruction and contamination of natural land.

In the future, this information could be used towards the creation of a cost-benefit analysis that would put monetary values to things such as natural land,

water quality, and public health, and balance the loss of value in these to the increase in values that will be experienced economically. Originally going into this project one of my goals was to conduct a cost benefit analysis however I experienced difficulty finding data to support any monetary values associated with the environment and public health. However the information and evaluation I have conducted supports the idea of lack of power at the local level and showcases the disadvantages I aimed to highlight with this thesis.

V. Conclusion

In conclusion, the results indicate that if the proposed Gogebic Taconite mine is constructed in the Northwestern Wisconsin Penokee Range with the current mining policy in place, the negative environmental and human health impacts will outweigh any economic gains from mine implementation. Mining for taconite puts natural lands and water at risk with the potential for acid mine drainage, deforestation and destruction of land, and severe water pollution. Human health is also put at risk due to contamination of drinking water, and increased carcinogens in the atmosphere as a result of mining. The economic gains of increased job opportunities and increased wealth in the economic impact area do not outweigh the harms due to limited economic advantages with the sure outcome of exhaustion in the mining industry with a time frame of about 40 years.

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