



STIBNITE ADVISORY
COUNCIL

The background is a photograph of a natural landscape. In the foreground, there is a grassy field with some low-lying shrubs and a small, shallow stream. In the middle ground, there is a dense forest of evergreen trees. In the background, there are rolling hills or mountains under a clear sky. A dark green diagonal line runs from the bottom left towards the middle right of the page, separating the landscape image from the white text area.

The Economics
Of The
Stibnite Gold Project
2024

Authors Page

Prepared By

Timothy P. Nadreau, Ph.D.
Sr. Economist
Recon Insight Group LLC
(208) 907-6147
recon.insight@gmail.com

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Executive Summary

Over the past decade several organizations have assessed various economic aspects of the reopening of the Stibnite mine. As the project continues, costs, time horizons, strategic goals, engineering reports etc. evolve, and those revisions result in changing economic factors. Interest and inflation rates have moved substantially in the past ten years, not to mention prices on minerals and metals. As such, the Stibnite Advisory Council (SAC) sought to update the previous research to bring expectations on economic consequences back into focus.

The project will cover 1) an impact analysis of the primarily impacted region i.e., Valley County, 2) an informal review of the previous independent economic research on the mine, 3) A regional industry profile including a labor market analysis, and 4) a detailed outline of the region's competitive advantages.

This economic study considered the broad geographic area known as the West Central Idaho Mountains, which includes Valley County and portions of Adams and Idaho Counties. Certainly, all of the communities in the broader region will be impacted by the mine, and some communities may feel a significant impact – economically and in other ways. However, given the location of the mine deep within Valley County and the relative size of Valley County, the region of analysis for this economic impact study is specific to Valley County.

Data and Methodology

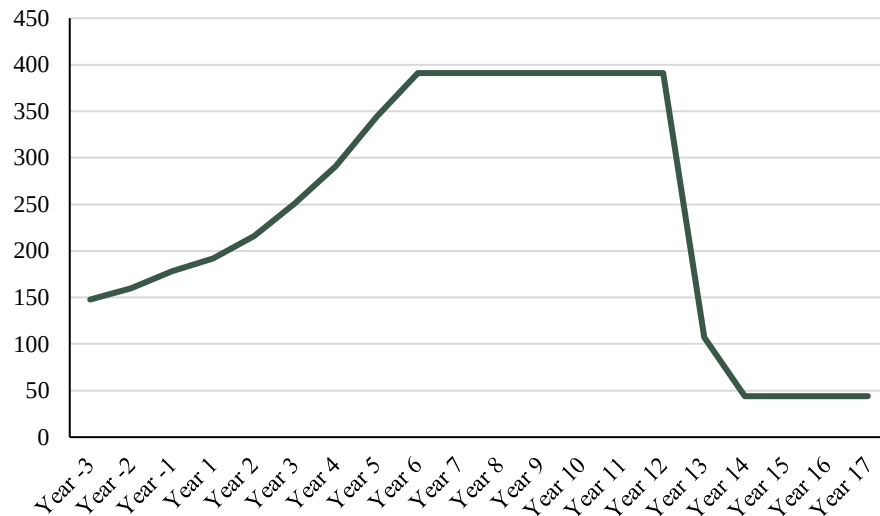
It is only by attracting new dollars into the economy that the Stibnite Mine will generate net economic impacts on employment, earnings, and increases to gross regional product. Unlike farming or logging, the mine is not primarily owned by residents, meaning the mineral exports from the mine do not result in accrued dollars to the county. However, the wages of employees who live and work within Valley County do represent new dollars to the local economies. Those financial injections are the basis for measuring the impacts of the mine. Any of the capital expenditures that occur within the county also represent new dollars to the economy, as those are dollars flowing into and through the economy that would not be there in the absence of the mine. Even though the primary economic impacts are felt outside of the county, the county itself still sees a significant boost in activity.

We assess three scenarios. The conservative scenario captures the economic impacts of the new income of residents who work at the mine. The baseline assumption includes the conservative numbers, but also captures a margin of capital expenditures. The optimistic scenario reflects the baseline assumptions, but increases the local capital spending. It assumes family members of mining immigrants to the county fill vacant non-mining employment in the various municipalities.

The data on mining employment over time comes from the previously completed feasibility studies. However, the portion and rate of local employment operating at the mine is assumed by the authors, as are the marginal non-labor expenditures within the county. Figure E1 shows the baseline employment figures over the life of the mine. Figure E2 shows the Conservative,

Baseline, and Optimistic Spending profiles used to shock¹ the economy-wide Input-Output model.

Figure E1: Valley County Baseline Direct Stibnite Mine Employment Estimates

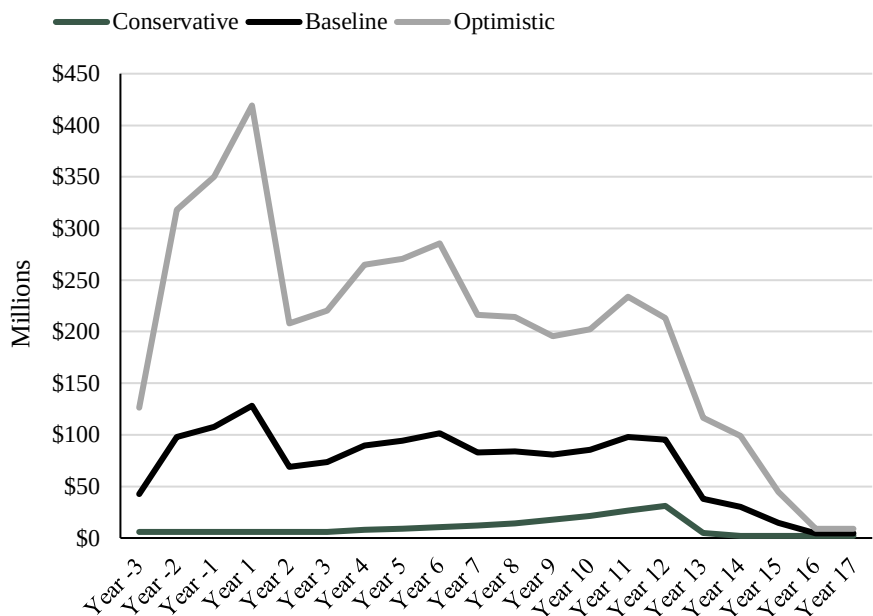


Source: M3 Stibnite Feasibility Study and author's calculations

Note that the baseline assumptions slow the equilibrium rate of employment in the early years, as the majority of mine employees will be commuting. Over time, some of those commuters will become immigrants to the county, largely coming from the Boise MSA or out-of-state.

¹ A “shock” in the context of impact analysis simply refers to the specific alteration to the status quo economic structure. We model shocks one at a time so that we can assess how each individual alteration affects the economy independently.

Figure E2: Valley County Direct Spending Profiles by Scenario

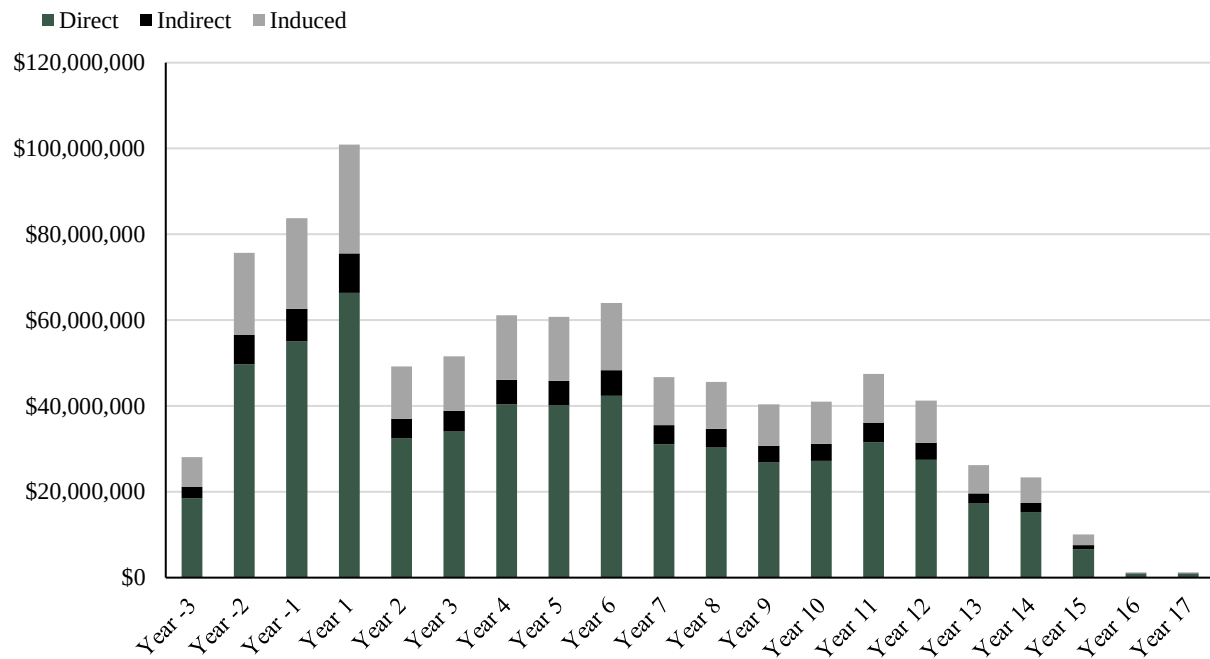


Source: M3 Stibnite Feasibility Study and author's calculations

Summary Results

The annual Valley County impacts fluctuate over the lifetime of the mine, depending on employment and capital expenditures in the local economy. During the first three establishment years, the average annual impact is estimated at approximately \$62.5 million in additional GDP for the county. This average drops considerably over the next 15 years of the mine's operations, representing \$47.3 million in additional GDP annually. During the final closure and monitoring phase, the contributions fall to approximately \$2.5 million in annual county GDP. Figure E3 shows the baseline trajectory of impacts broken out by the direct mining impacts, the indirect business-to-business impacts, and the induced household-to-business impacts.

Figure E3: Valley County GDP Impact Projections from the Stibnite Mine



Source: IMPLAN and author's calculations

Conclusions

Even under the most conservative set of assumptions, the opening, operating, and closure of the Stibnite Mine represent a boon to economic activity in the Valley County economy. However, the region faces significant challenges in terms of housing and infrastructure capacities. The positive impacts are muted the longer these constraints remain in place. Affordable and available housing, increased capacity of water and sewage treatment facilities, and local road and traffic infrastructure need to be expanded even without the opening of the mine. These issues are facing the local municipal governments now, having amassed long before Perpetua arrived on the scene.

Table E1: Valley County Economic Impacts by Source and Scenario from the Stibnite Mine

	Conservative	Baseline	Optimistic
<i>Sales</i>	\$42,429,186	\$82,630,078	\$188,412,652
<i>GDP</i>	\$23,109,733	\$44,982,970	\$102,386,273
<i>Income</i>	\$17,711,672	\$34,842,323	\$82,257,201
<i>Employment</i>	202	390	855

Source: IMPLAN and author's calculations

This research corroborates and refines many of the prior studies that have looked at the economic implications of remediating and reopening the Stibnite Mine. Two of the last three studies utilized general equilibrium Input-Output models that have been utilized nationally and internationally. The modeling system itself was originally developed by the U.S. Forest Service and has been tested rigorously over the last half century. The report by Power Economics did not develop an economic model and only speculated on potential risks and fallout from an unlikely catastrophic failure of the Tailing Storage Facility. While the risks associated with mining are real, the findings were neither economic in nature nor balanced in approach. The results of the current analysis are consistent with two prior studies, though they differ as a result of changing labor, wage, and economic structures in general.

The labor market in the region has aged drastically and, without an influx of young families, faces a serious issue with its dependency ratio. Many of the retirees will not have the local labor force to support the services and amenities needed. The Stibnite Mine poses a strategic advantage if it is able to attract prime aged working people to the economy. This cannot happen without infrastructure enhancements and affordable housing.

Nonetheless, the economy is growing and the structural diversity within it is improving. The strengths of the economy are in the healthcare and tourism industries. But those advantages will be short lived if a balanced industry portfolio cannot be generated in the next decade. An aging population and lack of available workers will cause dynamic shifts in the economy that may result in wealthy retirees leaving the area. Diversifying and expanding the industry mix will be key for increasing the long-term health of McCall, Donnelly, and Cascade.

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1. Introduction

Over the past decade, several organizations have assessed various economic aspects of the reopening of the Stibnite mine. As the project continues, costs, time horizons, strategic goals, engineering reports etc. evolve, and those revisions result in changing economic factors. Interest and inflation rates have moved substantially in the past ten years, not to mention prices on minerals and metals. As such the Stibnite Advisory Council (SAC) sought to update the previous research to bring expectations on economic consequences back into focus. In May of 2023, they engaged Recon Insight Group LLC to update the economic impact research that began in 2014.

Project Goals

The project will cover 1) an impact analysis of the primarily impacted region i.e., Valley County, 2) an informal review of the previous independent economic research on the mine, 3) A regional industry profile including a labor market analysis, and 4) a detailed outline of the regions' competitive advantages.

The labor market assessment will provide a discussion of the tradeoff between employment opportunities and growth given from a labor force reallocation. The economic assumption that labor allocates itself to its highest valued use is applied here, implying that a reallocation increases regional labor productivity and associated labor incomes. Movement from current employment to mining employment will occur only in so far as labor at the mine is more productive and generates a higher wage than current opportunities provide. The occupational assessment describes the compatibility of key occupations between current local employment and mining employment. This movement of labor to higher valued employment often results in increased disposable income to the region and increased spending. However, jobs left vacant could destabilize existing firms that are unable to compensate employment at new market rates.

An industry shift share analysis describes the region's driving industries and how expansion of industrial operations serves to diversify and/or strengthen the existing economic base. We will explore Idaho's mining and recreation industries and how they represent complimentary, rather than substitutionary, relationships in the event of national and international market disruptions. Particularly, we will discuss the reduction in tourism during times of regional and national recessions and how natural resource industries protect the economy in the midst of such contractions. Alternatively, in periods of natural resource disruptions, tourism serves to bring outside dollars into the economy as visitors spend money in the local economy.

Past reports

Peterson and Associates (2014)

Mr. Peterson's report was undertaken early in the scoping of the reopening of the Stibnite mine, then called Midas Gold. Because so much of the scoping was speculative in 2014, significant assumptions regarding expenditures and employment had to be made. His analysis was based on the IMPLAN model, as all subsequent research has been. It is also worth noting that the

IMPLAN model underwent significant revisions regarding the mining sector, primarily to account for the regional capital flows.

At the time IMPLAN was claiming far greater regional absorption in the mining sector, which served to make the multipliers generating the indirect effects, and ultimately the induced effects, far greater than they would be in subsequent modeling efforts. Not only modeling revisions, but employment and earnings estimates have been updated and refined. Finally, the large inflation pressure and tight labor markets have drastically altered the base case scenarios. In 2014 the expected average wages to be paid were \$70,000 annually, a far cry from the current estimate of \$96,000.² However, the numbers in Mr. Peterson's report were not internally consistent, though that may have been due to the information he was given. He reported,

“Midas Gold would anticipate employing 551 workers with a total salary/compensation package of around \$48.3 million annually... The total annual compensation per employee is anticipated to be around \$70,000 with overtime, which would make it the highest paid major (broad) occupational category in the regional economy and the State of Idaho. This is consistent with Idaho mining wages of approximately \$1,396/week (about \$72,500 annually not including fringe).”

-Steven Peterson, An Economic Impact Analysis of the Proposed Midas Gold, Inc. Golden Meadows Gold Mine Technical Report Update

An average compensation of \$70,000 multiplied by 551 employees should give \$38.6 million rather than the \$48.3 million reported. Even at the average regional earnings of \$72,500, this would only yield roughly \$40 million. We allow for some latitude on such issues due to the speculative nature of preliminary and scoping research. Despite the issues surrounding early estimates, Mr. Peterson did provide a thorough overview of the Valley County regional economy, as well as a significant overview of the state and national economic conditions affecting regional markets.

It appears he shocked the IMPLAN Pro software via an employment shock after having adjusted some of the regional data to reflect actual market conditions. One of the issues with using off the shelf models such as IMPLAN is that the data is regionalized based on national production trends for the industry, and regularly needs to be modified with local reconnaissance data that is not readily available in the systematically collected government databases (see the box on surveillance, reconnaissance, and actionable intelligence).

Mr. Peterson provided an average annual impact figure, rather than an annual impact based on the forecast of annual expenditures. He found that in the average operating year, employment was expected to be 300 jobs, and a total of 774 jobs would result in the county, including the direct, indirect, and induced effects. This contributed \$55 million in additional payroll and \$205 million in Gross Regional Product (GRP). Average annual county transactions amounted to

² All estimated annualized expenditures are assumed to be in nominal terms unless explicitly stated. Chapter 22 of the feasibility study converts future values to the present for the purpose of economic investment analysis, but that is not the case here.

\$301.6 million. Economists should not report the sales figures as impacts, as there is a significant double counting issue in sales values.

Highland Economics, LLC (2018)

In 2018 the impact numbers were updated when Midas Gold hired Highland Economics, LLC to review the project. This report was a comprehensive review with detailed methodologies outlined in the appendices. The one restriction in the analysis was that only jobs and incomes were reported. No measurement of gross regional or gross state product were reported. Sales figures were likewise not reported, though, as stated earlier, that is reasonable.

One of the most helpful aspects of their analysis was in appendix A and B where they detailed the portion of spending between regional and state levels, and then which IMPLAN sector those dollars were mapped into for building the shock.

Surveillance, Reconnaissance, and Actionable Intelligence

Intelligence gathering is broadly broken into two categories: surveillance and reconnaissance.

Surveillance reflects persistent monitoring of a variable e.g., government data. We do this with GDP, Inflation, oil prices, LMI, etc. Even tourism income falls under the purview of surveillance. This is where the “data driven” folks live. This is critical work and with improvements in technology, more and more variables fall into this surveillance category every year. Often this data misses economic theory, or more frequently, on the ground knowledge. Call it industry knowhow, or something that is just in the wind, regional idiosyncrasies are not being captured. How close a researcher is to a revolutionary breakthrough in bioinformatics, how close auto pilot is to being operational in vehicles — these are things outside the purview of surveillance. They require reconnaissance. This typically means needing to embed researchers, analysts, etc. within the industry trying to address a problem.

Reconnaissance is on the ground information gathering. When we embed with economic development teams or industry groups, we spend a considerable amount of time learning and understanding the unique attributes of the problem and industry of analysis. This is the most difficult and least profitable part of the job. It requires learning new terminology, and understanding historic and stochastic processes within the industry’s culture.

These two types of information are synthesized, along with experience, to arrive at intelligence. Even if you have the intelligence that matters, you may not be the ultimate decision maker—the “boots on the ground” as it were. At this stage you have intelligence, but it is not yet actionable because it is in the wrong hands. Operations and intelligence only benefit one another in so far as they communicate with one another. Actionable Intelligence happens when a comprehensive understanding of a problem can be coupled with a policy that addresses that problem with minimal fallout.

One of the aspects of the Highland report demonstrating their competence was the use of retail and wholesale margins. Those unfamiliar with Input-Output analysis will shock a retail sector by spending, which is incorrect. We can only shock retail, wholesale, and transportation sectors with the margin of the spending retained by the firms. They also mapped the spending according to the indirect and induced effects by isolating the impacts derived from Perpetua's non-labor purchases and from the employee spending of wages and salaries.

There are only two assumptions that we disagree with in the Highland analysis: 1) current residents that are employed by the mine are likely giving-up their current employment. An individual that is working construction currently may be giving up \$70,000 per year in earnings in order to make \$90,000 per year working for Perpetua. In that case we cannot claim the \$90,000 in earnings because the earnings paid by Perpetua were lost from the construction company. Only the \$20,000 in net increased earnings can be claimed as new productivity in the region. Net, rather than gross, earnings change is a more conservative assumption and is in keeping with current economic impact practices. 2) Because of the housing constraint specifically, and the infrastructure constraints more broadly, we cannot assume in-migration for mining employees. Most out of region workers will have to commute until those housing constraints are relaxed. As more affordable housing becomes available, in-commuters will convert to in-migrants. Highland Economics assumed in-migrants would move to Valley County upon opening of the mining operation phase. We revise this assumption to allow for a "phasing in" of in-migrants over time. This causes the impacts to be lower in the early years of the mine and increase slowly up to the fully phased-in level reported by Highland Economics.

While this was not an assumption of Highland Economics, we would question the veracity of running a national input-output model as they did. These models are inherently regional and begin to lose validity at larger and larger geographies. This is because the multiplier effects tend to grow exponentially as money stays in, and circulates more indefinitely at a larger scale. However, we did not find the national impact discussion to be a primary focus of their analysis.

As reported in the executive summary of the report, Highland Economics estimated baseline annual operating employment impacts of 470 jobs and \$29.3 million in regional household income impacts. While these baseline figures are lower than those reported by Mr. Peterson in 2014, Highland provided low, baseline, and high-end estimates. The high-end impacts estimated for the operations phase of the mine were 600 jobs with \$35.6 million in household income for the average year. These numbers are still lower than Mr. Peterson's, but closer to his reported numbers. The capital issues in IMPLAN had been corrected by the time Highland Economics had conducted their analysis.

Power Consulting Inc. (2022)

In 2022 Power Consulting Inc. based out of Montana released their "Evaluation of the Potential Socio-Economic Impacts of The Proposed Stibnite Mine on Valley County, Idaho." This study was commissioned by the Idaho Headwaters Economic Study Group and provided a detailed overview of the economy, but particularly emphasized non-labor income, which in Valley County is nearly all categorized by regional economists as "resident outside income accounts." These are dollars brought into the county via 1) transfer payments such as social security and

welfare, 2) investment income from non-locally held assets such as dividends, interests, or rents, or 3) the sale of non-locally held assets resulting in capital gains.

Power Consulting Inc. reported that non-labor income in the county was 36% higher than labor income. This shows that the region is highly leveraged to capital asset owners and quality of life retirees, both of which tend to be footloose in regard to their residency. The report discusses the 30-year decline of Valley County's good-producing sectors of timber and mining. They suggest that service-related industries quadrupled over that same time. But they neglect the fact that service-related jobs were scant in Valley County 30 years ago, and the quadrupling of service jobs was not sufficient to replace the job losses from the natural resource industries. The report also neglects that the losses in natural resource production also resulted in a reduction in industrial diversity. The risk resulting from a lack of industrial diversity will be discussed at length later in this report.

Like the Highland study, Power Consulting recognized that most of Perpetua's spending will take place outside of Valley County, as very little of the capital spending can take place locally. No bulldozers or trucks, etc. will be produced in county and thus, the majority of those expenditures will take place outside of Valley County and most likely outside of Idaho.³ Outside of this discussion there is little actual economic analysis. The majority of the report focuses on potential risks associated with increased use of EMS services, and the consequences of a catastrophic failure of the tailing storage facility. None of this reads like a standard economic assessment and seems to be filled with anecdotes and doomsday economic scenarios.

Perhaps the greatest faux pas was when the authors compared the value of the resources being obtained by the mine relative to the economic contributions provided locally. While the data reported may not have been in error, the comparison was.

“If we take this one step further and look at the assumed value of all of the minerals that are going to be recovered, which totals into the billions, and all of the local spending (direct, indirect, and induced) on the three phases of the mine, then the local area stands to receive about 8 percent of the value of the minerals that are extracted from the mine.”

-Power Consulting “An Evaluation of the Potential Socio-Economic Impacts of The Proposed Stibnite Mine on Valley County, Idaho.” Pg. 17

The residents of Valley County do not own the mineral rights to the land Perpetua is mining. To suggest that county residents are not reaping rightful returns on assets they do not own seems strange. Indeed, careful investment analysis always attributes benefits and costs to *investors*. If the residents would like to partake in the “billions” they can invest in Perpetua.⁴ We would go one step further as well and suggest members of the community look at the investment Perpetua

³ Perpetua has already spent a significant amount of money locally on signage, vehicle purchases, labor income, etc. and has, by all accounts, tried to spend their money in county when they are able to.

⁴ NASDAQ: PPTA

has made with no guarantee of return. Figure 1.1 shows the historical NASDAQ reported share value for investors. It is clear that the investors are taking on a significant financial risk and those dollars are being spent in the Idaho-wide and Valley County economies at present.

Figure 1.1: Historic PPTA Share Value (Oct 2011-Feb 2024)



Source: Google Finance

Comparisons 2014 to the Present

Two of the last three studies utilized general equilibrium Input-Output models that have been utilized nationally and internationally. The modeling system itself was originally developed by the U.S. Forest Service and has been tested rigorously over the last half century. The report by Power Economics did not develop an economic model and only speculated on potential risks and fallout from an unlikely catastrophic failure of the Tailing Storage Facility or a potential transportation accident. While the risks associated with mining are real, the findings were neither economic in nature nor balanced in approach. The results of the current analysis are in line with two prior studies, though they differ because of changing labor, wage, and economic structures in general. Table 1.1 shows a comparison of the results of the prior studies. Because Mr. Peterson and the Highland Economic reports assumed average annual impacts per period, we assumed the sixth year of operation in our model was commensurate with their set of assumptions. Another approach would be to take the average annual impacts from the operating years of the mine.

Table 1.1: Comparison of Previous Studies Forecasting the Economics of the Stibnite Mine

	2014 Baseline	2018 Baseline	2022	2023 Baseline
Sales	\$301,580,085	x	x	\$117,515,630
GDP	\$205,155,691	x	x	\$64,020,228
Income	\$55,029,086	\$29,300,000	x	\$48,849,779
Jobs	774	470	x	562

Regional Profile

This economic study considered the broad geographic area known as the West Central Idaho Mountains, which includes Valley County and portions of Adams and Idaho Counties. Certainly, all of the communities in the broader region will be impacted by the mine, and some communities may feel a significant impact – economically and in other ways. However, given the location of the mine deep within Valley County and the relative size of Valley County, the region of analysis for this economic impact study is specific to Valley County.

While the previous reports have focused on the two-county region that includes Valley and Adams, we find no economic rationale for including Adams County in this analysis. While there is some labor market spillover between Valley County and the tourism industry in Adams County (Brundage and other outdoor recreation opportunities), they are not parts of the same functional economic area or central place structure. The Census Bureau does not combine them in a core based statistical area, and the central place hierarchy would have them both subsumed under the Boise City-Mountain Home-Ontario MSA.⁵ In non-technical terms, Adams is more rural than Valley County. Combining the two region increases the multipliers mathematically, but that is inconsistent with actual dollar trade flows.⁶ As such, our focus is solely on Valley County and the state of Idaho. The next most appropriate region for analysis would be the Boise MSA, which would drastically increase the reported local spending as well as the multiplier effect. Our analysis thus presents a more conservative picture.

Because Idaho in general, and Valley County in particular, have undergone drastic changes in population and employment over the past decade, we lay out the changing economic dynamics from both the labor market and housing standpoints. This provides a backdrop for understanding the regional/county economy. Note that the tourism industry that has done well as of late is susceptible to recessions, while mining tends to be resilient to or even improve during recessions. For this reason, we find diversifying the county's industry portfolio will increase its overall resilience, provided infrastructure and carrying capacity can be improved.

Industry Data

We begin our industry profile with a discussion of basic, high level industry data. Industries are categorized by the Census Bureau under the North American Industry Classification System (NAICS) codes. The highest levels are known as two-digit industries, and you can dig into those industries down to the six-digit level. For example, NAICS 11 is "Agriculture, Forestry, Fishing and Hunting." NAICS 115112 is "Soil Preparation, Planting, and Cultivating." These NAICS Codes are how businesses are classified, and when they report their employment and wage payments to the IRS, to the U.S. General Services Administration, the Idaho Department of Labor, etc. those reports are attached to their unique business identification number (UBI) and

⁵ See U.S. Department of Commerce Economic and Statistics Administration U.S. Census Bureau.

⁶ According to census data Valley County is more closely linked economically with Ada and Canyon counties than with Adams. Twenty percent of the non-local Valley County labor base comes from Ada and Canyon as opposed to five percent from Adams.

their associated NAICS code. Table 1.2 Shows the two-digit profile of Valley County over the past 20 years. A drawback to this type of employment data is that it misses much of the non-labor income that drives the economic activity in Valley County. It focuses on the local employment that serves the residents, but many of those residents derive income from outside of the economy through retirement or investment incomes.

Table 1.2: Valley County 2-digit NAICS Profile (2004-2024)

NAICS	Description	2004 Jobs	2024 Jobs	Job Change
11	Agriculture, Forestry, Fishing and Hunting	107	60	(47)
21	Mining, Quarrying, and Oil and Gas Extraction	10	33	22
22	Utilities	<10	23	Insf. Data
23	Construction	624	738	113
31	Manufacturing	82	77	(5)
42	Wholesale Trade	15	104	89
44	Retail Trade	592	738	146
48	Transportation and Warehousing	65	82	17
51	Information	58	42	(16)
52	Finance and Insurance	101	118	17
53	Real Estate and Rental and Leasing	148	285	137
54	Professional, Scientific, and Technical Services	152	225	73
55	Management of Companies and Enterprises	15	<10	Insf. Data
56	Administrative and Support and Waste Management and Remediation Services	174	205	31
61	Educational Services	19	41	22
62	Health Care and Social Assistance	190	486	296
71	Arts, Entertainment, and Recreation	242	593	351
72	Accommodation and Food Services	667	1,090	423
81	Other Services (except Public Administration)	187	237	50
90	Government	1,073	1,058	(15)
00	Total Employment	4,525	6,234	1,709

Source: Lightcast

A problem with Employment data of this type is that it focuses on overall growth or decline rather than the quality of that change. Transportation and Warehousing grew by 17 jobs and so we congratulate ourselves on the growth. But given the industry and national trends, we would have expected it to grow by 41 jobs. It drastically underperformed by that metric. Shift Share Analysis allows us to assess whether an industry's performance lagged, met, or exceeded expectations. Table 1.3 shows the Shift Share Analysis at the two-digit NAICS level. Those industries that exceeded expectations are said to represent a competitive advantage for the

region. The current advantages are NAICS 44, 53, 62, 71, and 72 i.e., healthcare and the tourism-based industries. The natural resource-based industries tend to outperform these industries in times of economic downturns.

Table 1.3: Valley County 2-digit NAICS Shift Share Analysis

NAICS	Description	Ind. Mix Effect	Nat'l Growth Effect	Expected Change	2004 - 2024 Change	Competitive Effect
11	Agriculture, Forestry, Fishing and Hunting	(19)	19	(0)	(47)	(47)
21	Mining, Quarrying, and Oil and Gas Extraction	(1)	2	1	22	21
22	Utilities	(1)	1	0	19	19
23	Construction	(56)	108	53	113	61
31	Manufacturing	(22)	14	(8)	(5)	3
42	Wholesale Trade	(2)	3	1	89	88
44	Retail Trade	(91)	103	12	146	135
48	Transportation and Warehousing	29	11	41	17	(24)
51	Information	(9)	10	1	(16)	(17)
52	Finance and Insurance	(5)	18	13	17	4
53	Real Estate and Rental and Leasing	(3)	26	23	137	114
54	Professional, Scientific, and Technical Services	62	26	88	73	(16)
55	Management of Companies and Enterprises	5	3	8	(14)	(22)
56	Administrative and Support and Waste Management and Remediation Services	7	30	37	31	(6)
61	Educational Services	3	3	7	22	15
62	Health Care and Social Assistance	58	33	91	296	205
71	Arts, Entertainment, and Recreation	41	42	82	351	268
72	Accommodation and Food Services	92	116	208	423	215
81	Other Services (except Public Administration)	(26)	33	7	50	43
90	Government	(144)	186	42	(15)	(57)
00	Total	(80)	786	706	1,709	1,003

Source: Lightcast

Industrial Diversity

Diversity and industry stability play an important role in articulating an economy's ability to withstand shocks. An economy that is fragile sees volatility while lacking resiliency (ability to rebound from a disruption). An economy that is durable tends to be able to withstand shocks tolerably well, feeling the shock but recovering quickly. The desirable condition for an economy is to be antifragile, where the economy is strengthened by the shocks. Such economies are said to exhibit "work-hardening" attributes that improve the longevity and growth experienced.

The diversity of Valley County's industry portfolio has improved over the 2004-2024 period. Unfortunately, we do not have the data to compare it against periods when mining and mill

operations were present. We measure economic diversity using the Shannon-Weaver index.⁷ To have a balanced industry portfolio requires that high-growth, but volatile industries are coupled with stable industries, even though stable industries typically have low growth potential. New computer technology such as AI may have high growth upsides but carry significant risk, as it is an infant industry. Furniture manufacturing or commodity agriculture, on the other hand, provides more stability but in general have low growth opportunities.⁸ An industry portfolio should consider both risks and returns.

The high growth tourism industries have large amounts of both risk and return but tend to follow business cycles. Mining has a great deal of both risk and return as well, but is counter cyclical with business cycles. These two industries complement one another, because as one industry thrives the other may be struggling. The situation often reverses as the business cycle shifts, thus canceling out one another's volatility.

Currently Valley County has a diversity index of 2.37, not as low as the 1.5 minimum recorded for some rural counties in Idaho, but not as high as the national diversity near 3. With the mine operating at normal levels the diversity is estimated to be 2.7 under the baseline assumptions. These marginal improvements and counter cyclical balancing effects provide opportunities and stability to the Valley County Industry portfolio.

Occupation and Demographic Information

Occupations are reported based on the Standard Occupation Classification (SOC) codes. We assess the occupations in much the same way as the industries, trying to identify where the strengths and weaknesses in the local labor market are. This helps us in understanding the knowledge, skills, and abilities embedded in and available to local employers.

Tables 1.4 and 1.5 show the occupational profile of the county. This illustrates the earnings mix in the county, as well as tying together the skills base of the region. It is true that many of the skills demanded by the mine can be met by those skills currently embedded in the workforce. However, the age profile, as we will see shortly, does not match the needs of the mine, as the workforce is aging and most of the skills demanded are about to retire from the workforce.

Nearly all occupations have seen some level of growth in Valley County, and total employment has grown by 38% over the last two decades. Five occupations that were lagging expectations (17, 19, 25, 31, and 45) all had above average and median earnings, with the exception of 31 – Healthcare Support Occupations. This may have to do with the wage controls set by Medicaid. Because these are, by and large, high wage jobs and the region is underperforming in provision of those jobs, we can argue that there is a skills shortage in the local labor market. This argument is further supported by the fact that low wage tourism-based occupations were the most regionally competitive occupations. Food preparation, grounds maintenance, and office support

⁷ This measure of diversity is calculated as $H = -\sum_{i=1}^n p_i \ln(p_i)$ where p_i is the employment within each industry.

⁸ Agriculture may be a volatile industry, dependent on climate, disease, and pest damage, but agriculture also has built in insurance programs backed by federal stabilization programs.

occupations saw some of the most competitive growth. This contributes to the hollowing out of the middle-class jobs that will support the county over the long run.

Table 1.4: Valley County 2-digit SOC Profile

SOC	Description	2004 Jobs	2024 Jobs	2004-2024 Change	Median Annual Earnings
11	Management Occupations	267	487	220	\$65,197
13	Business and Financial Operations Occupations	108	228	120	\$65,926
15	Computer and Mathematical Occupations	28	62	34	\$77,322
17	Architecture and Engineering Occupations	62	59	(3)	\$72,458
19	Life, Physical, and Social Science Occupations	139	159	20	\$49,441
21	Community and Social Service Occupations	42	64	23	\$50,232
23	Legal Occupations	30	39	9	\$63,159
25	Educational Instruction and Library Occupations	238	252	15	\$47,467
27	Arts, Design, Entertainment, Sports, and Media Occupations	60	110	49	\$44,634
29	Healthcare Practitioners and Technical Occupations	137	256	119	\$80,000
31	Healthcare Support Occupations	99	134	34	\$36,142
33	Protective Service Occupations	109	129	21	\$48,173
35	Food Preparation and Serving Related Occupations	609	859	250	\$27,929
37	Building and Grounds Cleaning and Maintenance Occupations	281	482	201	\$35,343
39	Personal Care and Service Occupations	128	267	140	\$31,279
41	Sales and Related Occupations	460	579	119	\$33,650
43	Office and Administrative Support Occupations	496	661	165	\$38,651
45	Farming, Fishing, and Forestry Occupations	71	52	(19)	\$42,954
47	Construction and Extraction Occupations	588	589	2	\$46,877
49	Installation, Maintenance, and Repair Occupations	205	278	74	\$49,272
51	Production Occupations	139	157	19	\$39,622
53	Transportation and Material Moving Occupations	217	313	95	\$39,878
55	Military-only occupations	15	18	3	\$37,077
00	Total	4,525	6,234	1,709	\$44,132

Source: Lightcast

Table 1.5: Valley County 2-digit SOC Shift Share Analysis

SOC	Description	Occ. Mix Effect	Nat'l Growth Effect	Expected Change	2004-2024 Change	Competitive Effect
11	Management Occupations	116	46	163	220	57
13	Business and Financial Operations Occupations	61	19	80	120	40
15	Computer and Mathematical Occupations	15	5	20	34	14
17	Architecture and Engineering Occupations	(4)	11	6	(3)	(10)
19	Life, Physical, and Social Science Occupations	26	24	50	20	(30)
21	Community and Social Service Occupations	7	7	15	23	8
23	Legal Occupations	2	5	7	9	2
25	Educational Instruction and Library Occupations	(15)	41	26	15	(11)
27	Arts, Design, Entertainment, Sports, and Media Occupations	7	10	18	49	32
29	Healthcare Practitioners and Technical Occupations	38	24	62	119	57
31	Healthcare Support Occupations	60	17	77	34	(42)
33	Protective Service Occupations	(2)	19	17	21	4
35	Food Preparation and Serving Related Occupations	44	106	149	250	101
37	Building and Grounds Cleaning and Maintenance Occupations	(41)	49	8	201	193
39	Personal Care and Service Occupations	(5)	22	17	140	123
41	Sales and Related Occupations	(90)	80	(11)	119	130
43	Office and Administrative Support Occupations	(130)	86	(44)	165	209
45	Farming, Fishing, and Forestry Occupations	(10)	12	2	(19)	(21)
47	Construction and Extraction Occupations	(125)	102	(23)	2	24
49	Installation, Maintenance, and Repair Occupations	(11)	36	25	74	49
51	Production Occupations	(41)	24	(17)	19	36
53	Transportation and Material Moving Occupations	19	38	57	95	38
55	Military-only occupations	(2)	3	0	3	2
00	Total	(82)	786	703	1,709	1,006

Source: Lightcast

Moving forward, the region faces demographic upheavals that younger, in-migrating families could alleviate. One issue in the county is that the younger, productive, working-age population has dwindled in proportion to the overall population. Often economists and demographers will discuss the dependency ratio, where the non-working young population and retired populations (0-14 years old and 65+) are divided by the prime-working age population (15-64 years old). When this ratio is 50:50 or less, the workforce is well positioned to provide for the dependents, not only financially, but in terms of the production capacity of the dependents' needs. This refers to everything from food services, and construction, to daycare and medical services. If the population is not there to meet these needs, income will need to be spent outside of the economy to acquire the needed services. Table 1.6 shows the population by age cohort from 2004 and 2024.

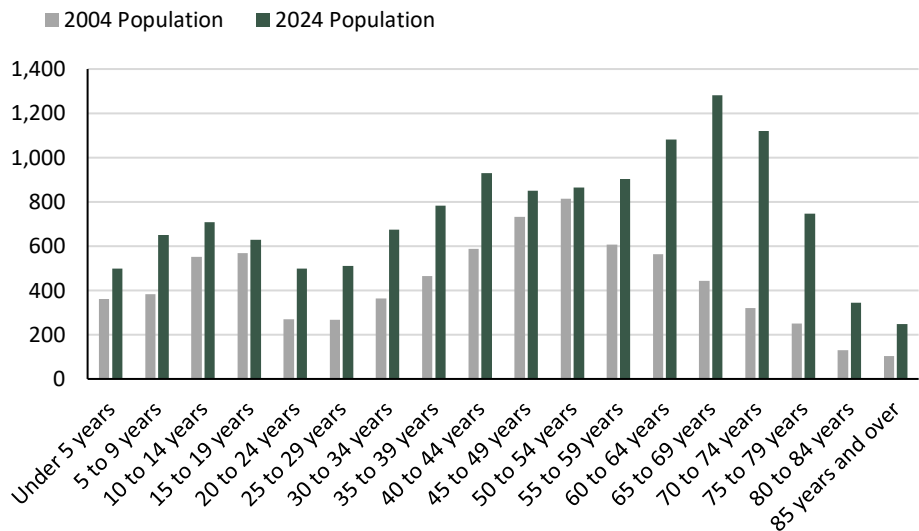
Table 1.6: Valley County Age Profile

Age Cohort	2004 Population	2024 Population
Under 5 years	360	498
5 to 9 years	383	651
10 to 14 years	552	709
15 to 19 years	568	628
20 to 24 years	270	500
25 to 29 years	268	509
30 to 34 years	364	675
35 to 39 years	464	783
40 to 44 years	588	929
45 to 49 years	732	850
50 to 54 years	814	865
55 to 59 years	608	904
60 to 64 years	564	1,082
65 to 69 years	442	1,282
70 to 74 years	320	1,119
75 to 79 years	250	748
80 to 84 years	130	343
85 years and over	103	249
Total	7,780	13,324
Dependency Ratio	48.5%	72.5%

Source: Lightcast

This reiterates what was said in the power Economics Report—Valley County has moved into an outside income supported economy—but it also shows that the population and associated income is unstable because the dependency ratio has become unbalanced. While the dependency ratio in 2004 was within range of the healthy 50:50 ratio, by 2024 the ratio skyrocketed to 72.5:27.5, meaning dependents—particularly elderly dependents—vastly outnumber those employees tasked with providing the productive output being demanded. Figure X shows the change in the county age distribution. This shift will return to a stable equilibrium at some point, as it cannot be sustained at this level in the long-term.

Figure 1.2: Valley County Age Profile



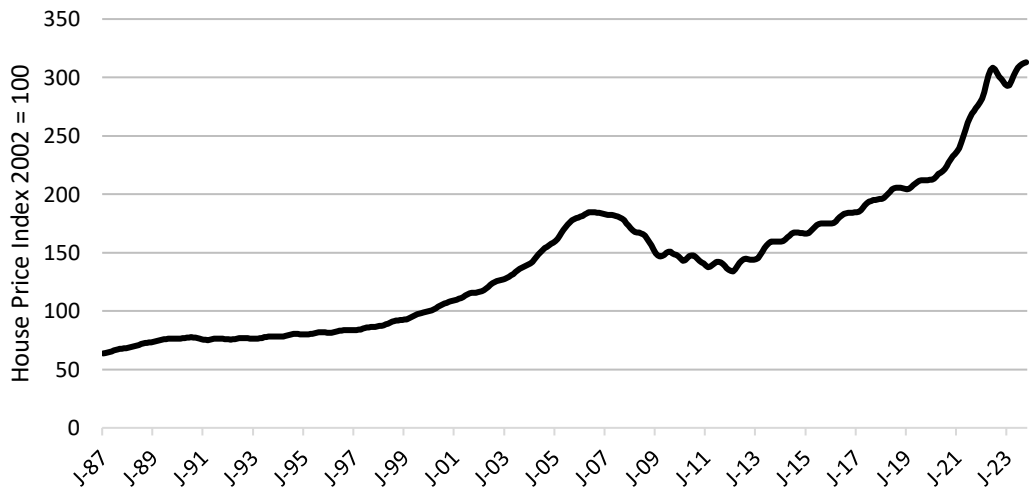
Source: Lightcast

Housing and Infrastructure Constraints

U.S. Housing Crisis

Housing availability and affordability have been in crisis in the U.S. since 2018, and the situation was exacerbated during the pandemic. Housing prices have increased 52% from January 2018 to October 2023 as measured by the Case-Shiller Housing Index (Figure 1.3). The recent sharp increase in interest rates has not substantially reduced the overall housing price levels, although it may have slowed the increase. Housing prices peaked in most communities in the U.S. in the second quarter of 2022, declined through the first quarter of 2023, and then largely recovered, increasing but at a slower rate.

Figure 1.3: Case-Shiller Housing Index January 1987 to October 2023



Source: S&P Dow Jones Indices LLC, S&P CoreLogic Case-Shiller U.S. National Home Price Index [CSUSHPINSA], retrieved from FRED, January 9, 2024.

Population Growth of Idaho and Valley County

Idaho's population has been fast-growing since a benchmark year of 1990, presenting many infrastructure and housing challenges for both urban and rural regions.⁹ From 2010 to 2020, Idaho was the second fastest growing state in the U.S. with a cumulative population growth rate of 17.3%. From 2020 to 2021, Idaho was the fastest growing state in the U.S. with a 2.9% growth rate. Idaho ranked second from 2021 to 2022 (1.82%), and ranked fourth from 2022-2023 (1.3%), reaching 1.965 million people in 2023.

Valley County, like Idaho, has experienced rapid population growth since 1990. From 1990 to 2000, the county grew cumulatively 29%, ranking seventh in the state. It grew 19% from 2010 to 2020, tied for the fifth fastest growing county in Idaho. The county also grew 6.1% from 2020 to 2022, ranking 17th in the state. The population growth rate may be slowing, and the housing challenges may be contributing to this.

Idaho's Housing Crisis

Idaho is in an unprecedented housing crisis, and Valley County (McCall), Ada County (Boise), and Kootenai County (Coeur d'Alene) are epicenters. The seeds of the housing crisis in Valley County (specifically) have developed *independently* of the Stibnite Mine project and represent long term serious structural infrastructure issues within the county that have not yet been fully addressed by policy makers.

Utilizing the Zillow housing database and ranking the housing prices by state, from August 2018 to a peak in August 2022, Idaho ranked first in the nation in housing prices increases at 92%, followed by Montana (78%), Arizona (77%), and Georgia (72%).⁸ As of 2023, Idaho ranks 12th in the nation in terms of the highest, "typical," single-family housing prices, (\$443,638). Idaho ranked 30th in average household income in 2022.⁹ Idaho is no longer known as an inexpensive place to live. The housing crisis is not just isolated to the urban regions of the state but has reached even the most rural regions.

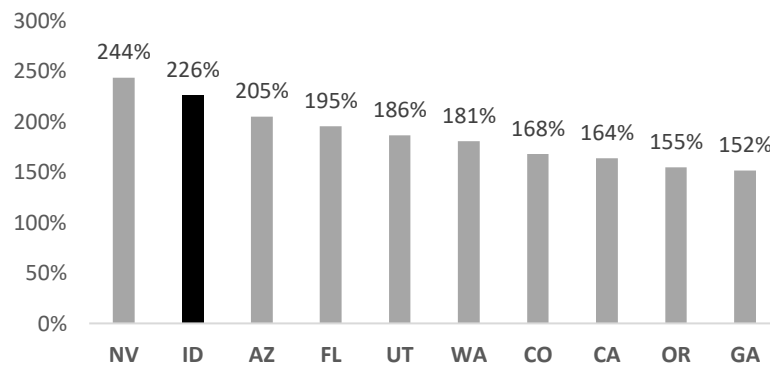
Idaho was second highest in terms of the percentage growth in home purchase prices from the second quarter of 2012 to the second quarter of 2022, experiencing a substantial increase of 226%. In this regard, Idaho trailed behind Nevada, which recorded the highest growth at 244% (Figure 1.4).¹⁰

⁸ [Housing Data - Zillow Research](#)

⁹ U.S. Census Bureau

¹⁰ [House Price Index Datasets | Federal Housing Finance Agency \(fhfa.gov\)](#)

Figure 1.4: State Rankings in Percentage Increase in Home Purchase Prices 2012 (Q2) to 2022 (Q2)



Source: [House Price Index Datasets | Federal Housing Finance Agency \(fhfa.gov\)](https://www.fhfa.gov/data/house-price-index/datasets)

In 2014 a median priced home in Valley County was \$255,000 and had increased to \$715,000 by 2022.¹¹ The average priced home had increased from \$317,192 to \$912,104 over the same period. All of this was occurring while average household income only rose 47% from \$49,722 to \$72,878 annually (Table 1.7).

Table 1.7: Median and Average Valley County Housing Price Changes 2014-2022

Year	Median	Average	Average Household Income
2014	\$255,000	\$317,192	\$49,722
2022	\$715,000	\$912,104	\$72,878
% Change	180%	188%	47%

In 2014 (10 years ago), 50% of the households in Valley County and 64.4% of the families could afford to purchase a median priced home of \$255,000 at 3.18% interest with a 30-year loan and 5% down. By 2022, only about 25% of households and 30% of families could afford to purchase a medium-priced home of \$715,000 at 3.18% interest with the same terms. At the current mortgage rate of 6.81%, only about 16% of the households could afford to purchase a medium-priced home, and 20% of the families.¹²

Housing Starts and New Construction Deficits

The economic disruption from the 2007-2009 recession (i.e., the Great Recession), caused in part by the subprime mortgage crisis, created a near collapse on new U.S. housing construction that

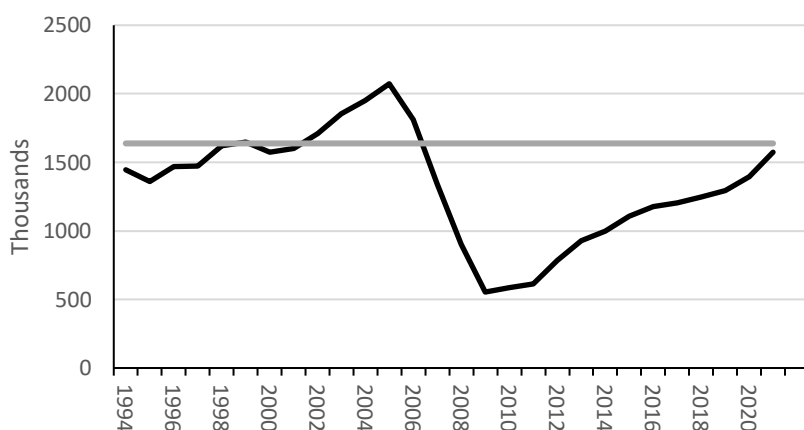
¹¹ Intermountain MLS. Accessed 12/23. [IMLS \(imlsmembers.com\)](https://www.imlsmembers.com).

¹² Methodology developed from: “Next Steps: The Updated Housing Availability and Affordability Study for Kootenai County.(10/2023),” Steven Peterson, Tim Nadreau, Raven Luciano-DeSmith, Nick Swayne, Shane Cunningham, Ryan Malone, Savanna Pagel and Quinn Cowden. Sponsored by PAHA, CDA EDC, [6fba29_5c58964ad064493d9534b8539c270316.pdf \(cdaedc.org\)](https://www.cdaedc.org/files/6fba29_5c58964ad064493d9534b8539c270316.pdf).

stretched from 2008 to 2018. Both demand and supply factors have played an important role in the recent housing price spikes.

An estimate was made in the *Kootenai County Housing Study* on the magnitude of the U.S. housing start deficit caused by the Great Recession, and placed it at a cumulative 8,625,929 units from 2008-2022.¹⁵ Other studies suggest a deficit between 2.3 million and 6.5 million homes, using alternative benchmark averages (Figure 1.5).¹³ Employing the same methodology, the estimated Idaho housing unit deficit was 30,215 units in 2022. For Valley County, the deficit was about 500 units in 2022. These estimates do not fully account for the rapid population growth and construction lags. For Valley County, it also does not account for the fact that a significant portion of the housing stock are “secondary” vacation homes and not available to the local population. Adjusting for these factors could increase the housing deficit to several thousand units.

Figure 1.5: U.S. Housing Starts 1994-2022 and Estimated Deficit



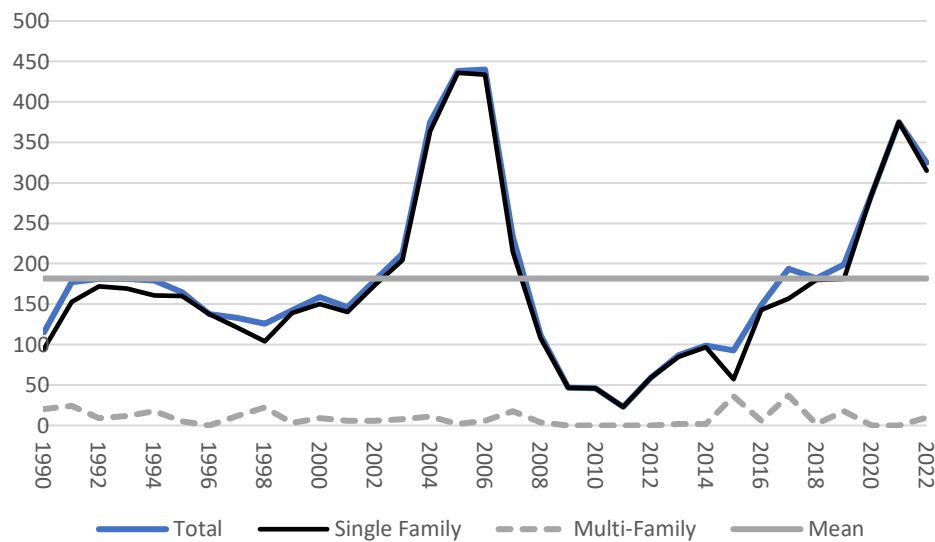
U.S. Census / FRED and Authors' Calculations

Valley County housing starts mirrors the nationwide trends. Housing starts rose steadily from the end of the dot-com recession in 2001 to the subprime mortgage collapse and the Great Recession (2007-2009). Housing starts collapsed and remained underwater until 2018 (Figure 1.6). Valley County housing starts averaged 182 per year from 1990 to 2022. Starts peaked in 2006 at 434, hit a low of 23 in 2011, and reached a peak of 375 in 2021 (Table 1.8).

¹⁵ Ibid.

¹³ “The US housing market is short 6.5 million homes.” The US housing market is short 6.5 million homes | CNN Business. 17 March 2023. See also: “Housing Supply: A Growing Deficit.” Freddie Mac, Freddie Mac, May 2021, http://www.freddiemac.com/fmac-resources/research/pdf/202105-Note-Housing_Supply-08.pdf. Middle range: Market Update July 2023, Windermere CDA Realty.

Figure 1.6: Valley County Housing Starts 1990-2022



Source: U.S. Census Bureau Building Permits Survey

Table 1.8: Valley County Housing Starts 1990-2022

Year	Total	Single Family	Multi-Family	Mean (From 1990)
2004	375	364	11	182
2005	438	436	2	182
2006	440	434	6	182
2007	233	215	18	182
2008	112	108	4	182
2009	47	47	0	182
2010	46	46	0	182
2011	23	23	0	182
2012	59	59	0	182
2013	87	85	2	182
2014	99	97	2	182
2015	93	57	36	182
2016	149	143	6	182
2017	194	157	37	182
2018	182	180	2	182
2019	199	181	18	182
2020	286	286	0	182
2021	375	375	0	182
2022	325	315	10	182

Source: U.S. Census Bureau Building Permits Survey

Housing Challenges

According to the American Community Survey (ACS) five-year database, in 2022 nearly 69% of the entire housing stock is vacant, representing vacation homes servicing the tourist population (Table 1.9). Tourism and the revenues gained from second homes are important to the economy,

but they also come with an opportunity cost. It is the housing needs for full-time residents that are the greatest constraint to growth in Valley County.

Table 1.9: Housing Vacancy Rates Valley County

Type of Housing	# of units	% of stock
Occupied	3,806	31%
Vacant	8,553	69%
Total	12,359	100%

B25002: Occupancy Status - Census Bureau Table

Housing Affordability and High Rents

Table 1.10 data from the American Community Survey (ACS) has a rent profile for Valley County. These percentages should be considered low-bound estimates, since there is considerable volatility in the rental market and prices have increased rapidly in the last couple of years. There is a lag in these numbers. Table 1.11 represents a distribution of homes by estimated market value in Valley County. Over 50% of the homes are valued over \$500,000 and this is a lagged low-bound estimation.

Table 1.10: Rental Rates Valley County

Range	% Renters
Less than \$500	4%
\$500 to \$999	62%
\$1,000 to \$1,499	21%
\$1,500 to \$1,999	7%
\$2,000 to \$2,499	7%
\$2,500 to \$2,999	0%
\$3,000 or more	0%

Source: McCall CCD, Valley County, Idaho - Census Bureau Profile

Table 1.11: Home Value Distribution in Valley County

Home Value	% of Market
Less than \$50,000	2.10%
\$50,000 to \$99,999	3.50%
\$100,000 to \$149,999	2.30%
\$150,000 to \$199,999	5.20%
\$200,000 to \$299,999	10.90%
\$300,000 to \$499,999	22.70%
\$500,000 to \$999,999	43.00%
\$1,000,000 or more	10.30%

Source: McCall CCD, Valley County, Idaho - Census Bureau Profile

Infrastructure Limitations

The overall infrastructure is underdeveloped in Valley County, according to stakeholder interviews conducted by the authors of this study. Roads, telecommunications, utilities such as water and sewer systems are underdeveloped. The sewer system in McCall is nearing capacity and will likely need expansion to meet current needs and future housing needs will require even further expansions. However, the limited number of construction workers available locally acts as a restraint to development. Even if municipalities fix infrastructure problems, there may be secondary and tertiary issues like labor that prevent rapid housing development.

2. Economic Data and Sources

This chapter of the report is simply to familiarize the reader with the various data sources utilized in the impact analysis, and how that data is treated to account for the idiosyncratic nature of mining. Most of the data on the regional economy comes from one of two sources, IMPLAN or Lightcast. These data sets measure labor market variables and the economic transactions within a geographical setting. The actual and proposed spending within the county comes from the DEIS or the Perpetua Feasibility Study

IMPLAN

IMPLAN was founded in 1976 under the National Forest Management Act, which required the USFS to provide land use and economic effects of forest management practices, particularly on local communities. The impact analysis for planning (IMPLAN) was developed for assessing the economic consequences of various shocks to the economy stemming from forestry and wood products alterations.

IMPLAN had grown beyond the forest service and maintaining, and training other economists how to use the framework fell outside of the forest service's mission. In 1985 The USFS had had enough of assembling and developing regional I-O models and those responsibilities were outsourced to the University of Minnesota. Soon the Minnesota IMPLAN Group (MIG, Inc.) was formed and lead by Scott Lindall, Doug Olson, and their data officer Greg Alward, now at the University of Idaho.

IMPLAN takes data from the National Income and Product Accounts (NIPA) produced by the Bureau of Economic Analysis and "regionalizes" that data to each county in the nation. The data set ultimately contains commodity trade flows so we can see how much of each commodity flows from one county to another. Industry employment and earnings metrics are incorporated as part of each industry's production function. The brilliance of IMPLAN is that within an economy we can see the recipe each firm is using to create its output. We can see what purchases each industry is making (the use or input data), and where each industry's outputs are being sold (the make or output data).

I-O generally, and IMPLAN in particular, has become integral in impact analysis, supply chain analytics, and policy assessment. We use IMPLAN's Valley County data as the basis for our impact assessments, though we adjust some of the mining production data to align with the data in the M3 feasibility study discussed below.

Lightcast

Lightcast was originally founded by a University of Idaho professor, Hank Robison, that specialized in regional economics. He did economic consulting under the name Economic Modeling Specialists Inc. for years, ultimately partnering with a colleague, Kjell Christophersen, to provide economic research and support for community and technical colleges. That

partnership was named CC Benefits. Ultimately the company found the two names confusing and Emsi LLC was formed. By then the CEO, Andrew Crapuchettes, had found that labor market and economic data could help community colleges and universities in everything from curriculum planning to strategic industry alignment.

Today Lightcast is the premier international labor market data source. They provide industry, occupation, and program data, with an emphasis on skills and job alignment. They found that both training and data for economic development agencies was missing from the consulting world and began filling that need. Today they regularly report to White House Officials and industry leaders on demographic and labor market shifts, as well as gaps and bottlenecks in the labor force.

We use the Lightcast labor market data for the Shift Share Analysis and the industrial diversity metrics. It also shows where the skills compatible with Perpetua's mining needs are most likely to be found, and thus where most of the workers will originate from. This gives us an idea of where in-commuter employees will most likely be remitting their earnings.

Interviews

Over the summer of 2023, Recon visited Valley County, ID and spent time talking with various individuals to discuss the mine and the labor market risks associated with it. Virtually all of the interviewees commented on the lack of labor supply and the extraordinary increase in housing expenses. None of the discussions suggested that the mine would cause, or exacerbate, the primary issues already facing the county. Some opposition to the mine exists, but that appears to be coming from a very vocal minority of the population, many of whom are provisional residents, or dependent on such residents. What follows is our understanding and takeaways from the several conversations. Unless direct quotations are provided, this section represents our understanding alone. We are grateful to the following individuals for their time and candor: Jeff McFadden, Valley County Road & Bridge Department Superintendent; Elt Hasbrouck, Valley County Commissioner; Josh Davis, CEO Granite Excavation Inc; Eric Pingrey, MDSD Superintendent; Jim Hinson, Owner Rocky Mountain Signs; Tom Reinhardt & Dave Donnahoo, CEO and CFO of Cascade Medical. These individuals represent local business, education, and political leadership in Valley County, which was the primary motivation for interviewing these individuals.

Mr. McFadden was not concerned about his staff exiting county employment to work at the mine. His impression was that most of them prefer to return home to their families each night. The structure of employment and additional compensation was not the primary issue for his staff. He mentioned that he is having difficulty filling positions, but that was because the "...boomers are retiring and there don't seem to be millennials qualified or looking to fill those jobs."

Several interviewees mentioned concern with some of the roads being at carrying capacity, but that has, at this point, little to do with Perpetua. The county would be looking for some support for road maintenance on roads heavily trafficked by Perpetua, and several individuals indicated

that Johnson Creek Road needed to be paved. Congestion, particularly on busy tourism weekends, was mentioned several times. It is unclear the extent to which Perpetua's operations would exacerbate such congestion.

Both county officials and local business owners cited a lack of development, though that is somewhat advantageous to the county since they don't have the staff necessary or available for expansion. We juxtaposed Valley County's 800 miles of road supported by 8,000 resident taxpayers, with 640 miles of road supported by 40,000 resident taxpayers in Nez Perce County. This underscores that Valley County is rural and has more roads to cover with less tax support. When asked about the impact the mine would have on the county, one commentor replied that "90% of folks won't even notice what is going on." Locals in Yellow Pine, folks that will notice what is going on, commented on, and commended Perpetua for, working to get alternate snowmobile and winter recreation routes put into Yellow Pine.

We intended to meet with County Commissioner Hasbrouck for breakfast, but none of the local restaurants in Cascade were open the morning of our meeting. We ended up meeting in the county chambers. This emphasized, and was corroborated by all of the interviewees, that the labor constraint is hard on local businesses because they cannot find the help, even unskilled help, to fill basic service roles.

While there appears to be significant infrastructure movement in Cascade and additional carrying capacity exists in Donnelly, McCall has an assessed home value of \$536 per square foot or 243% higher than the national average.¹⁴ This suggests under development of McCall by the town officials. Not all of the development constraints are political in nature. One of the primary development constraints Commissioner Hasbrouck mentioned was that over 43% of the valley was too wet to build on.

County services will need to expand once the mine opens. While most of the interviews focused on current problems that exist with or without the mine, fire, ambulatory, and enforcement will need to expand with the growth being experienced. Mr. Hasbrouck estimated that from 2010-2020, the population was expanding by 200 people per year. That number increased to between 400 and 500 people per year between 2020 and 2023. As such, the number of sheriff deputies will need to expand from the current six, to eight, and potentially more if the mine generates additional growth as is expected.

The local business owners said they had received or anticipated additional work as the mine moved forward, and that Perpetua had been good about sourcing their vendors locally, as much as was possible. Though we asked explicitly if employers were concerned about losing employees to the mine, none felt that was a primary concern. Either the mining work required specific skills, or a lifestyle that they did not feel fit with their employees' stated desires. One thing that jumped out at us when speaking with Mr. Davis from Granite Excavation Inc. was that a large portion of his operation was centered in the Boise MSA, suggesting that his firm had a large basic effect on Valley County, and was supporting an outsized portion of employment

¹⁴ Rate.com and St. Louis Federal Reserve Economic Data

locally through induced impacts. This represents a type of resident outside income because the growth in Boise is supporting employment in Valley County.

The constraints are affecting the local school districts as well. Beginning in 2023, Idaho reverted from an enrollment to an attendance-based funding structure. With the large volume of absentee owners (see Table 1.8), the local school districts are struggling to support staff and faculty. Housing and living costs are high and the schools now lack the funds to support the faculty and staff with living wages. The concern is that qualified instructors that do not receive cost of living raises will seek employment elsewhere and result in a spiral. Perpetua has been hands on in supporting local education service, as it aligns with their local needs. They have supported internships for local students, training them in biology and water quality testing labs. Training is taking on a different and needed skills-based element, with students now being able to get CDL qualifications or other certified technical education and agricultural oriented credits by the time they graduate from high school. Many of the facilities are at capacity, and large-scale investments will need to be made to maintain school employment and quality learning environments.

3. Theory and Methodology

Input-Output Theory

The system of accounts known as Input-Output (I-O) represents an economist's version of double-entry bookkeeping for industries. Figure 3.1 below shows a simplified version of an I-O matrix with just a hand full of industries. Each cell in this table of accounts is populated by dollar transactions.

Figure 3.1: Example System of Input-Output Accounts

		Producers as Consumers						Final Demand			
		Agric.	Min.	Const.	Manuf.	Services	Other	Households	Investment	Government	Net exports
Producers	Agric.										
	Min.										
	Const.										
	Manuf.										
	Services										
	Other										
Value Added	Labor							Gross Domestic Product			
	Returns to Capital										
	Taxes										

Reading down a column of this table shows what inputs an industry is buying in order to produce their output. The mining column, for example, may buy construction services for road construction, trucks, signage, heavy equipment, etc. from the manufacturing sector, and legal and accounting services from the service sector. They will also purchase imports. Payments to mine employees are captured in the “Labor” row. Payments must be made to owners of capital, and the industry pays taxes to the government. This is where the proposed expenditure patterns from the Feasibility Report enabled us to isolate the spending profile of the Stibnite mining operations and embed it into our modeling framework. Reading across a row tells us where an industry's income originates. Sticking with mining, virtually all of the revenue in our case will derive from selling output outside of Valley County, i.e., exporting the minerals via the “Net exports” column.

Adding up all the labor, capital, and tax payments for all industries gives the sum of all value added and will equal the Gross Regional Product (GRP) of the county. Similarly, summing all of the expenditures of households, government, investment, and net exports yields the GRP of the county. These two methods of calculating GRP are known as the Income and Expenditure approaches, respectively, and they represent a check for ensuring all accounts balance. It is through the I-O system that we are able to trace the dollars through the economy and calculate multiplier effects on new dollars entering the county but for the presence of the mine.

However, it is only through attracting new dollars into the economy that the mine will generate impacts. Economists distinguish between industries that are export-oriented and those that serve the local economy, recirculating the dollars once they are in the economy. We call export-oriented industries “basic” and resident serving industries “non-basic.” The mining sector, as with most natural resource industries, is considered basic as local residents are not buying directly from the mine. The basic industries that bring dollars into the economy support the non-basic industries, which could not exist locally without the income from exports. As such, the employment contributions of basic industries support more than the direct employment within the industry. One of the key issues at stake here is whether or not the presence of the mine represents a tradeoff between the basic industries of mining and tourism. Where others have represented these industries as substitutes that compete with one another, we find them to be complimentary.

Basic vs. Non-Basic Impacts: Which Industries Support the Economy?

A small rural town may seem to have a large retail trade sector in terms of employment, while the number of employees engaged in natural resource industries is fairly low, and often seasonal. However, the natural resource industries are exporting their product and bringing money into the economy. The retail trade sector is predominantly serving residents. In this story, it is the loggers, farmers, ranchers, and miners that are supporting the economy, and the retail shops are retaining the money generated within the economy. However, it should be clear that the natural resource-based industries would continue to exist in the absence of the retail shops, while the barbers, bakers, and clothing store clerks would not be likely to stay in the absence of the farms etc. In this setting, the non-basic retail jobs rely on the basic natural resource jobs. The employment impacts, including many of the schoolteachers and retail employees, would be attributed to the basic agricultural industries.

Methodology

As discussed above, we were able to build the Stibnite mine into our model based on the feasibility study. However, the only spending in valley county is the portion of capital that can be purchased in region. It is only the spending that stays in region that we can claim (see Sales vs. Value Added text box). If Perpetua purchases a truck locally, we only claim the margin of the total expense that stays in the local economy. The labor spending that is incurred when Perpetua

pays its employees are largely remitted back to the employees' home state or county, unless they live in Valley County.

We assume that the majority of employees are in-commuters, meaning that the majority of the employee compensation is flowing out of the county. Over time some of the in-commuters will move to valley county, thus becoming in-migrants. As that occurs, more of the employee compensation will stay local and have a deeper impact on the local economy. Figure 3.2 shows the rate at which in-commuters become in-migrants for our baseline assumption. This value caps at 1/3 of total employment while we assume another 1/3 remain in-commuters for the life of the mine.

According to the Draft EIS and the Highland study, it is assumed that 1/3 of the total mine employment will come from the current labor market in Valley County. This poses a problem for us because we can only claim the net increase in income for those individuals. If an employee currently working construction is making \$70,000 per year and they are hired by the mine at \$90,000, there is only a \$20,000 direct effect that can be claimed by the mine because the community "lost" the \$70,000 the individual had been making. Thus again, we can only claim the marginal increase as a direct impact on the Valley County economy.

Determining Direct Effects

The direct effects in an input-output model represent the new spending in the local economy as a result of an economic shock, like that of the opening of the mine. Based on the methodology discussed above, we report the total new capital and labor expenditures over the life of the mine from the three years prior to opening to the remediation and monitoring after the closure of operations.

For the direct conservative assumptions, we assume no local capital expenditures and delay the conversion of in-commuters to in-migrants for the first six years of mining operations. Direct baseline assumptions allow for some level of local capital expenditure margined for the retained regional spending. We also speed up the conversion from in-commuters to in-migrants. Our direct optimistic assumptions assume additional local capital expenditures, and again speed up the in-migration and reduce the local opportunity costs from forgone labor. This final assumption allows for the families of in-migrants to fill local labor demand caused by residents forgoing their original employment in Valley County i.e., the families of in-migrating mine employees expand the workforce to fill a portion of forgone labor earnings.

Determining Multiplier Effects

The multiplier effects are estimated as the spending from the direct effects goes through rounds of additional spending in the local economy. The purchase of signage may result in a local manufacturer purchasing additional paint from a hardware store that in turn pays employees, who in turn purchase groceries etc. These multiple rounds of spending are captured by the I-O model and are broken into two categories: indirect and induced effects, collectively referred to as the multipliers.

Indirect effects: those rounds of spending stemming from the direct business-to-business expenditures within the local supply networks.

Induced effects: those rounds of spending stemming from the direct payroll and subsequent household-to-business expenditures within the local supply networks.

Sales vs. Value-added

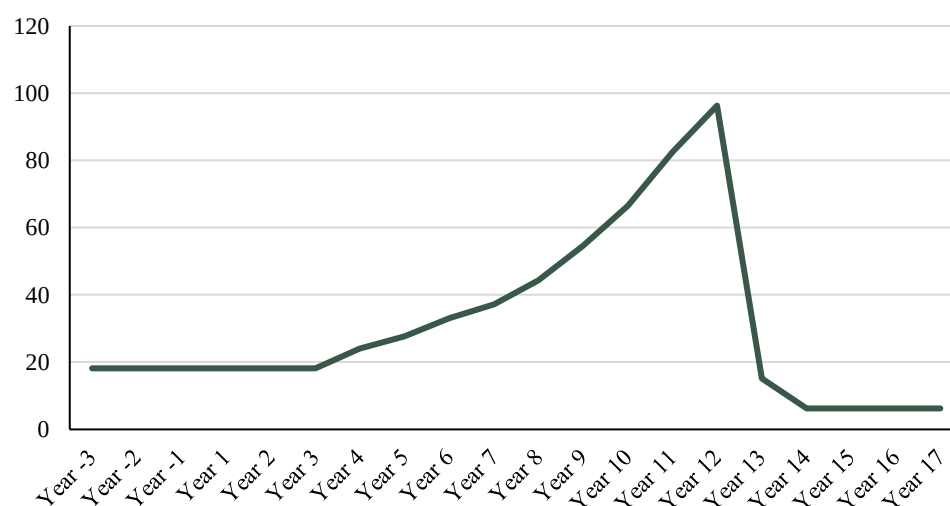
A way to explain why sales overstates impacts is to imagine individuals spending money in a regional economy. Suppose an individual spends \$40,000 on a new truck. Another individual spends the same amount on an appendectomy at the regional hospital. From a sales perspective, the impacts are the same, \$40,000. However, from a value-added perspective the purchase of the truck provides less to the regional economy. Perhaps \$30,000 of the truck purchase had to immediately go to the manufacturer back in Detroit or Japan. Conversely, the appendectomy at the hospital probably saw most of the spending stay local as income to the doctors, nurses and hospital staff. Perhaps only \$10,000 leaves the region for importing of capital assets like the hospital bed, scalpels, etc. From a value-added perspective, the hospital is more valuable than the auto dealership even though they are equivalent from a sales perspective.

4. Results

Scenario 1: Conservative Assumptions

Our conservative assumptions lean heavily on the wages paid to current residents that are or become employed by the mine, as well as the wages paid to those individuals migrating into Valley County over the life of the mine. Figure 4.1 Shows the direct mining employment over the three-year establishment phase (years -3, -2, -1), the operating phase (years 1-14), and the closure and monitoring phase (years 15-17).

Figure 4.1: Conservative Direct Valley County mining employment



Source: M3 Stibnite Feasibility Study and author's calculations

The associated net wages paid to these employees result in local expenditures in the Valley County economy. These expenditures ripple through the economy until they eventually leak out of the county for purchase of imports. For example, a household that takes their mining wages and buys groceries generates local spending and supports local wages and employment at the grocery store. However, a portion of that spending goes to the bread, beans, or beer that is not locally sourced. Those dollars leak out of the economy as the goods are imported to the grocery store. Figure 4.2 shows the total employment contributions in Valley County as a result of this spending.

Table 4.1 shows the total sales, gross regional product, income, and employment supported in the county each year as a result of the conservative assumptions regarding mining operations, particularly wage payments. Because our conservative assumption only focuses on the net wage gains paid to mine employees living in Valley County, the total impacts follow a similar trend. However, all of the spending will be derived from household wages being spent locally, i.e.,

there are no indirect business-to-business transactions, only direct wage payments and induced household-to-business transactions.

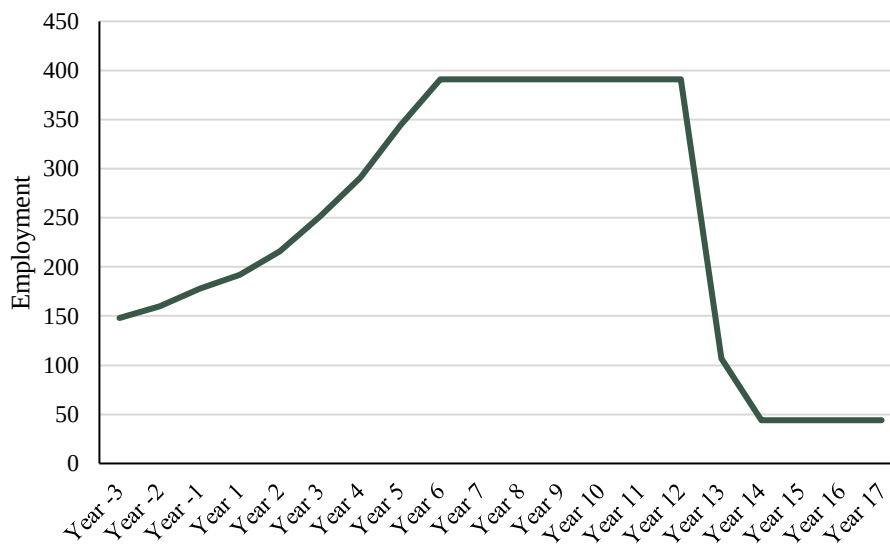
Table 4.1: Total Valley County Economic Impacts Under Conservative Scenario

Year	Sales	GRP	Income	Employment
Year -3	\$4,334,948	\$2,403,734	\$1,157,242	28
Year -2	\$4,334,948	\$2,403,734	\$1,157,242	28
Year -1	\$4,334,948	\$2,403,734	\$1,157,242	28
Year 1	\$4,334,948	\$2,403,734	\$1,157,242	28
Year 2	\$4,334,948	\$2,403,734	\$1,157,242	28
Year 3	\$4,334,948	\$2,403,734	\$1,157,242	28
Year 4	\$5,755,168	\$3,191,247	\$1,536,378	38
Year 5	\$6,607,300	\$3,663,756	\$1,763,860	43
Year 6	\$7,885,497	\$4,372,518	\$2,105,083	52
Year 7	\$8,879,651	\$4,923,777	\$2,370,479	58
Year 8	\$10,583,915	\$5,868,794	\$2,825,443	69
Year 9	\$13,069,300	\$7,246,943	\$3,488,932	86
Year 10	\$15,909,740	\$8,821,970	\$4,247,206	104
Year 11	\$19,673,322	\$10,908,881	\$5,251,918	129
Year 12	\$23,010,839	\$12,759,538	\$6,142,889	151
Year 13	\$3,623,746	\$2,009,371	\$967,382	24
Year 14	\$1,490,138	\$826,284	\$397,802	10
Year 15	\$1,490,138	\$826,284	\$397,802	10
Year 16	\$1,490,138	\$826,284	\$397,802	10
Year 17	\$1,490,138	\$826,284	\$397,802	10

Scenario 2: Baseline Assumptions

Scenario 2 represents our baseline set of assumptions. We claim only a portion of local spending in the local economy, trying to err on the side of being conservative with such spending.¹⁷ While there are realities on either side of this baseline set of assumptions, we find the moderate growth of the labor force and spending plausible and realistic. We do anticipate that some immigration will occur, and while we anticipate local labor constraints being relaxed by the presence family members of the miners, we err on the side of being too restrictive by not attributing the work of those individuals to the mining operation itself. Figure 4.2 shows the direct employment trajectory assumed in our baseline.

Figure 4.2: Direct Valley County Mining Employment

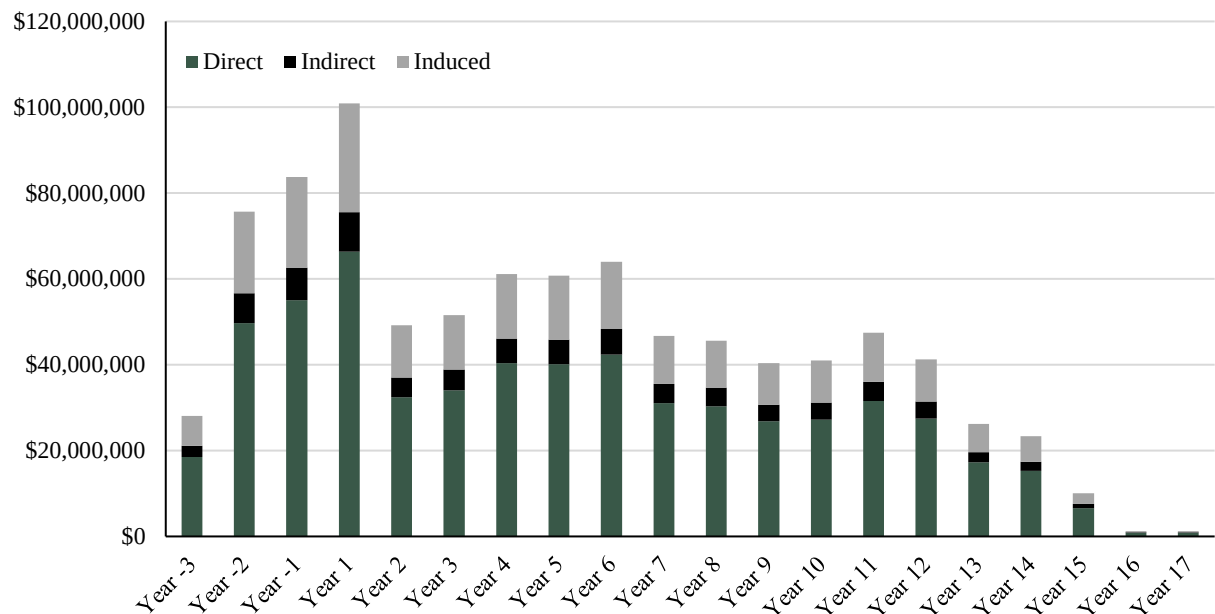


Source: M3 Stibnite Feasibility Study and author's calculations

While the baseline employment and impacts follow similar trajectories in the conservative scenario, this is not the case in the baseline results. Because spending on local vendors is included in this scenario, the impacts take on a different shape than the simple employment. That is a result of local supply chains for businesses not mimicking the same supply chains as those of households. For example, a construction enterprise is likely to have a different supply chain than that of a family of four. Figure 4.3 shows the total economic impact by year and effect.

¹⁷ We know that Perpetua is currently spending money on local vendors so this is not entirely an assumption, though the magnitude of that spending moving forward is uncertain.

Figure 4.3: Baseline Valley County GDP Impacts by Source



Source: M3 Stibnite Feasibility Study and author’s calculations

Table 4.2 shows the actual data presented in Figure 4.3, but it includes the sales, income, and employment figures. Year six is the comparison year made between this study and prior research. We chose this year rather than the LOM average impact, as Mr. Peterson and the Highland study focus on average “production” years (i.e., years 1-14). Under our baseline scenario Valley County is assumed to see an increase in the county’s gross output of \$45 million dollars, and 390 full-time equivalent jobs being supported, directly or indirectly. Lest someone think these numbers are inflated, the current Gross Regional Product of Valley County is over \$563 million and currently employs over 7,700 people. We are suggesting the mine will enhance the economy by roughly 8% above its current growth trajectory and increase employment rolls by only 5%. While these represent modest gains to a small and rural economy, they still represent a net asset gain.

Table 4.2: Baseline Total Valley County Economic Impacts by Source

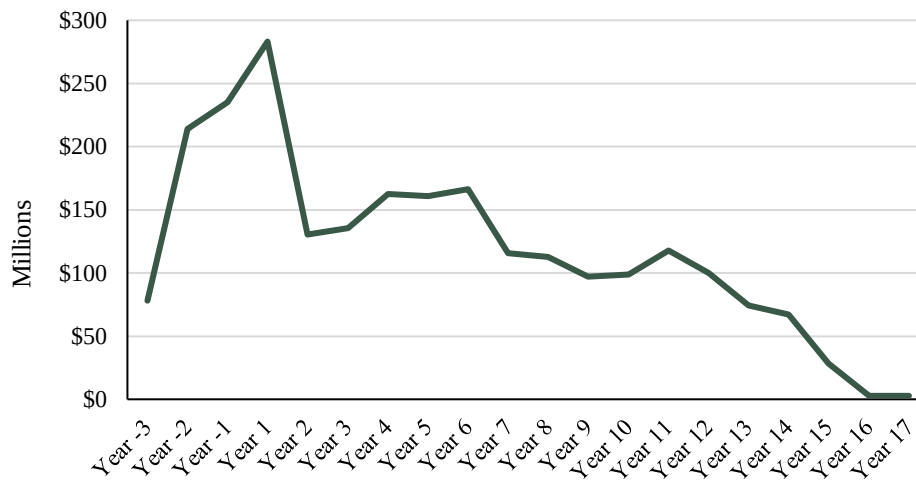
Year	Sales	GRP	Income	Employment
Year -3	\$51,738,566	\$28,133,271	\$22,316,361	238
Year -2	\$139,326,072	\$75,665,965	\$61,529,589	624
Year -1	\$154,079,021	\$83,692,200	\$67,828,745	692
Year 1	\$185,766,951	\$100,899,908	\$81,846,516	834
Year 2	\$90,343,286	\$49,164,842	\$38,356,657	423
Year 3	\$94,637,284	\$51,517,141	\$39,942,527	446
Year 4	\$112,364,151	\$61,155,611	\$47,598,736	527
Year 5	\$111,690,638	\$60,813,464	\$46,939,778	528
Year 6	\$117,515,630	\$64,020,228	\$48,849,779	562
Year 7	\$85,656,131	\$46,739,200	\$34,452,412	424
Year 8	\$83,662,738	\$45,657,957	\$33,551,594	415
Year 9	\$73,884,897	\$40,354,322	\$29,132,970	372
Year 10	\$75,031,659	\$40,976,342	\$29,651,194	377
Year 11	\$86,964,186	\$47,448,708	\$35,043,525	429
Year 12	\$75,650,582	\$41,312,054	\$29,930,886	380
Year 13	\$48,306,363	\$26,245,833	\$21,159,539	218
Year 14	\$42,924,755	\$23,300,986	\$19,122,182	190
Year 15	\$18,519,211	\$10,063,085	\$8,093,271	84
Year 16	\$2,269,722	\$1,249,140	\$750,097	13
Year 17	\$2,269,722	\$1,249,140	\$750,097	13
Average Annual Impacts	\$82,630,078	\$44,982,970	\$34,842,323	390

Source: M3 Stibnite Feasibility Study and author's calculations

Scenario 3: Optimistic Assumptions

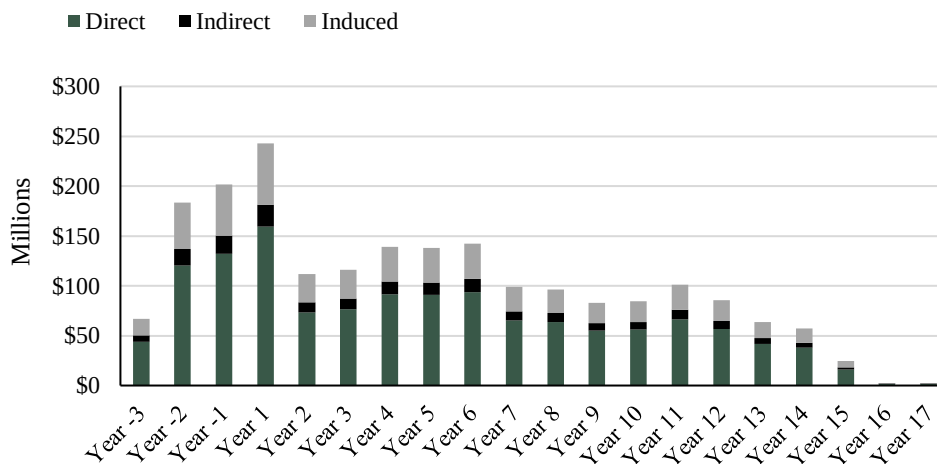
The optimistic scenario allows for a faster buildup of in-migrant employment. This assumes the carrying capacity of the region is high enough to support more rapid growth, particularly in the affordable housing arena. We also assume in-migrating families are able to fill local employment rolls so that normal day-to-day business is not curtailed by locals leaving current work for mining employment. Lastly, we increase the local purchases of capital assets. Figure 4.4 shows the direct regional spending, including wages and the margin of local capital expenditures. Again, the local capital purchases are only able to exceed the baseline spending if the infrastructure is available to support those purchases.

Figure 4.4: Optimistic Direct Valley County Spending



Source: M3 Stibnite Feasibility Study and author's calculations

Figure 4.5: Baseline Valley County GDP Impacts by Source



Source: M3 Stibnite Feasibility Study and author's calculations

Once again Table 4.3 reports the GRP impacts reflected in figure 4.5 but includes the sales, income, and employment outcomes as well. Average annual employment as a result of mining operations comes in at 851 FTE jobs and a total of \$82.1 million in income. Under this scenario, the average job supported by the mine would be nearly double the current average annual earnings reported in Table 1.3. This would serve to substantially rebuild the middle-income portion of the labor market that has been replaced by the lower wage service jobs that cater to the tourism and absentee residents.

Table 4.3: Baseline Total Valley County Economic Impacts by Source

Year	Sales	GRP	Income	Employment
Year -3	\$123,154,456	\$66,899,729	\$54,137,920	554
Year -2	\$338,004,583	\$183,447,675	\$151,071,493	1,492
Year -1	\$371,194,384	\$201,465,727	\$165,833,628	1,639
Year 1	\$447,325,230	\$242,772,155	\$200,053,434	1,973
Year 2	\$205,499,561	\$111,623,207	\$90,456,771	924
Year 3	\$213,926,699	\$116,224,244	\$93,805,349	966
Year 4	\$256,291,065	\$139,237,589	\$112,424,558	1,157
Year 5	\$253,577,622	\$137,811,273	\$110,502,291	1,153
Year 6	\$261,713,609	\$142,264,686	\$113,561,699	1,196
Year 7	\$182,064,861	\$99,062,116	\$77,568,283	849
Year 8	\$177,081,378	\$96,359,007	\$75,316,238	827
Year 9	\$152,636,776	\$83,099,921	\$64,269,677	721
Year 10	\$155,503,682	\$84,654,970	\$65,565,237	733
Year 11	\$185,335,000	\$100,835,884	\$79,046,064	863
Year 12	\$157,050,989	\$85,494,250	\$66,264,467	740
Year 13	\$117,370,637	\$63,731,903	\$51,992,459	524
Year 14	\$105,915,702	\$57,478,278	\$47,432,734	466
Year 15	\$44,901,842	\$24,383,527	\$19,860,458	201
Year 16	\$4,278,119	\$2,348,664	\$1,502,522	24
Year 17	\$4,278,119	\$2,348,664	\$1,502,522	24
Average Annual Impacts	\$187,855,216	\$102,077,174	\$82,108,390	851

5. Conclusions

Even under the most conservative set of assumptions, the opening, operating, and closure of the Stibnite Mine represents a boon to economic activity in the Valley County economy. However, the region faces significant challenges in terms of housing and infrastructure capacities. The positive impacts are muted the longer these constraints remain in place. Affordable and available housing, increased capacity of water and sewage treatment facilities, and local road and traffic infrastructure need to be expanded even without the opening of the mine. These issues are facing the local municipal governments now and have been building long before Perpetua arrived on the scene.

Table E1: Valley County Economic Impacts by Source and Scenario from the Stibnite Mine

	Conservative	Baseline	Optimistic
<i>Sales</i>	\$42,429,186	\$82,630,078	\$188,412,652
<i>GDP</i>	\$23,109,733	\$44,982,970	\$102,386,273
<i>Income</i>	\$17,711,672	\$34,842,323	\$82,257,201
<i>Employment</i>	202	390	855

Source: IMPLAN and author's calculations

This research corroborates and refines many of the prior studies that have looked at the economic implications of remediating and reopening the Stibnite Mine. Two of the last three studies utilized general equilibrium Input-Output models that have been utilized nationally and internationally. The modeling system itself was originally developed by the U.S. Forest Service and has been tested rigorously over the last half-century. The report by Power Economics did not develop an economic model and only speculated on potential risks and fallout from an unlikely catastrophic failure of the Tailing Storage Facility. While the risks associated with mining are real, the findings were neither economic in nature nor balanced in approach. The results of the current analysis are consistent with two of the prior studies, though they differ as a result of changing labor, wage, and economic structures in general.

The labor market in the region has aged drastically and, without an influx of young families, faces a serious issue with its dependency ratio. Many of the retirees will not have the labor force locally to support the services and amenities needed. The Stibnite Mine poses a strategic advantage if it is able to attract prime aged working people to the economy. This cannot happen without infrastructure enhancements and affordable housing.

Nonetheless, the economy is growing and the structural diversity within it is improving. The strengths in the economy reside in the healthcare and tourism industries. But those advantages will be short lived if a balanced industry portfolio cannot be generated in the next decade. An aging population and lack of available workers will cause dynamics shifts in the population that may result in wealthy retirees leaving the area. Diversifying and expanding the industry mix will be key for increasing the long-term health of McCall, Donnelly, Cascade, and Valley County as a whole.

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