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**Wisconsin**  
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# **The Economic Impact of a New Metallic Mine in Wisconsin**

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**October 17, 2018**

<https://crowe.wisc.edu>

## Executive Summary

In December 2017, Governor Walker signed into law a measure ending the effective mining moratorium in Wisconsin. The new law could usher in a new era of mineral mining in Wisconsin, which has substantial deposits of iron, copper, zinc, gold, and silver. The goal of this project is to evaluate the economic impact of a representative new metallic mining operation in the state. In particular, we evaluate the potential economic impact if a new metallic mining operation were to be located in Oneida County. We consider the impact on the state and local economy of a representative mine in this area, which in turn would be indicative of similar operations in other parts of the state.

Based on a comparison of existing and planned metallic mines in neighboring states, we analyze the economic impact of a potential 350 employee metallic mine in Oneida County. We also evaluate the impact of the construction phase of the mine, which we assume lasts two years with a total capital expenditure of \$250 million. Our results could also be scaled to evaluate the impact of different sized mining operations.

We find that Oneida County would see substantial gains in employment and incomes, two measures where it has lagged the state as a whole. We estimate that the 350 mining jobs would pay an average of \$72,568, which is 85% higher than the average pay in Oneida County. Moreover the mine would have impacts statewide through its network of workers, suppliers, and customers, and through the increased economic activity generated. Accounting for all of these impacts, we estimate that the new mine would generate 700 total jobs, and lead to \$44 million total additional labor income and roughly \$243 million in output each year. The increased economic activity would also generate \$6.8 million in state and local taxes per year.

In addition to the ongoing mining operations, the construction of the new mine would generate short term benefits. We estimate that a \$250 million capital expenditure over a period of two years would lead to a total of 1274 jobs and over \$200 million in output created each year.

Overall, the construction and operation of a new metallic mine would have significant impact on employment, incomes, and output in the county, region, and the state.

## Acknowledgments

This project was supported by a grant received from the Oneida County Economic Development Corporation supported by a private donation.

In addition, I thank Dr. Russ Kashian, Director of UW-Whitewater's Fiscal and Economic Research Center, for his quality work and project advice.

## History of Mining in Wisconsin

The state of Wisconsin has a long history of mining, with a particular tradition in metallic mining. The history of metals in the state dates to the Old Copper Complex, items made by early inhabitants of the Great Lakes region, where copper was used to produce a wide variety of tools beginning around 4,000 BC. In the more modern era, lead and zinc mining began in the state in the 1820s, and gave rise to the state's nickname. The original "Badgers" were lead and zinc miners that populated the Upper Mississippi lead district. Both the Coat of Arms and Great Seal of the state have a miner, picks and shovels, and pyramid of stacked metal on them also showing the importance of mining to the history of the state.

Mining of Wisconsin's vast and varied mineral deposits has historically been an important industry. Iron mining began in Wisconsin in the 1850s and was undertaken in many different locations across the state for over 100 years, until the Jackson Iron Company ceased operations in 1983. Beyond iron, the Flambeau mine in Rusk County was in operation until 1997, producing mostly copper, with a smaller production of gold and silver.

Since the closing and reclamation of the Flambeau mine, there have been no metallic mining operations in the state. In fact, in 1998, Wisconsin lawmakers enacted legislation requiring companies seeking to mine sulfide ores such as copper, zinc and gold to prove similar Canadian or U.S. mines had operated for 10 years and been closed for 10 years without causing pollution. This law, known as a "Prove it First" law, provided an effective moratorium on new metallic mining operations. Today, most mining in Wisconsin occurs as nonmetallic mining, producing rock, stone, sand, gravel, limestone and other materials used for industry, construction, road building, agriculture and many other purposes.

## Prospects for Metallic Mining in Wisconsin

In December 2017, Governor Walker signed into law a measure ending the effective mining moratorium in Wisconsin. The new law could usher in a new era of mineral mining in Wisconsin, which still has several substantial deposits of iron, copper, zinc, gold, and silver. Several mining companies have conducted exploratory drilling in areas of northern Wisconsin in recent years, and they now can begin the process of bringing proposed projects to fruition. The goal of this project is to evaluate the potential economic impact of a new metallic mining operation in the state.

There are several potential metal ore deposits which in the state which could be developed in the near future.<sup>1</sup> In particular, the Gogebic Iron Range stretches across Northern Wisconsin, and had been considered for development by Gogebic Taconite from 2013-2015 before they ultimately withdrew. The Bend Copper-Gold Deposit is located in Taylor County, within the Chequamegon

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<sup>1</sup> See the description of potential metallic mines by the Wisconsin Department of Natural Resources: <https://dnr.wi.gov/topic/Mines/Projects.html>

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National Forest. The deposit, which is mostly copper-bearing sulfides with significant gold and minor amounts of silver, totaling an estimated 4.2 million tons of ore, was explored by Aquila Resources in 2012. The Reef Deposit is a potential high-grade gold deposit in Marathon County, estimated to contain up to 454,000 tons of high-grade gold reserves. Aquila Resources conducted exploratory drilling there in 2012. Finally, the Lynne deposit in Oneida County was discovered in 1990 by Noranda Exploration, and is estimated to be approximately 5.6 million tons of primarily a zinc sulfide ore with significant lead and silver and minor amounts of gold and copper. Tamerlane Ventures had expressed interest in mining this deposit in 2009. In addition, the Back Forty zinc and gold deposit is located in Michigan, just across the Menominee River from Wisconsin, and Aquila Resources is in the permitting process to open a mine there.

A recent study by the National Mining Association can help assess the magnitude of the potential effects of the new mining operations.<sup>2</sup> In 2017, the NMA estimated that Wisconsin had roughly 4,900 mine workers, with an additional 3,400 employees in mining support and transportation. They estimated that these 8,300 total workers supported an additional 13,600 indirect and induced jobs. The mining sector directly contributed \$1.8 billion to output in the state, with an additional \$1.9 billion contribution from its indirect and induced activity. Thus totaling direct, indirect and induced economic activity, mining contributed to 1% of private employment and 1.2% of output in the state.

But while the total mining sector is an important part of the state economy, there is currently no employment in metal ore mining in Wisconsin. By contrast, the NMA estimated that Minnesota had roughly 5,100 metal ore mine workers, and an additional 8,900 in support and transportation, which in turn generates 24,000 indirect and induced jobs. Similarly the NMA estimated that metal ore mining in Michigan accounts for 16,700 total direct, indirect, and induced jobs. Thus metallic mining is an important contributor to output in these states, producing in total roughly \$2.6 billion in Michigan and \$5.4 billion in Minnesota.

### Scope of This Study

While the future size of the metallic ore mining industry in Wisconsin is yet to be seen, the experience of neighboring states suggest substantial growth opportunity. In this study we focus on one piece of this potential growth: the economic impact of a single new metallic mine.

In particular, we evaluate the potential economic impact if a new metallic mining operation were to be located in Oneida County. We analyze the impact on the state economy of a representative mine in this area, which in turn would be indicative of similar operations in other parts of the state. While our approach uses the same methods as typical economic impact studies, it is limited in some important respects. Typical economic impact studies focus on the economic impact of a

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<sup>2</sup> "The Economic Contributions of U.S. Mining" (2017 Update) available at [https://nma.org/wp-content/uploads/2016/09/Economic\\_Contributions\\_of\\_Mining\\_2017\\_Update.pdf](https://nma.org/wp-content/uploads/2016/09/Economic_Contributions_of_Mining_2017_Update.pdf)

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particular existing or planned new business, and thus have well defined employment, investment, and cost structures. By contrast, our study considers the impact of a potential future new mining operation, without a well-defined business plan. While we base our analysis on the scale of the Lynne deposit, we also consider existing and planned metallic mines in Michigan and Minnesota to gain a sense of the size and scale of a typical operation.

Furthermore, economic impact studies usually consider the addition of a new business to an existing industry, which allows for detailed consideration of how the business would fit into the existing local network of suppliers and purchasers. But, as we noted there is no metallic mining industry in Wisconsin. Thus we base our analysis on results from other states as well as the existing non-metallic mining sector in Wisconsin.

We analyze the impact of an operating new metallic mine as well as its construction with a new capital investment, with both components relying on what we estimate to be a typical size. But of course the true impact of any future operation may be larger or smaller than what we estimate, depending on its scale. In particular, we analyze the economic impact of a potential 350 employee metallic mine in Oneida County. We also evaluate the impact of the construction phase of the mine, which we assume lasts two years, with a total capital expenditure of \$250 million. Both of these figures are roughly the size of the proposed Back Forty mine in Michigan, which is estimated to employ around 300 workers with an initial capital expenditure of \$263 million.<sup>3</sup> The capital expenditure is also on par with other recent mining operations. The existing iron mines in Michigan and Minnesota have significantly larger employment rolls, typically around 500-700 workers.<sup>4</sup> Thus our candidate mine is on the small side of existing operations.

Due to the uncertainty in the size and scope of a potential future mine, it may be useful to focus on per-worker variables and the employment, income, and output “multipliers.” As discussed below, these measures give the proportional increase in the amount of total employment and activity which is generated by the direct activity of the mine. Thus these variables scale with the size of the overall operation and investment, and thus can be applied to evaluate the impact of any future mining operation.

### Economic Impact Analysis

To estimate the total economic contribution that a new mine would make to the state economy, it is necessary to look beyond the direct expenditures made by the business itself. The initial expenditures on the mine create a “multiplier effect” as they lead to expenditures made for goods and services related to the mine, which in turn create additional employment.

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<sup>3</sup> See the Aquila Resources feasibility study: <https://aquilaresources.com/projects/back-forty-project>

<sup>4</sup> See NorthStar Economics Report, “The Economic Impact of the Gogebic Taconite Mine,” available here: <http://legis.wisconsin.gov/eupdates/Sen17/GTAC%20Impact%20FINAL.pdf>, for some of these comparisons.

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In this study we use an IMPLAN input/output model to determine the overall economic impact that the creation of a new mine would have on the state economy. The University of Wisconsin–Whitewater Fiscal and Economic Research Center (FERC) was engaged to run the economic impact numbers. FERC uses the IMPLAN model and regularly updates the multipliers used in the model. Dr. Russ Kashian, director of FERC, was very helpful in running and analyzing the data in this study.

The IMPLAN model estimates to what extent different spending categories affect the regional economy in terms of the direct effect, indirect effect, and induced effect.

- **Direct effect** refers to production change associated with a change in demand for the good or service itself. It is the initial impact to the economy, which is external to the model. In the case of the mine, it is the spending in the project area that comes from the operation of the mine. In addition to the miners themselves, the mining operations would entail a number of direct support positions, including the transportation of mine output from the mine to the purchaser.

- **Indirect effect** refers to the economic impact or multiplier effect that comes from the direct spending on a project or operation. The indirect contributions include the effects of upstream suppliers to mining, including contractors and other companies providing inputs to mining companies, e.g. equipment manufacturers. In turn, the suppliers spend that money on payroll and material, causing additional economic activity which is termed the indirect effect. The economic success of the mine affects all of the mine’s suppliers.

- **Induced effect** is caused by changes in household spending due to the additional employment generated by direct and indirect effects. Employees throughout the supply chain would receive income associated with the direct and indirect activities, a portion of which is consumed. This consumption causes additional economic activity attributable to the mining operations. The induced effect measures the effects of the changes in household income, as the workers at the mine and the mine’s suppliers spend money at restaurants, grocery stores, and shops.

The multiplier effect refers to the recurrent economic activity generated by an initial expenditure. For example, money spent directly on construction will cycle through the local economy again as wages to workers, purchases of construction materials, gasoline for machinery, and worker transportation. The initial wave of spending generates a second and third wave of spending as wages paid and profits made on the direct construction spending move through the economy in several cycles. Thus, the original direct expenditure yields a greater economic impact than just the money initially spent. Some money “leaks out” of the regional economy at each level because of spending made outside the area (for example, some goods may be purchased from another state). As a result, the subsequent spending cycles decrease in impact.

## The Economy in Oneida County and Statewide

Before discussing the economic impact results, it's useful to give discuss some economic indicators for Oneida County and the state as a whole. This will help to put the impact results in context and to provide scale for interpretation. Unless stated, the data are 2017 annual averages.

**Table 1: Summary Economic Statistics for Oneida County and Wisconsin Statewide**

	<u>Oneida County</u>	<u>Wisconsin Statewide</u>
Employment	16,371	2,850,145
Average Annual Pay	\$39,341	\$ 47,238
Personal Income (2016, millions)	\$1,661	\$270,226
Output (GDP, millions)	---	\$324,061
Total Wages (millions)	\$ 644	\$134,636
Unemployment Rate (2017)	3.9%	3.3%

The table shows that employment in 2017 was just over 16,000 in the county and 2.85 million in the state. Thus while the direct employment effects of a 350 worker mine are negligible statewide, the new mining jobs would represent an increase of more than 2% in employment in Oneida County.

Further, the table shows that the average income in the county in 2017 was \$39,341, which is significantly lower than the \$47,238 statewide average. Although the county unemployment rate was relatively low at 3.9%, it was notably higher than the statewide average. Both of these measures suggest that Oneida County lags the state in incomes and employment, so that a new mining operation could help stimulate activity in the county.

Our later analysis will also discuss the implications of the new mine for labor income and output, so I report those to give a sense of the scale. Data on output (GDP) at the county level is unavailable, so I also report the closely related measure of total personal income.

## Economic Impact of an Operating Metallic Mine

We now turn to our results. Tables 2 and 3 summarize the annual economic impact of the potential new mine. In Table 2, we present the total economic impact of the new mine for employment, labor income, and output, broken into the direct, indirect, and induced effects discussed above. We also list the multipliers which scale the direct employment, income, and output to their total effect. In Table 3, we convert the total impact results to per-worker levels, which both provides a sense of the impact for individuals in the county and state, and allows one to easily scale the economic impact for mining operations of different size.

**Table 2: The Economic Impact of an Operating Metallic Mine in Oneida County**

<u>Impact Type</u>	<u>Employment</u>	<u>Labor Income</u>	<u>Output</u>
Direct Effect	350	\$25,398,664	\$183,508,766
Indirect Effect	167	\$10,866,194	\$34,666,015
Induced Effect	184	\$7,809,472	\$24,682,833
Total Effect	700	\$44,074,330	\$242,857,614
Multiplier	2.00	1.74	1.32

**Table 3: The Per Worker Economic Impact of an Operating Metallic Mine in Oneida County**

<u>Impact Type</u>	<u>Income per Worker</u>	<u>Output per Worker</u>
Direct Effect	\$72,568	\$524,311
Indirect Effect	\$65,262	\$208,204
Induced Effect	\$42,558	\$134,511
Total Effect	\$62,963	\$346,939

A major impact of any industrial project is the creation of jobs. As discussed above, we assumed that the mine at full operation would support 350 jobs, which includes miners themselves as well as support operations. As is clear from Table 3, metal ore mining jobs are good paying jobs, as the average annual pay for workers at the potential new mine is \$72,568. This is less than average metallic mine workers in Minnesota and Michigan make (which has been more than \$80,000 in recent years), but it is consistent with the pay differential between nonmetallic mine workers across the states. Moreover, this income is significantly greater than the \$63,000 average earnings of nonmetallic mining workers in Wisconsin.<sup>5</sup> But perhaps most importantly, these mining jobs are significantly higher-paying than typical jobs in Oneida County. The \$72,568 average pay is 85% more than the county's average income from Table 1.

<sup>5</sup> These average annual pay figures come from the Quarterly Census of Employment and Wages from the Bureau of Labor Statistics.

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Beyond the direct jobs involved in mining the ore, the new mine would create indirect jobs that come from upstream suppliers, as well as induced jobs that result from the spending from payrolls and operations, and transportation jobs needed to move the material to downstream purchasers. Table 2 shows that the metallic mining jobs have a multiplier of 2, as the 350 direct jobs leads to a creation of 700 total jobs in the state through indirect and induced activity. This multiplier is somewhat lower than what has been estimated for similar mines in Michigan or Minnesota, largely because these states have an existing metallic mining industry with well-developed supply chains and clients.<sup>6</sup> Because Wisconsin lacks this mining infrastructure, we estimate that more of the economic activity leaks to other states.

Nonetheless, the multiplier effect is still significant, doubling the effect of the initial job creation. Moreover, as Table 3 shows, the jobs which are created through the indirect and induced effects are also in general high-paying. The 167 estimated indirect jobs pay an average of \$65,262, which is well above the average annual pay both in Oneida County and in the state of Wisconsin. The further 184 induced jobs, which are largely in services, pay \$42,558, which is above average for the county but slightly below average for the state. Overall, the new mine would lead to 700 high-paying jobs averaging nearly \$63,000 per year, which would be a significant addition to the economy of the county and the state.

In addition to job creation, Table 2 provides our estimates of the total labor income and economic output which would be generated by the new mine. There we see that the mine would directly generate \$25 million in labor income and \$183.5 million in output for the local economy. Thus the contribution of the mine to the economy in Oneida County in income and output would be even larger than in employment. The 350 jobs represent a 2.1% increase in county employment, but a 3.9% increase in total wages and an over 11% increase in output (as measured by personal income) in the county.

Moreover through the indirect and induced effects, the new mine would lead to \$44 million total additional labor income statewide (a labor income multiplier of over 1.7) and roughly \$243 million in output each year. In addition, combining the total output per worker of roughly \$347,000 with the employment multiplier of 2, we see that we estimate that each mine worker will lead to an additional \$694,000 in total output. Because we consider a relatively small mine of 350 workers, these impacts are still small as a share of the state economy, but would provide a large contribution to the economy of Oneida County and the region.

Table 4 provides more detail on the distribution of the economic impact of the new mine across industries, listing the employment and economic impact (output) for each of the top ten industries which would benefit from the new mine. There we see that the mine would benefit the trades and services which would support the mining operation, such as building maintenance and wholesale trade. In addition, the mine would generate employment and output in services such as

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<sup>6</sup> In addition to the NAM study referenced above, see the 2012 report from the University of Minnesota – Duluth, “The Economic Impact of Ferrous and Non-Ferrous Mining on the State of Minnesota.”

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hospitals and restaurants, which would benefit from the increased employment and incomes that the mine would provide.

**Table 4: Economic Impact of an Operating Metallic Mine in Oneida County in Different Industries**

<b>Description</b>	<b>Employment</b>	<b>Economic Impact</b>
Metal Ore Mining	350	\$183,508,766
Maintenance of nonresidential structures	22	\$3,352,658
Wholesale trade	21	\$4,530,513
Architectural, engineering, and related services	19	\$2,990,984
Management of companies and enterprises	14	\$3,233,604
Real estate	12	\$2,638,399
Full-service restaurants	12	\$516,338
Hospitals	10	\$1,587,306
Limited-service restaurants	10	\$769,522
Employment services	8	\$529,253

Finally, we analyzed the tax impact of the new mining operation. The economic activity created by the mine will generate tax revenue for state and local government.<sup>7</sup> In addition, payroll to workers will generate income taxes, property taxes, and sales taxes. Upstream suppliers and the mine operation itself will pay income taxes, sales taxes, local property taxes, and a variety of other business taxes. We estimate that the total state and local tax contribution of the new mine would be \$6,820,526 per year.

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<sup>7</sup> The mining activity itself would be subject to the metalliferous mining tax on net proceeds, whose funds would be split between the Investment and Local Impact Fund and the state general fund. (See the Legislative Fiscal Bureau Informational Paper 11, "Miscellaneous Taxes" from 2017.) In the absence of specific production plans or an existing metallic mining operation in the state, we were unable to separately estimate the net proceeds tax revenue.

## Economic Impact of Mine Construction

In addition to the annual economic impact of operating the mine, there will be one-time economic benefits relating to the capital investment in constructing the mine. As discussed above, we assumed that the new mine would call for an initial capital expenditure of \$250 million would be invested over a period of two years. Tables 5 and 6 below give our results for the construction phase, parallel to Tables 2 and 3 above for the operating phase of the mine.

**Table 5: The Annual Economic Impact of Constructing a Metallic Mine in Oneida County**

<u>Impact Type</u>	<u>Employment</u>	<u>Labor Income</u>	<u>Output</u>
Direct Effect	750	\$38,608,077	\$125,000,000
Indirect Effect	228	\$11,428,159	\$33,365,223
Induced Effect	296	\$12,563,695	\$39,718,846
<b>Total Effect</b>	<b>1274</b>	<b>\$62,599,931</b>	<b>\$198,084,069</b>

**Table 6: The Per Worker Annual Economic Impact of Constructing a Metallic Mine in Oneida County**

<u>Impact Type</u>	<u>Income per Worker</u>	<u>Output per Worker</u>
Direct Effect	\$51,457	\$166,600
Indirect Effect	\$50,129	\$146,354
Induced Effect	\$42,463	\$134,243
<b>Total Effect</b>	<b>\$49,131</b>	<b>\$155,464</b>

Although the construction phase is shorter-lived, it would still have a substantial employment and economic impact on the region. We estimate that construction would require 750 direct workers per year at an average annual pay of \$51,457. This temporary employment impact in the region is larger than the total impact statewide of the complete mining operations, and would represent a 4.6% increase in employment in Oneida County. Further, while the construction phase jobs do not pay as well as jobs in the operating mine, they still represent more than a 30% premium over the current average pay in the county.

In terms of total impact, the construction of the mine would generate nearly \$200 million annual output and generate 1274 jobs. While the employment multiplier of 1.7 is not as large as for the operating mine, the construction phase would still generate 524 indirect and induced jobs. We also estimate that the construction phase would generate \$5,456,199 annually in state and local tax revenue. Overall, the construction of the mine would generate significant contribution to the economy of the region, which would only be enhanced with the continuing mine operations.

## Conclusion

Although mining has a long history in the state of Wisconsin, there have been no operating metallic mines in the state for decades. The recent lifting on the establishment of new mining operations represents an opportunity for significant economic development in several parts of the state. We focused on one such potential opportunity, the construction and operation of a representative new metallic mine if one were to be constructed in Oneida County.

An operating metallic mine would have significant impact on employment, incomes, and output in the county, region, and the state. In particular, we estimated that a 350 employee metallic mine would generate a total of 700 jobs, produce over \$44 million in labor income, and add nearly \$253 million in output. The new mining jobs would be significantly higher-paying than existing jobs in the county, and lead to an improvement in employment in incomes in an area that has lagged the rest of the state.

In addition to the operation of the mine, there would be economic benefits associated with the construction of the mine. These benefits would be short term benefits that occur while the mine is being built or expanded. We estimated that a \$250 million capital expenditure over a period of two years would lead to a total of 1274 jobs and over \$200 million in output created each year.