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THE ECONOMIC IMPACT OF THE PROPOSED COPPER WORLD/ROSEMONT MINE COMPLEX

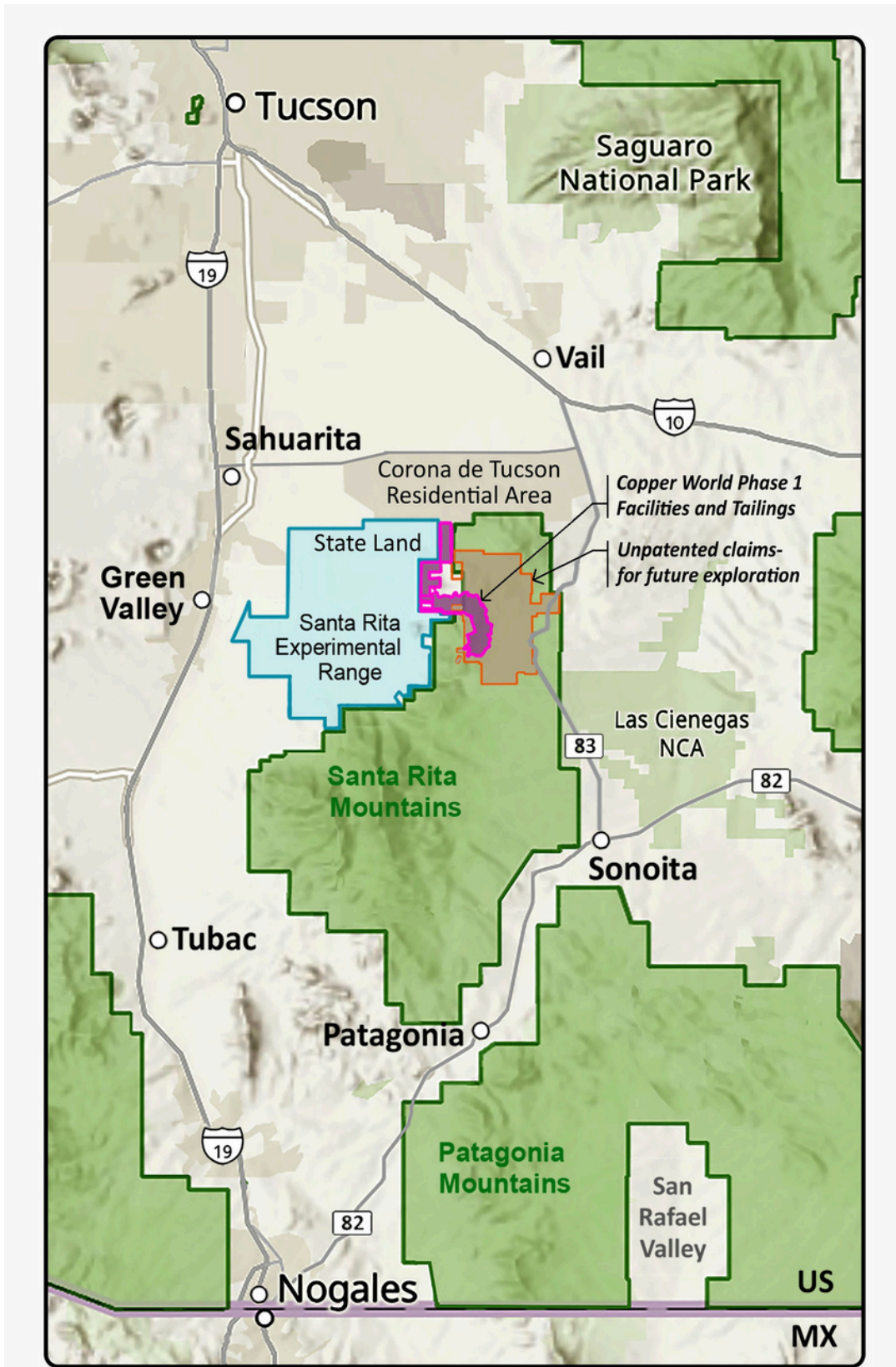
EXECUTIVE SUMMARY

PREPARED FOR:
SAVE THE SCENIC SANTA RITAS

BY:
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LOCATION OF THE PROPOSED COPPER WORLD/ROSEMONT MINE COMPLEX



Map design by Robert Gay, courtesy of Save the Scenic Santa Ritas

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“ANALYTIC TOOLS FOR NATURAL RESOURCE ECONOMICS”

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Photo credits (Santa Rita Mountains):

- Front Cover, T.G. Nelson
- Author Page, T.G. Nelson
- Back Cover, Larry Simkins

EXECUTIVE SUMMARY

This report was commissioned to analyze the socio-economic impact of Toronto-based Hudbay Minerals Inc.'s proposed Copper World/Rosemont Mine Complex (hereafter "Copper World project") in the greater Tucson area.

Making a rational economic decision about whether the mine would help or hurt the area's economy

Hudbay Minerals Inc.'s overriding financial interest is to make the Copper World project profitable and attractive to investors. Conversely, the local community, herein referred to as Pima County or the greater Tucson area, is concerned with whether the mining operation will benefit the community overall. Analysis by local political leaders, businesses, labor, non-profits, and citizens at large typically considers not only the direct economic benefits from the mine, but also costs to economic drivers that include recreation, tourism, health, and the housing market. If the proposed mine's benefits to the greater Tucson area are outweighed by the costs, then the community's rational economic decision would be to oppose the mining project. This report explores the economic facts that would form the basis for such decisions.

As the report details, overall, the Copper World project would contribute minimal economic gain to the greater Tucson economy, while destroying the northern half of the Santa Rita Mountains and threatening human health and water supplies. The mine would damage economic sectors much larger than mining, including outdoor recreation, tourism, and the housing market. The project would create a barrier to people who otherwise might move to the area for its natural and cultural amenities.



Sierra Club hike on the Oak Tree Trail near the Copper World mining operations, 2024. Photo credit: Anna Darian

I. TUCSON AREA ECONOMY IS STRONG AND RESILIENT

The greater Tucson area has a strong and resilient economy with a large service industry and a significant amount of non-labor income. During past national recessions the local economy either continued to thrive or quickly made up the slight losses incurred during a recession. Many people have moved to Pima County over the past 50 years because of the favorable climate and cultural and recreational amenities. These include access to national parks, state parks, national forest land, a long, paved bicycle and walking trail throughout Tucson, designation of Tucson as a UNESCO City of Gastronomy, and a mixing of many different cultures and traditions.

EMPLOYMENT FROM THE PROPOSED MINE WILL ONLY ADD TENTHS OF 1% TO THE LOCAL ECONOMY.

IF ONLY 2.7% OF PEOPLE PROJECTED TO MOVE TO PIMA COUNTY OVER THE NEXT 20 YEARS CHOOSE NOT COME BECAUSE OF LOST AMENITIES DUE TO THE MINE, THIS WOULD OFFSET ALL OF HUSBAY'S ESTIMATED JOBS.



Photo credit: Larry Simkins

Thru-hiker on the section of the Arizona National Scenic Trail that crosses the Santa Rita Mountains.

Because so many people are moving here with accumulated wealth, including retirement savings and investments, per capita income is growing at a much faster rate than average wage compensation, growth that has contributed to the area's resilience during recessions. Because the 5,000-plus newcomers arriving per year need homes, during the 2000 to 2010 decade Pima County's residential acreage increased twice as fast as the national average.

If people keep moving in at the same rate over the planned 20-year first phase of the mine, the number of new people arriving would be nearly 128,000. This is 37 times the 430 direct and 3,000 secondary jobs that Hudbay claims it would create. If only 2.7% of these 128,000 people choose not to move to Pima County because of amenities lost due to the mine, this would offset all projected direct and secondary jobs.

II. LIMITS OF THE TRADITIONAL ECONOMIC BASE

The traditional economic base consists of industries that produce raw materials for export, like mined metal and agricultural products, or else finished products like textiles and refined food products. At one time some of the biggest drivers of the greater Tucson area’s economy were known as the five C’s: copper, cattle, cotton, citrus, and climate, the first four forming part of the traditional economic base.

However, in the period from 1970 to 2000, service-related jobs became dominant and rose from 54.2% to 65.9% of the Pima County economy, while non-service jobs, which include copper mining, cattle raising, and growing cotton and citrus, dwindled from 20.4% to 16%. So, relatively small percentage changes in the dominant service sector can have outsized effects on the overall economy.



MANY TRADITIONAL MINING DISTRICTS AROUND THE COUNTRY AND WITHIN THE STATE OF ARIZONA HAVE BEEN PERSISTENTLY POOR ECONOMIC PERFORMERS COMPARED WITH SIMILAR AREAS WITHOUT MINING.

Greenlee County, which includes the above Morenci Mine, the nation's largest copper mine, has lower per capita income than Pima County and the U.S. overall.

Even in the past when the mining industry formed a larger share of the overall economy in terms of jobs and consumption of local goods and services, most of the money generated did not remain in the community. Typically, mining companies, which may be national, foreign, or multi-national, take their profits out of the area, while the community is left with the costs associated with environmental degradation.

Moreover, once a mine is played out and closed, the mining jobs disappear. As a result of this pattern, many traditional mining districts around the country and within the state of Arizona have been persistently poor economic performers compared with similar areas without mining.

Comparing about 100 mining-dependent counties across the U.S. with non-mining counties, from 1980 to 2010 mining-dependent counties’ earnings grew at only two-thirds the rate of non-mining dependent counties, personal income grew at three quarters the rate, and population and per capita income grew at about 88%.

III. COPPER WORLD IS UNLIKELY TO BE ESSENTIAL FOR THE U.S. GREEN ENERGY TRANSITION

Hudbay has publicly stated that copper produced by the Copper World complex will be important for aiding the national transition to green energy. But this mine is unlikely to be essential for U.S. copper needs because copper is not in short supply. It is mined and processed in many countries, including many with whom the U.S. has free trade agreements.

The U.S. Geological Survey (USGS) has not listed copper as a critical mineral because the United States is the world's fourth largest producer of copper and has access to additional copper from major producing countries including Chile, Mexico and Canada with Free Trade Agreements. The USGS also notes that recycled copper alone supplies more than 30% of domestic copper demand. Analysts have concluded that over the next five to 10 years copper suppliers will be able to cover the demand with available mines and available technology.

ANALYSTS HAVE CONCLUDED THAT OVER THE NEXT FIVE TO 10 YEARS COPPER SUPPLIERS WILL BE ABLE TO COVER THE DEMAND WITH AVAILABLE MINES AND AVAILABLE TECHNOLOGY.

Although the U.S. Department of Energy included copper in a report analyzing many critical materials in July 2023, the report concluded that copper is neither currently critical nor critical in the medium term through 2035.

IV. ANALYSIS OF ECONOMIC BENEFITS FROM THE COPPER WORLD PROJECT

1. Plans to produce finished copper delayed to at least year 5

In both the 2022 PEA and 2023 PFS, Hudbay stated that it plans to mine on both the east and west sides of the Santa Rita Mountains, place tailings piles near residential areas on the west side, and route truck traffic northwest across unpaved Santa Rita Road through the Santa Rita Experimental Range.

Hudbay's 2022 Preliminary Economic Analysis (PEA) stated the mine would produce finished copper onsite that would be sold in the United States. However, in its 2023 Pre-Feasibility Study (PFS) Hudbay changed its plans and stated that during at least Copper World's first four years of operation it will not produce finished copper but only raw copper concentrate for export.

Copper concentrate is a mix of finely-ground copper and other elements that Hudbay will export to overseas smelters and refineries because there is not enough capacity in the U.S. Beginning in year five of the project, Hudbay claims that it will begin refining some ore to pure copper on-site, while still exporting a sizable quantity of raw copper concentrate overseas.

2. Volatile copper prices create economic uncertainty

Market demand and supply determines price, which determines production, which in turn would determine the mine’s employment and economic contribution to the county. Typically, when the market price goes up, production, jobs, and income taxes all go up. Hudbay’s economic projections assume a break-even world market price of \$3.75 per pound, below which it would not be profitable to mine.

The below graph, which displays copper prices converted to constant 2022 dollars, shows that from 1990 to 2023 prices have been extremely volatile, ranging from a low of \$1.06 per pound to a high of \$5.91 per pound, with an average of \$2.91. Just looking at 2010 on, copper has been below the \$3.75 threshold about 52% of the time.



This figure shows the “real” price of copper in constant 2022 dollars since 1990 as well as Hudbay’s \$3.75/lb. break-even threshold (red line). Source: Federal Reserve Bank of St. Louis. Global Price of Copper and CPI. 5.12.2023. <https://fred.stlouisfed.org/series/PCOPPUSDM#0>

3. Analysis of Hudbay’s employment projections

In its 2023 Pre-Feasibility Study, Hudbay projected that 430 miners will be directly employed at its proposed mine and ore processing facilities and that 3,000 secondary jobs will be created. However, studies on other mining communities, including those near the proposed Resolution Copper Project, indicate that Hudbay’s 430 mining jobs would likely create significantly fewer than the 3,000 secondary jobs claimed.

Mining pay per worker will be higher than the average pay in Pima County. However, it is unclear how many of the miners will actually come from Pima County, since the jobs may attract miners from other areas of the country.



Photo credit: Center for Biological Diversity

Aerial photo of exploration drilling for Copper World expansion on west side of the Santa Rita Mountains, 2022.

Even assuming that Hudbay’s projection of 3,430 total jobs is correct, employment from the proposed mine will only add tenths of 1% to the local economy. The number of mine-related jobs will ultimately be dependent on the amount of production, in turn dependent on market demand and price of copper.

HISTORICAL VOLATILITY AND PERIODIC LOWS IN COPPER PRICES CALL INTO DOUBT HUSBAY’S ASSERTIONS THAT IT WILL CONTINUOUSLY EMPLOY 430 MINERS AND INDIRECTLY CREATE 3,000 JOBS FOR 20 YEARS.

The historical volatility and periodic lows in copper prices call into doubt Hudbay’s assertions that its activities will continuously employ 430 miners and create 3,000 secondary jobs for 20 years. During periods when the market price falls below the mine’s break-even price, the number of mining and indirect jobs are likely to fall.

4. Analysis of Hudbay’s tax payments

Hudbay claims it will pay \$12.35 million per year in property taxes, which would be slightly less than 1% of Pima County’s total intake of property taxes. Roughly half would go to education, of which a portion would be spent in other counties under the state’s equalization policy to ensure that school funding is equitable across the state.

Hudbay states it will pay \$8.4 million per year in state taxes over the initial 20-year Phase 1 of the mine, representing 0.03% of Arizona’s 2022 tax revenues of \$27.8 billion. Payments to the federal government are projected to be \$43 million per year, some 0.009% of the \$4.9 trillion in federal income taxes collected 2022.

V. ECONOMIC VALUES AT RISK FROM THE COPPER WORLD PROJECT

The proposed mine has the potential to negatively affect important industries that depend on Pima County’s natural environment and/or groundwater, notably tourism, outdoor recreation, the housing industry, and agriculture. The harm to these industries could easily offset whatever economic benefits the mine would contribute in the form of jobs and tax payments.

1. Degraded natural landscapes and public lands

The outdoor recreation industry in Pima County annually generates \$1.4 billion and employs more than 14,000 people. The mine would only directly employ 430 people, 3% of the number of recreation jobs.

BY DEGRADING THE NATURAL ENVIRONMENT AND BLOCKING ACCESS TO THE SANTA RITA MOUNTAINS, THE MINE WILL HARM THE OUTDOOR RECREATION INDUSTRY, WHICH IS DEPENDENT UPON ATTRACTIVE OPEN SPACE AND ACCESS TO PUBLIC LAND.



Photo credit: Shannon Villegas

Arizona Trail near Kentucky Camp, Santa Rita Mountains, approximately 6 miles south of where Phase 2 of the Copper World Project would bury the trail beneath hundreds of feet of mine tailings.

By degrading the natural environment and blocking access to the Santa Rita Mountains, the mine will harm the outdoor recreation industry. Loss of recreation opportunities may decrease net in-migration. If the mine decreases the outdoor recreation industry and/or decreases the number of people who want to live in the greater Tucson area, that loss will offset some or all of the economic benefits of the projected mining employment.

The mine will destroy known jaguar habitat and block one of the most important wildlife corridors in the United States, a corridor that jaguars and other rare species use to move back and forth between the Santa Rita Mountains, other “Sky Island” mountains across Southeast Arizona, and Sonora, Mexico. The extremely high biological diversity of the Sky Islands, including jaguar, ocelot, and a high concentration of bird species, attracts people to Pima County and helps support the outdoor recreation industry.

THE MINE WILL BLOCK ONE OF THE MOST IMPORTANT U.S. WILDLIFE CORRIDORS, A CORRIDOR THAT CONNECTS THE SANTA RITA MOUNTAINS WITH OTHER “SKY ISLANDS” MOUNTAINS ACROSS SOUTHEAST ARIZONA AND SONORA, MEXICO.



Photo credit: Conservation CAtalyst and the Center for Biological Diversity

Photo of the jaguar El Jefe in the Santa Rita Mountains, 2016.

One important contributor to the natural landscape is the Santa Rita Experimental Range (SRER), owned by the Arizona State Land Department and managed by the University of Arizona. The SRER is required by state law to operate for “ecological and rangeland” purposes as well as placing “state trust lands with high public value into public ownership where their special natural resources can be protected and managed for the general public.”^[1] The heavy truck traffic passing through the SRER on its way to and from the mine will disturb natural animal behavior and conflict with the ecological and rangeland purposes of the SRER. Hubday’s plans to place millions of tons of toxic tailings immediately adjacent to the SRER will compromise its pristine ecology.

^[1] Arizona Legislature. Senate Bill 1249. Page 208. 1988. <https://azmemory.azlibrary.gov/nodes/view/20911>

2. Increased heavy truck traffic

Hudbay's mining plans indicate that heavy trucks will make more than 100 round trips each 24-hour period between the mine processing operations on the west side of the Santa Rita Mountains and the East-Sahuarita-Road-and-Interstate 19 interchange. The truck traffic will include copper concentrate and industrial supplies, including hazardous chemicals needed to operate the mine.

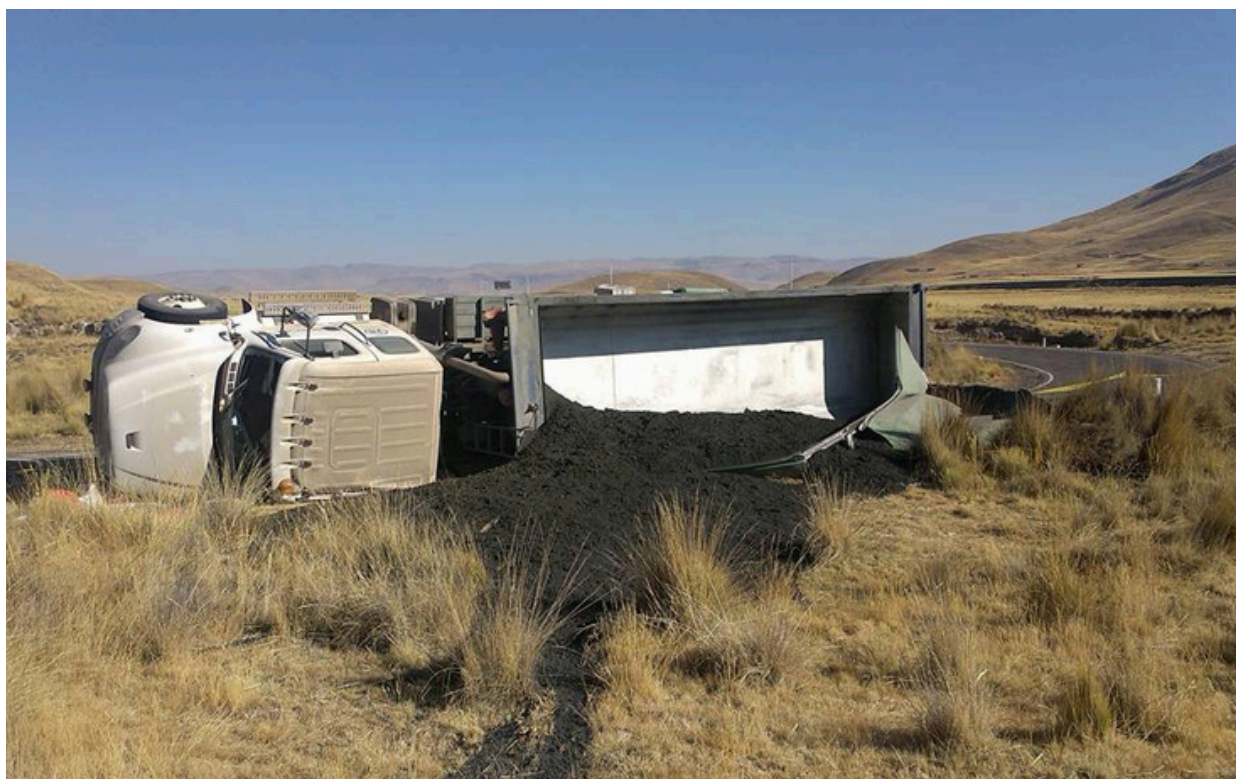


Photo taken by Peruvian activist. Photo supplied by John Dougherty.

An overturned truck hauling copper concentrate near Hudbay's Constancia Mine site in Uchucarcco, Peru.

THERE WILL LIKELY BE AT LEAST 100 ROUND TRIPS BY HEAVY TRUCKS TO AND FROM THE MINE EACH DAY ACROSS UNPAVED SANTA RITA ROAD THROUGH THE 52,000-ACRE SANTA RITA EXPERIMENTAL RANGE

This industrial truck traffic will cut northwest through the 52,000-acre Santa Rita Experimental Range (SRER) on unpaved Santa Rita Road, passing by the community of Sahuarita Highlands, and will then take East Sahuarita Road through Sahuarita to Interstate 19.

Concerns include dust, possible collisions between trucks and passenger vehicles, spills of copper concentrate, and possible spills of sulfuric acid when it is produced beginning in year five.

3. Competition for water

We deduce from information provided by Hudbay that water use at the beginning of the project is likely to be 6,000 acre-feet per year, the amount allowed by its current state permit. This is enough water to supply some 20,000 households. If Hudbay follows its current plan to start refining copper onsite in year five, it is likely to need a total of at least 13,000 acre-feet per year, enough for roughly 40,000 households.



Photo credit: Brittany Battle

Family ranch on east side of Santa Rita mountains with private well utilizing same aquifer as Hudbay

The wholesale value of this water, depending on assumptions made, ranges from about \$1 million per year to about \$7 million per year for the 20-year life of the mine.

HUDBAY PLANS TO USE 6,000 TO LIKELY 13,000 ACRE-FEET PER YEAR, ROUGHLY ENOUGH TO SUPPLY 20,000 TO 40,000 HOUSEHOLDS.

This water will be pumped from the same aquifer used by nearby communities like Sahuarita, Quail Creek, and Green Valley, substantially decreasing water available to farmers and residential housing, with concomitant impacts on the local economy.

4. Drops in property values

In Pima County, drops in home value in communities near the mine may collectively be far larger than income from projected mining jobs.

Property values near the mine will decline when aesthetically attractive views are replaced by an industrial landscape. Contaminated dust blowing from tailings piles is likely to reach residences, causing health concerns. Residents also may be concerned about water availability and quality. Heavy truck traffic passing through or by residential neighborhoods like Sahuarita Highlands may further dampen housing prices.

House prices in Corona de Tucson, the community closest to the mine, could drop more than \$100 million due to the combined effects of air pollution and lost scenic vistas alone, while aggregated home values for the communities of Corona de Tucson, Sahuarita, Green Valley and Vail could drop between \$355 million and almost \$2 billion, depending on which methodologies are used for estimation.

PROPERTY VALUES IN CORONA DE TUCSON COULD COLLECTIVELY FALL BY MORE THAN \$100 MILLION.”



Photo credit: Brittany Battie

Family ranch on east side of Santa Rita Mountains.

5. Population growth and in-migration

Population grew 24% in Pima County from 2000 to 2021, substantially more than the national average, and in-migration contributed 78% of that population growth as more than 5,000 people per year on average moved into the county. The 5,000-plus people who move to Pima County in just one year is more than 10 times the number of workers that Hudbay will directly employ.



Photo credit: Tucson Saddle Club

Horseback recreation in the Santa Rita Mountains

Many of these newcomers bring with them large amounts of non-labor income, such as retirement funds, rental income, and income from stocks and bonds. This non-labor income is a vital economic driver that generates nearly half of the county's income and helps support the dominant service-jobs sector.

Very small percentage decreases in net in-migration could cause loss of jobs in the service industry that alone could offset any economic benefits from the mine. For example, a loss of only 0.1% of service industry jobs would offset the mine's 430 direct jobs.

RELATIVELY SMALL DROPS IN THE RATE AT WHICH PEOPLE MOVE TO PIMA COUNTY (IN-MIGRATION) OR INCREASES IN THE RATE AT WHICH THEY LEAVE (OUT-MIGRATION) COULD CAUSE ECONOMIC LOSSES MUCH GREATER THAN BENEFITS FROM THE MINE'S JOB CREATION AND PROPERTY TAX PAYMENTS.

READ THE FULL REPORT

Access the full report at:

www.copperworldeconomics.com

or scan the QR code below on your phone.



Mountain biking the Arizona Trail in the Santa Rita Mountains. Photo credit: Shannon Villegas



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