

Mining's Potential Economic Impacts in the Santa Rita and Patagonia Mountains Region of Southeastern Arizona

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Save the Scenic Santa Ritas

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Mining's Potential Economic Impacts in the Santa Rita and Patagonia Mountains Region of Southeastern Arizona

EXECUTIVE SUMMARY

The area of southeastern Arizona surrounding the Santa Rita and Patagonia Mountains is home to spectacular landscapes, unique ecosystems rich in biodiversity, and a diverse, robust amenity and knowledge-based regional economy. It is also an area where the Earth's crust is rich in precious and base metal mineral deposits, and where there is a history of mining. These facts, in conjunction with the extensive federal lands open to mining and high metals prices, have led to a significant increase in mineral exploration and development activities in the area over the last few years. As a result, concerns have arisen among various stakeholders about potential impacts on the local economy and environment from proposed mineral exploration and development activities. This report provides economic analysis and interpretation of these issues to inform the debate regarding the impacts of mining and mineral exploration in the area.

The Local Economy: Typical of the Changing West, Robust, Amenity- and Knowledge-Driven

The local economy in Pima and Santa Cruz counties in many ways exemplifies the changing economy of the West. People are moving to the rural West to live, work, and conduct business primarily due to quality-of-life considerations or amenities such as clean air and water, outdoor recreational opportunities, low crime rates, and a pleasant climate, among others. Important aspects of the changing economy are the decline in relative importance of the extractive industries like mining, and the fact that the economy in the West is no longer dependent on resource extraction, with only a few exceptions. Another very significant trend in the West in general — and locally — is that retirement and investment income have become important economic drivers in rural areas.

Specific findings about the local economy include:

- Pima County has a robust, diverse economy, with a strong knowledge economy component. The relative importance of the agriculture and mining industries is very small, accounting for 0.4% each of employment in the county and 0.1% and 0.5%, respectively, of total personal income.
- The economy of Santa Cruz County is much smaller than that of Pima County. Over the last 15 years, the growth in personal income in Santa Cruz County has been primarily due to an increase in income from government, non-labor sources, and wholesale trade. Most of the county's economic activity occurs in Nogales and along the Santa Cruz River corridor to the north.
- Sub-county areas in Santa Cruz County are very different socioeconomically. The Patagonia Census County Division has characteristics of an "amenity-based" economy and an incipient knowledge economy, including in-migration, high educational attainment, higher household



income, the presence of second homes, and a significant proportion of residents who work in their homes.

- Tourism and travel spending are very important components of the economy in both Pima and Santa Cruz counties. These activities are relatively more important in Santa Cruz County because of their magnitude relative to the size of the county economy.
- Outdoor recreation activities contribute significantly to the economy of both counties.

Modest Potential Local Economic Benefits From Proposed Rosemont Project

The Rosemont Copper Project is a proposed open-pit mine for copper, molybdenum, and silver which would be located in the northern portion of the Santa Rita Mountains in Pima County in southeastern Arizona. The project has been proposed by Rosemont Copper Corporation, a wholly-owned subsidiary of Augusta Resource Corporation.

The potential positive local economic benefits from the proposed Rosemont project are small in comparison to the magnitude of the local economy. Local economic impacts would derive primarily from employment, wages and salaries, business purchases, and taxes paid to local governments.

Specific estimate impacts include:

- jobs during the operational period of the proposed project, representing between eight-hundredths of one percent (0.08%) and three-tenths of one percent (0.3%) of total employment in Pima and Santa Cruz counties combined for the year 2005;
- wages/salaries of approximately one-tenth of one percent (0.1%) of total 2005 wages and salary in the two counties combined, or up to three-tenths of one percent (0.3%) of the 2005 total personal income in the counties, representing from one to six weeks of the average level of economic growth in the two counties over the last five years;
- local business economic impact ranging from less than five-tenths of one percent (0.5%) to six-tenths of one percent (0.6%) of the 2005 GDP of the Tucson Metropolitan Statistical Area (MSA);
- estimated total local tax revenues representing about 1.3% of total property, excise, and sales taxes collected in Pima County and the City of Tucson in the 2005/2006 fiscal year and between one-half of one percent (0.5%) and 1.2% of total combined revenues for the two governments.

Significant Potential Local Costs from Proposed Mine Project

The proposed Rosemont project would produce significant costs for local individuals, businesses, governments, and society in general, including:

- estimated increased costs to local school districts of between \$2.7 million and \$10 million per year;
- increased highway maintenance costs on SR 83;
- annual societal costs associated with increased driving of at least \$418,000;
- increased costs to travellers on SR 83 of approximately \$949,000 annually;
- decreased property values for those residential properties impacted by degraded viewsheds and dust pollution;



- decreased revenues from outdoor recreation and tourism; and
- economic impacts associated with environmental effects on surface and groundwater, electrical power generation, and increased carbon dioxide emissions.

The decreased revenues from outdoor recreation and tourism may be the most significant, since direct local economic impacts resulting from these total about \$2.95 billion. Even a very small decline in this activity due to the presence of mining in the area could generate costs to the local economy far in excess of any positive economic impacts.

Quality of life is one of the most important drivers of the local economy in the area of the Santa Rita and Patagonia Mountains. The abundant protected public lands in the area, such as the Mt. Wrightson Wilderness, Las Cienegas National Conservation Area, and the San Rafael Ranch Natural Area, provide key environmental amenities that are important contributors to quality of life. In addition, U.S. Forest lands within the Coronado National Forest contribute extensive recreational value. As such, these protected public lands are significant economic assets for local and regional economic development.

The proposed Rosemont mine and other mining activities in the area could offer important economic benefits in the form of employment, business purchases, and taxes paid to local governments. The project could also generate significant costs in the form of decreased revenues from outdoor recreation and tourism, decreased property values, increased commuting costs, habitat destruction, surface and groundwater impacts, and permanent environmental degradation that could seriously impact sustainability of the local economy long after the mine has closed and its positive economic impacts have dissipated.

As of the publication date of this report (November 30, 2007), the U.S. Forest Service has not approved the Mine Plan of Operations filed by Augusta Resource Corporation. If it is approved, an environmental review process will begin which includes opportunities for public input. The local community should compare potential benefits and costs to determine whether this and other proposed mining projects are justified. It must consider whether there are ways to change the mining plan to minimize or eliminate risks to the local environment and economy. These issues have to be critically examined as the decisions made will strongly impact the area's future economic prosperity and sustainability.



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Mining's Potential Economic Impacts in the Santa Rita and Patagonia Mountains Region of Southeastern Arizona

INTRODUCTION

The area of southeastern Arizona surrounding the Santa Rita and Patagonia Mountains is home to spectacular landscapes, unique ecosystems rich in biodiversity, and a diverse, robust amenity and knowledge-based regional economy. It is also an area where the Earth's crust is rich in precious and base metal mineral deposits, and where there is a history of mining. These facts, in conjunction with the extensive federal lands open to mining and high metals prices, have led to a significant increase in mineral exploration and development activities in the area over the last few years. As a result, concerns have arisen among various stakeholders about potential impacts on the local economy and environment from proposed mineral exploration and development activities. This report provides economic analysis and interpretation of these issues to inform the debate regarding the impacts of mining and mineral exploration in the area.

Data Sources and Methods

Several sources provided information for this report:

Arizona Game and Fish Department, including *The Economic Importance of Fishing and Hunting*, and *The Economic Importance of Off-Highway Vehicle Recreation*, both produced by Jonathan Silberman, School of Management, Arizona State University West, 2002, *Economic Impact Analysis Of Nonconsumptive Wildlife-Related Recreation In Arizona*, prepared by Southwick Associates, May 2003.

Arizona Office of Tourism, *Arizona Travel Impacts: 1998-2006*, produced by Dean Runyan and Associates, June 2007.

Augusta Resource Corporation, including *Rosemont Copper Project Feasibility Study: NI 43-101 Technical Report*, August 2007, and *Rosemont Mine Plan of Operations*, July 2007.

Western Economic Analysis Center, *The Impact of the Rosemont Mine on the Economies of Pima County, Arizona and the United States*, August 2007.

Economic Profile System (EPS) - This is a data storage and retrieval system developed by the Sonoran Institute in conjunction with the US Bureau of Land Management that creates customized socioeconomic profiles for specific geographies. For this report, profiles were created for the western U.S. (defined here as the 11 contiguous mainland states of Washington, Idaho, Montana, Oregon, Wyoming, California, Nevada, Utah, Colorado, Arizona and New Mexico, collectively termed the West in this report), the state of Arizona, Pima County, Santa Cruz County, an aggregation of the two counties, and two sub-county geographies – the Nogales Census County Division (CCD) and the Patagonia CCD. The EPS uses data from:



- U.S. Department of Commerce, Bureau of Economic Analysis (BEA), Regional Economic Information System (REIS)
- U.S. Department of Commerce, Bureau of the Census: Decennial census of population and housing
- Department of Commerce, Bureau of the Census: County *Business Patterns*
- U.S. Department of Labor, Bureau of Labor Statistics (BLS)

A Survey of Sonoita, Patagonia and Elgin Businesses, conducted by the Save the Scenic Santa Ritas organization and Sonoran Institute, September 2007.

This report provides an economic context with an overview of the changing economy of the West over the last four decades. This is followed by descriptive analyses of the economies of Pima and Santa Cruz counties. The focus is on long-term trends, with a closer look at the period from 1990 to the present.

EPS uses economic activity data categorized using the Standard Industrial Classification (SIC) and the North American Industry Classification System (NAICS). The SIC data are available for the period up to 2000. The U.S. Bureau of Commerce discontinued providing SIC data in 2000 and switched to the NAICS, which was developed in part to better describe the service sectors of the U.S. economy. The SIC and the NAICS methods of classifying economic activity differ. Essentially, the SIC was based on *what* was produced and the NAICS is based on *how* services and products are created. The NAICS is a completely new system of classification and because of this there is a discontinuity in the time series data. As a result of this discontinuity, the EPS produces two separate analyses, one from 1970 to 2000 and one from 2001 to 2005. The economic descriptions in this report follow this approach as well.

The general economic descriptions of the counties and Santa Cruz sub-county divisions are followed by a description of the tourism and travel industry's economic impacts on the area, along with an examination of the economic impacts of hunting, fishing, wildlife watching, and off-highway vehicle recreation. In this report, economic impacts described are limited to *direct* economic impacts. Economic multipliers are not used because there is a high level of uncertainty with respect to indirect and induced economic effects calculated using input-output models at the county and sub-county level.

The report then focuses on potential local and regional economic benefits and costs resulting from the proposed Rosemont project, using data published by Augusta Resource Corporation and the Western Economic Analysis Center. Only direct economic effects are described for reasons discussed above.

Geographic Context

As there are significant geographic components of the issues discussed in this report, it is important to establish a geographic context. Figure 1 shows the area of focus for this report, essentially eastern Pima County and all of Santa Cruz County in south-central Arizona. As can be seen on the map, this part of



Arizona contains extensive public lands, including federal, state, and county. Protected public lands are abundant, including wilderness areas, Saguaro National Park, Buenos Aires National Wildlife Refuge, Las Cienegas National Conservation Area, state natural areas and parks, and the county Cienega Creek Natural Preserve. The Santa Cruz River, Sonoita Creek (running from Sonoita southwesterly through Patagonia), Cienega Creek, and the Babocomari River are all important riparian habitat corridors. Arizona State Highways 82 and 83 between Mt. View and Sonoita, Patagonia and Nogales provide primary tourist and traveler access to the area.

Recent mining claim staking and other mineral exploration activities (mapping, sampling, road construction, drilling) have occurred in the Patagonia Mountains, and in the upper San Rafael Valley (on National Forest land north of the San Rafael Ranch Natural Area). The proposed Rosemont open-pit copper mine is in the north end of the Santa Rita Mountains (labeled on map). As such, it is the eastern portion of Santa Cruz County and the southeastern corner of Pima County that are most likely to experience environmental and socioeconomic impacts from mining and mineral exploration in the area of the Santa Rita and Patagonia Mountains. Socioeconomic impacts are also likely to be experienced in the Tucson metropolitan area, in Nogales, and to a lesser extent along the Santa Cruz River corridor between Nogales and Tucson.



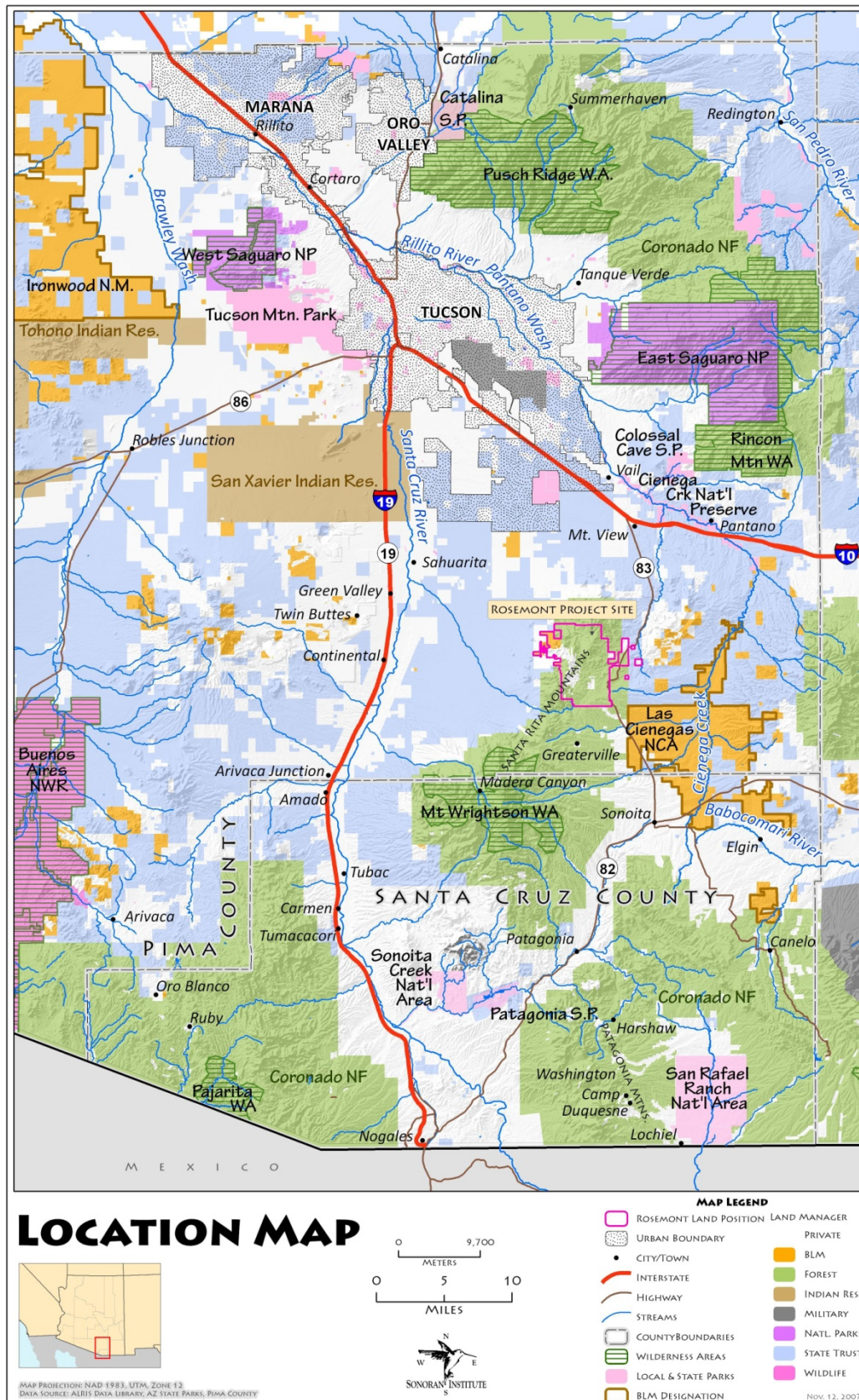


Figure 1: Map of Study Area



FINDINGS

The findings of this report begin with setting the economic context through an examination of the changing economy of the West. This is followed by a descriptive analysis of the current economy in south-central Arizona, analyzing separately the economies of eastern Pima County and Santa Cruz County. Sub-county areas in Santa Cruz County are then examined in order to describe the socioeconomic differences between the Nogales and Patagonia Census County Divisions. Impacts of tourist and travel spending, as well as those of various outdoor recreation activities are then described.

These analyses yielded the following findings:

- Pima County has a robust, diverse economy, with a strong knowledge economy component. The relative importance of the agriculture and mining industry is very small, accounting for 0.4% each of employment in the county, and 0.1% and 0.5%, respectively, of total personal income.
- The economy of Santa Cruz County is much smaller than that of Pima County. Over the last 15 years, the growth in personal income in Santa Cruz County has been primarily due to an increase in income from government, non-labor sources, and wholesale trade. Most of the county's economic activity occurs in Nogales and along the Santa Cruz River corridor to the north.
- Sub-county areas in Santa Cruz County are very different socioeconomically. The Patagonia Census County Division has characteristics of an "amenity-based" economy and an incipient knowledge economy, including in-migration, high educational attainment, higher household income, the presence of second homes, and a significant proportion of residents that work in their homes.
- Tourism and travel spending are very important components of the economy in both Pima and Santa Cruz counties. These activities are relatively more important in Santa Cruz County because of their magnitude relative to the size of the county economy.
- Outdoor recreation activities contribute significantly to the economy of both counties.

Economic Context

In order to establish a context for the economy in the area of the Santa Rita and Patagonia Mountains, it is useful to examine the economy of the West, how that economy is changing, and the factors driving the changes. For the purposes of this report, the West is defined as the 11 contiguous mainland states of Washington, Idaho, Montana, Oregon, Wyoming, California, Nevada, Utah, Colorado, Arizona and New Mexico.

Abundant research indicates that people are moving to the rural West to live, work, and conduct business primarily due to quality-of-life considerations or amenities such as clean air and water, outdoor recreational opportunities, low crime rates, and a pleasant climate, among others (Beyers, Lindahl et al. 1995; Johnson and Rasker 1995; McGranahan 1999; Shumway and Otterstrom 2001). This is a switch from the past when people often migrated to an area primarily based upon employment



availability. In this new structure of local economic development, business and jobs follow the people instead of the reverse (Whitelaw 1992). People move to an area because of its amenities, often visiting first as tourists. Known as “amenity migration,” this in-migration then stimulates the local economy through demand for new home construction and a full range of goods and services. Once a more robust local economy exists with additional amenities such as health care facilities, arts and entertainment, or regular airline service, a new round of migrants is attracted and the cycle repeats.

Protected public lands such as designated wilderness, national parks, and national conservation areas provide key environmental amenities that are important contributors to quality of life. As such, protected public lands are significant economic assets for local and regional economic development. An extensive study of the role of protected public lands in economic prosperity in the West, conducted by the Sonoran Institute, concluded that counties with protected public lands or close to protected lands have the fastest economic growth (Rasker, Alexander et al. 2004). The same study also found evidence that, in addition to protected public lands, other conditions are important for economic prosperity. These include good transportation access to metropolitan areas via road and airline connections, an educated workforce, and a diverse local economy.

The economy of the West has changed greatly over the last 30 to 40 years. Three of the most significant trends are: 1) a rapid growth in the role of services in the economy; 2) the rise of non-labor sources of income; and 3) the diminished levels of jobs and income from extractive industries.

The Bureau of Economic Analysis of the U.S. Department of Commerce (BEA) defines services as “products that cannot be stored and are consumed at the place and time of their purchase.” This category includes an extremely wide range of sectors, including arts and entertainment, lodging and food services, health and social services, finance, insurance and real estate, engineering and scientific services, and public administration, among others. This wide variety of activities includes high-wage high-skill occupations like doctors and financial consultants, as well as low-wage, low-skill positions such as landscapers and hotel maids. As such, it is important to differentiate categories of service-sector jobs in order to understand which service subsectors are growing.

The EPS profiles used to organize the data and create the figures for this report organize services into producer, consumer, social and government services, together comprising the category services and professional. *Producer services* is a relatively high-wage category and includes occupations such as real estate, insurance, finance, engineering, business services, and research. This category is a large component of the “knowledge economy.” *Consumer services* is mostly a low-wage category that includes food service, accommodation, retail, and personal services. By tracking the various service categories, it is possible to obtain a clear picture of a local economy.



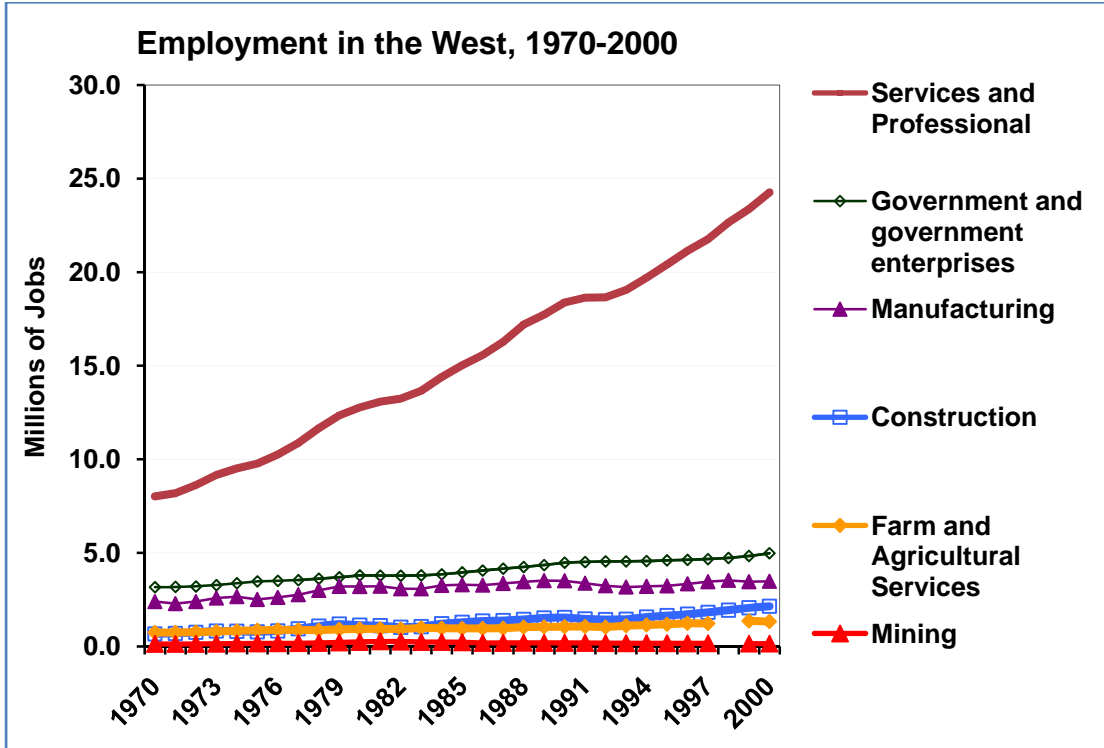


Figure 2: Employment, Western U.S., 1970-2000

As can be seen in Figure 2, nearly all of the new jobs created in the West since 1970 have been in the services and professional category. Most other categories of employment have maintained a relatively steady level.

Table 1 shows personal income data for the West broken down into various sectors such as transformative, distributive, retail trade, etc. The category of *services* as been re-classified into producer services (mainly high-wage, associated with producing goods), consumer services (mainly low-wage), social services, and government services. The last two categories are a mixture of high-wage and low-wage services. As can be seen in Table 1, the fastest-growing service sector in the West in the decade between 1990 and 2000 was producer services, which grew by 96% and accounted for 35% of all new personal income.



Table 1: Personal Income, Western U.S., 1990 and 2000

Personal Income					
All figures in millions of 2005 dollars	1990	2000	New Income	% Change	% of New Income
Total Personal Income	1,545,637	2,139,482	593,845	38%	
Labor Income					
Transformative					
Agriculture	12,089	15,912	3,823		
Mining	11,765	12,105	341		
Construction	76,670	107,490	30,820		
Manufacturing	195,533	250,970	55,437		
Total	296,056	386,478	90,421	31%	15%
Distributive					
Transportation & public utilities	74,136	108,459	34,323		
Wholesale Trade	34,708	34,718	10		
Total	108,844	143,177	34,333	32%	6%
Retail Trade	115,294	149,791	34,498	30%	6%
Consumer Services					
Hotels & Other Lodging	14,183	22,279	8,096		
Personal Services	11,070	12,150	1,080		
Household Services	3,622	0	-3,622		
Repair Services	17,763	24,353	6,590		
Motion Pictures	13,862	23,523	9,661		
Amusements and Recreation	12,465	18,082	5,617		
Total	72,965	100,387	27,422	38%	5%
Producer Services					
Finance, Insurance & Real Estate	70,315	143,837	73,521		
Legal Services	27,310	32,088	4,778		
Business Services	62,630	163,741	101,111		
Engineering & Management Services	47,063	72,890	25,827		
Membership Organizations	9,762	13,789	4,026		
Total	217,081	426,345	209,264	96%	35%
Social Services					
Health Services	86,025	104,704	18,679		
Social Services	7,694	14,781	7,087		
Educational Services	8,095	13,746	5,651		
Total	101,814	133,231	31,417	31%	5%
Government Services					
Federal,Civilian	43,788	45,115	1,327		
Military	28,220	20,790	-7,430		
State and Local	146,423	189,197	42,775		
Total	218,430	255,102	36,671	17%	6%

Non-labor income derives from two sources: investments and transfer payments. Investments provide dividends, interest, and rent. This includes income from retirement plans and investment accounts. Transfer payments are government payments to individuals, such as Social Security and Medicare. As can be seen in Figure 3, non-labor sources are the second largest source of personal income and the second-fastest-growing source in the West, accounting for 30% of all personal income in 2000 and 33% of new income growth between 1970 and 2000. In some areas of the West, non-labor income is the



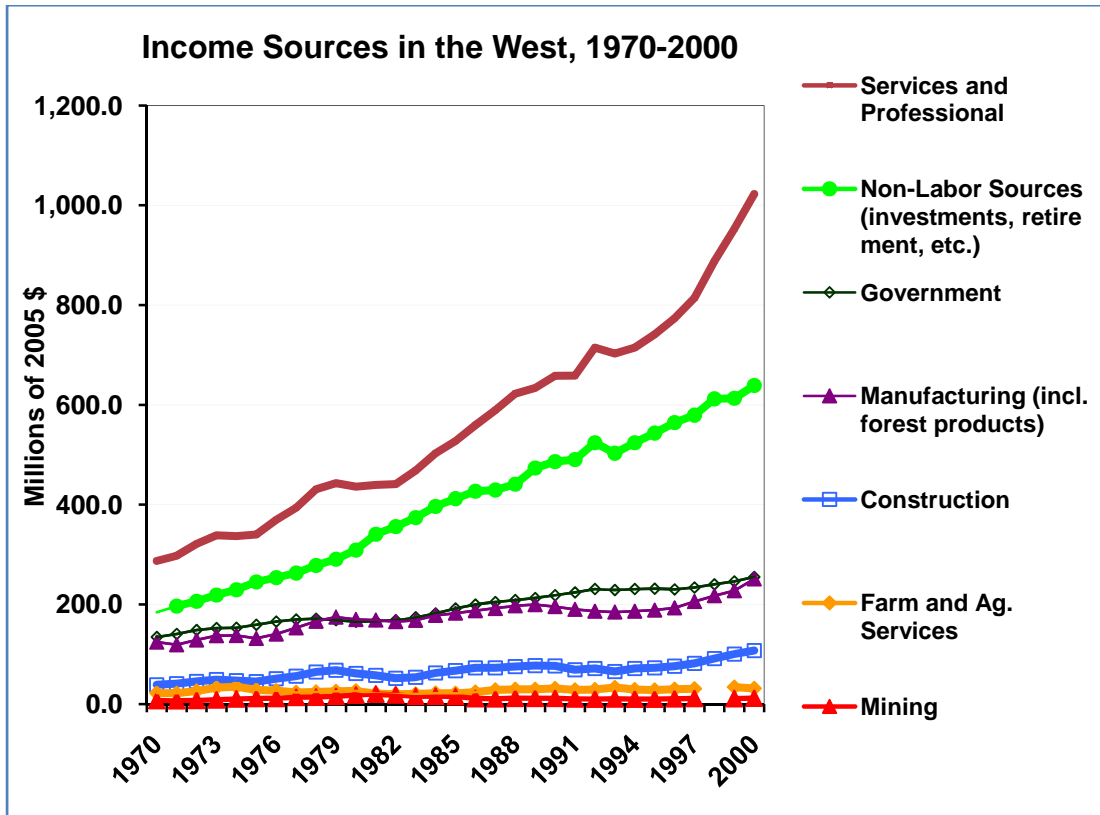


Figure3: Income Sources, Western U.S., 1970 - 2000

single largest source of income for many communities and has become a very important source of economic growth as people build second homes and retire in areas that they formerly visited as tourists.

As the economy of the West has grown and diversified over the last 30 to 40 years, the traditional extractive industries of mining, logging, oil and gas, and agriculture have become a much smaller component of the economy in a relative sense. In 2000, personal income from these sectors represented less than 8% of total personal income, down from 20% in 1970. As can be seen in both Figures 2 and 3, nearly all of the growth in employment and personal income has been in other sectors of the economy. Productivity increases in the extractive industries driven by technological advances have led to decreasing labor requirements. Higher-quality resource discoveries elsewhere in the world, in conjunction with freer international trade and low-cost labor, also contribute to the long-term decline of the resource industries in the West.

Rasker et al. (2004) found that states and counties in the West that were more dependent on the “transformative” industries such as mining, logging, agriculture, and manufacturing had the slowest economic growth whereas those with a diversified economy more dependent upon producer services grew the fastest.



To summarize the changing economy of the West:

- The economy over the last three to four decades has become much more diversified, with a mix of service sector businesses joining the traditional extractive resource industries. The amenity economy and knowledge economy are very important components of the economic picture in the West.
- The extractive industries are a much smaller but still important sector of the economy. The West is no longer dependent on resource extraction, with only a few exceptions. The extractive industries are not likely to provide a significant source of new employment and income.
- Counties and states with resource-based economies have the slowest economic growth.
- The service industries have grown greatly during the last 30 to 40 years. There is a great diversity in wage levels among the service sectors. Locales with a “knowledge economy” having a greater proportion of producer services such as finance, engineering, and business services have faster growth than areas dependent on low-wage consumer services such as accommodations and food service.
- Retirement and investment income has become a very significant economic driver in many rural areas of the West.



The Current Economy in the Area of the Santa Rita and Patagonia Mountains

Mineral exploration and proposed mining in the areas within and adjacent to the Santa Rita and Patagonia Mountains occur for the most part in eastern Santa Cruz County and southeastern Pima County. Since the two counties are quite different socioeconomically, they will be examined separately in this report.

Pima County

The economy of Pima County is dominated by the Tucson metropolitan area, located in its eastern portion. Most of the population, as well as business and government activities are in Tucson.

Population growth in Pima County between 1970 and 2005 was about 569,000 people, an increase of 160%. For comparison, population in Maricopa County grew by 271% over the same period.

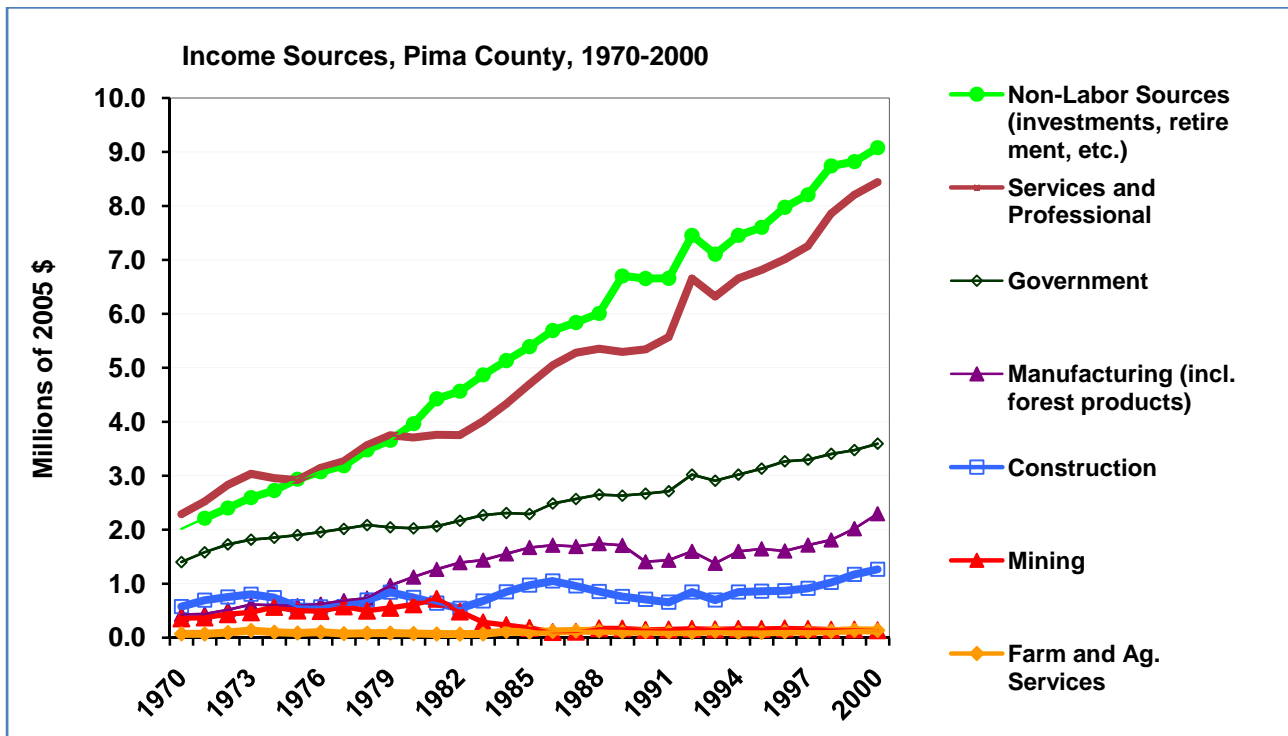


Figure 4: Income Sources, Pima County, 1970-2000

Over the period of 1970-2000, 72% of the job growth and 37% of the personal income growth was in the services and professional sector. Non-labor income accounted for 43% of the new personal income over the same period, the fastest growing and largest single source of personal income, as can be seen in Figure 4. Manufacturing, government, and construction personal income also increased moderately, especially since about 1990. Agriculture and mining sources of personal income were flat and decreasing, respectively. These trends generally match those of the West, except non-labor sources are more important in Pima County, as can be seen by comparing Figures 3 and 4.



Table 2: Personal Income, Pima County, 1990 and 2000

Personal Income					
All figures in millions of 2005 dollars	1990	2000	New Income	% Change	% of New Income
Total Personal Income	15,992.4	23,265.4	7,273.0	45.5%	
Labor Income					
Transformative					
Agriculture	71.5	114.1			
Mining	145.3	135.5			
Construction	710.6	1,266.2			
Manufacturing	1,406.7	2,293.8			
Total	2,334.2	3,809.8	1,475.6	63.2%	20.3%
Distributive					
Transportation & public utilities	485.6	683.1			
Wholesale Trade	332.3	504.8			
Total	817.8	1,187.9	370.1	45.3%	5.1%
Retail Trade					
	1,186.9	1,536.4	349.5	29.4%	4.8%
Consumer Services					
Hotels & Other Lodging	137.5	261.1			
Personal Services	128.7	168.6			
Household Services	41.7	44.4			
Repair Services	157.9	234.0			
Motion Pictures	0.0	15.1			
Amusements and Recreation	79.9	125.2			
Total	545.7	848.5	302.8	55.5%	4.2%
Producer Services					
Finance, Insurance & Real Estate	397.6	895.7			
Legal Services	206.6	209.5			
Business Services	361.5	1,185.8			
Engineering & Management Services	326.7	585.8			
Membership Organizations	81.8	117.5			
Total	1,374.3	2,994.3	1,620.0	117.9%	22.3%
Social Services					
Health Services	1,177.1	1,496.1			
Social Services	159.0	257.2			
Educational Services	30.2	70.8			
Total	1,366.3	1,824.2	457.9	33.5%	6.3%
Government Services					
Federal, Civilian	499.1	699.8			
Military	351.6	406.3			
State and Local	1,816.5	2,487.1			
Total	2,667.2	3,593.2	926.0	34.7%	12.7%

The reclassified data for the period between 1990 and 2000, shown in Table 2, indicate that producer services have grown the most. This was followed by the transformative sector, where most of the growth occurred due to construction and manufacturing.



These data show that Pima County has a robust, diverse economy with a strong knowledge economy component, typical of metropolitan areas in the West. The relative importance of the agriculture and mining industry is very small. In fact, data from 2005 indicate that agriculture and mining account for 0.4% each of employment and 0.1% and 0.5%, respectively, of total personal income in Pima County.

Santa Cruz County

Santa Cruz County lies between the Tucson metropolitan area and the U.S.-Mexico border (see Figure 1). The largest city and county seat, Nogales, is a major port of entry from Mexico. Most of the county's population is distributed along the Santa Cruz River which flows northward toward the Tucson basin. All of the major employers are in this area as well.

The eastern portion of the county, where the communities of Patagonia, Sonoita, and Elgin are located, has a much smaller population and lower population density. The Patagonia Census County Division, which comprises the eastern portion of the county, had a population in 2000 of 2,781, about 7% of the total county population.

Population growth in Santa Cruz County between 1970 and 2005 was about 28,000 people, an increase of 198%.

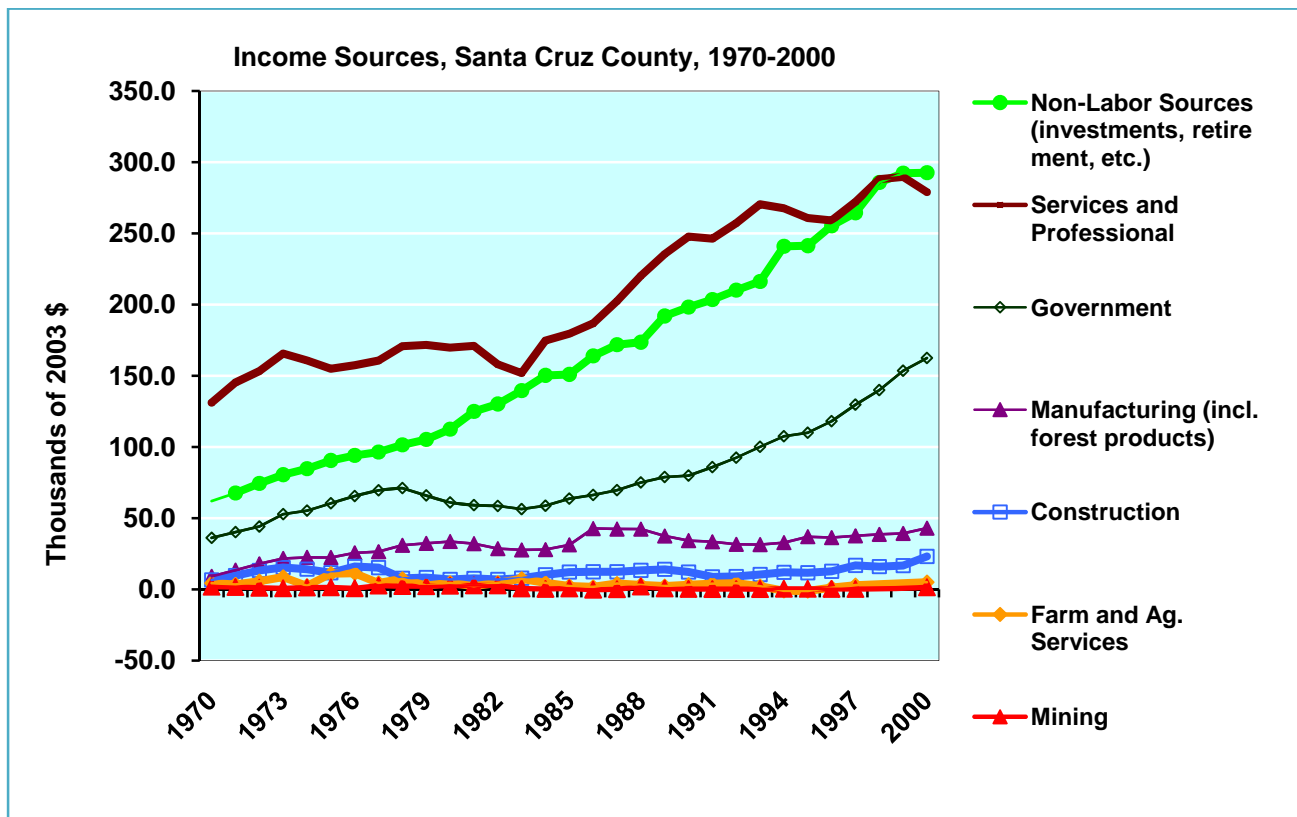


Figure 5: Income Sources, Santa Cruz County, 1970-2000



Over the period 1970 to 2000, 62% of the job growth and 31% of the personal income growth were in the services and professional sector. Non-labor income accounted for 48% of the new personal income over the same period, the fastest growing and largest single source of personal income, as can be seen in Figure 5. Personal income derived from government employment has risen steadily since about 1985, while manufacturing, construction, agriculture, and mining personal income has remained fairly steady especially since the mid-1980s.

Table 3: Personal Income, Santa Cruz County, 1990 and 2000

Personal Income					
All figures in millions of 2005 dollars	1990	2000	New Income	% Change	% of New Income
Total Personal Income	535.3	738.0	202.7	37.9%	
Labor Income					
Transformative					
Agriculture	1.2	4.7			
Mining	0.3	1.6			
Construction	12.7	24.0			
Manufacturing	35.5	44.5			
Total	49.7	74.7	25.0	50.3%	12.3%
Distributive					
Transportation & public utilities	29.1	54.4			
Wholesale Trade	86.7	93.3			
Total	115.8	147.7	31.9	27.6%	15.8%
Retail Trade	73.8	64.3	-9.5	-12.9%	-4.7%
Consumer Services					
Hotels & Other Lodging	7.0	11.4			
Personal Services	1.1	1.0			
Household Services	3.1	1.2			
Repair Services	2.5	0.0			
Motion Pictures	0.0	0.0			
Amusements and Recreation	0.0	2.3			
Total	13.7	16.0	2.3	16.9%	1.1%
Producer Services					
Finance, Insurance & Real Estate	9.4	14.8			
Legal Services	1.8	1.8			
Business Services	5.8	4.7			
Engineering & Management Services	11.1	12.8			
Membership Organizations	2.3	4.2			
Total	30.4	38.5	8.0	26.3%	4.0%
Social Services					
Health Services	14.4	11.9			
Social Services	3.6	2.2			
Educational Services	0.0	2.1			
Total	18.1	16.2	-1.8	-10.2%	-0.9%
Government Services					
Federal, Civilian	28.5	89.7			
Military	1.7	1.5			
State and Local	52.5	76.8			
Total	82.7	168.0	85.3	103.2%	42.1%



The reclassified personal income data over the period 1990-2000 indicates that government services grew the most at 103% and accounted for 42% of new personal income. This was followed by transformative industries at 50% (12% of new income) with most of the growth due to construction and manufacturing. Personal income from distributive industries grew by 28%, which represented 16% of new personal income.

Using the NAICS data for the period 2001 to 2005, 52% of new personal income derived from government, 20% was from wholesale trade, and 9% due to retail trade. Construction was flat and manufacturing down about 47%.

What this means is that over the last 15 years, the growth in personal income in Santa Cruz County has been primarily due to an increase in income from government, non-labor sources, and wholesale trade. Most of this economic activity occurs in Nogales and along the Santa Cruz River corridor to the north. The wholesale trade is associated with imports from Mexico.

Comparison of Santa Cruz County Sub-areas

Even though small geographically, Santa Cruz County exhibits large socioeconomic differences between its eastern and western portions. The U.S. Census Bureau splits the county into two Census County Divisions (CCDs), the Nogales CCD and the Patagonia CCD (see Figure 6). To more clearly understand the economic structure of the county, it is important to examine the difference between the two CCDs. As the Patagonia CCD is much less populated, and consequently has a considerably smaller economy, the overall county-level economic data do not accurately reflect the economic structure in this portion of the economy. In effect, the Patagonia CCD economy is subsumed in the overall county economic data; the magnitude of the Nogales CCD economy is much greater and thereby masks the actual economic structure in the Patagonia CCD.



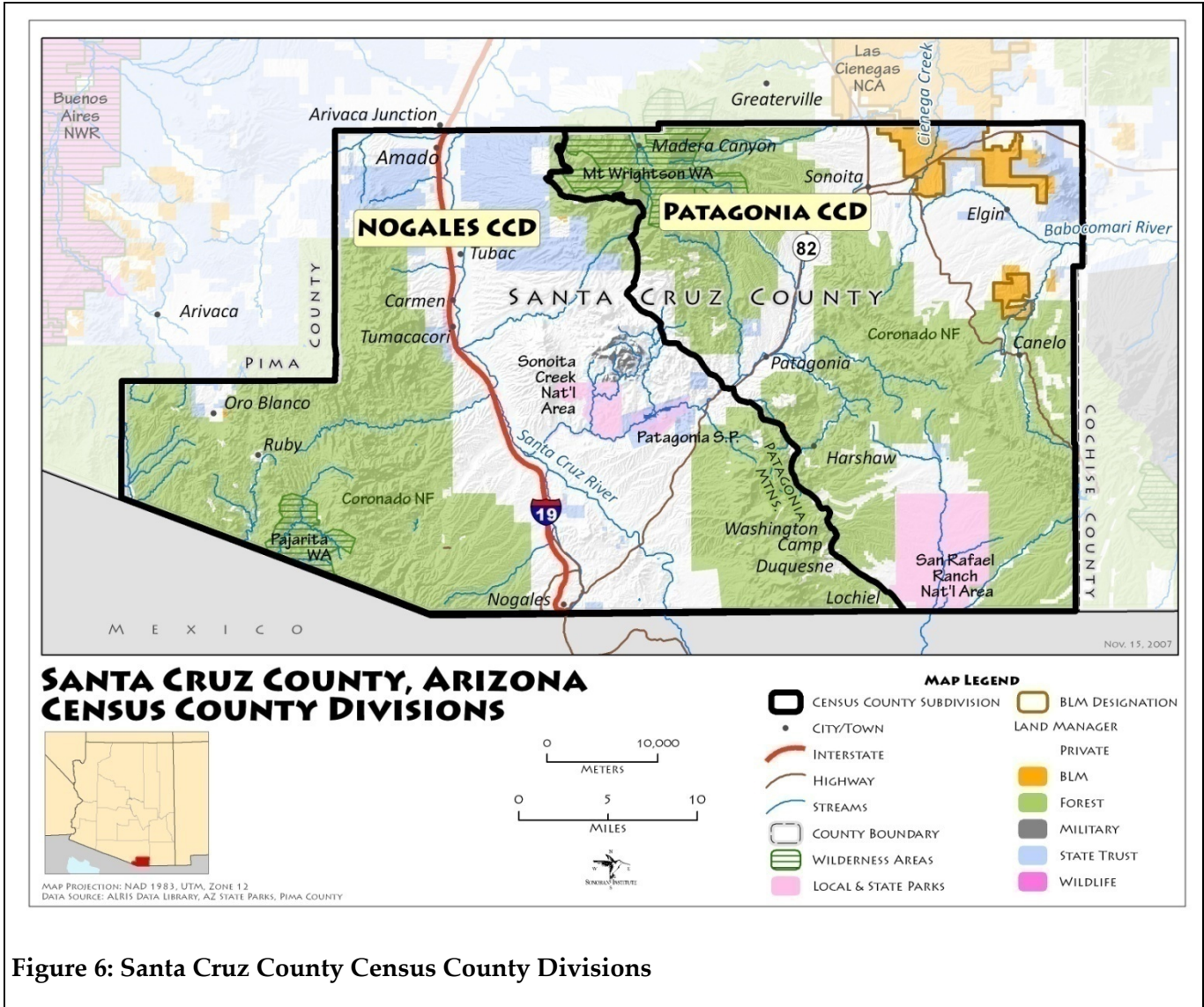


Figure 6: Santa Cruz County Census County Divisions



The population of the Nogales CCD in 2000 was 35,600; that of the Patagonia CCD was 2,781. Figure 7 shows the age distribution of the two areas and indicates there are significant differences between them. The Patagonia CCD figure on the right below shows an older population, with more retirement-age residents, while the Nogales CCD has a much larger proportion of residents under 20 years old.

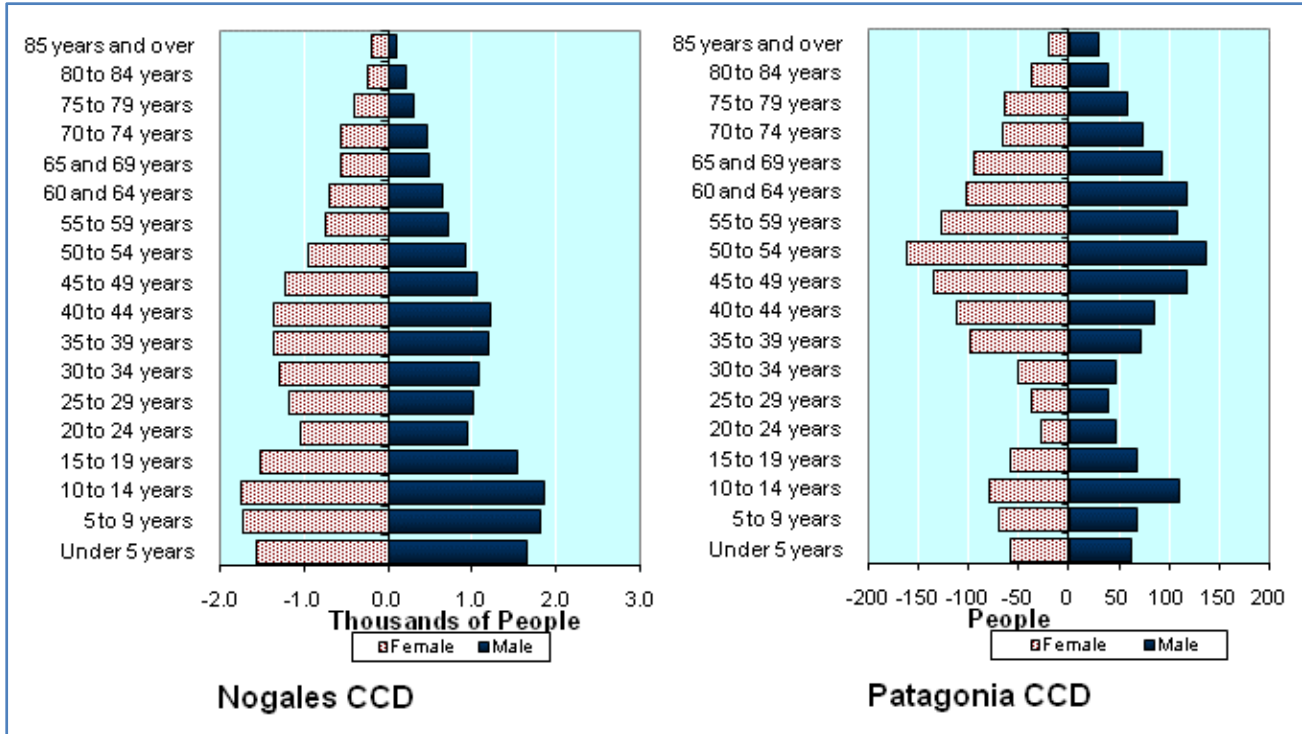


Figure 7: Age Distribution, Nogales and Patagonia CCDs, 2000

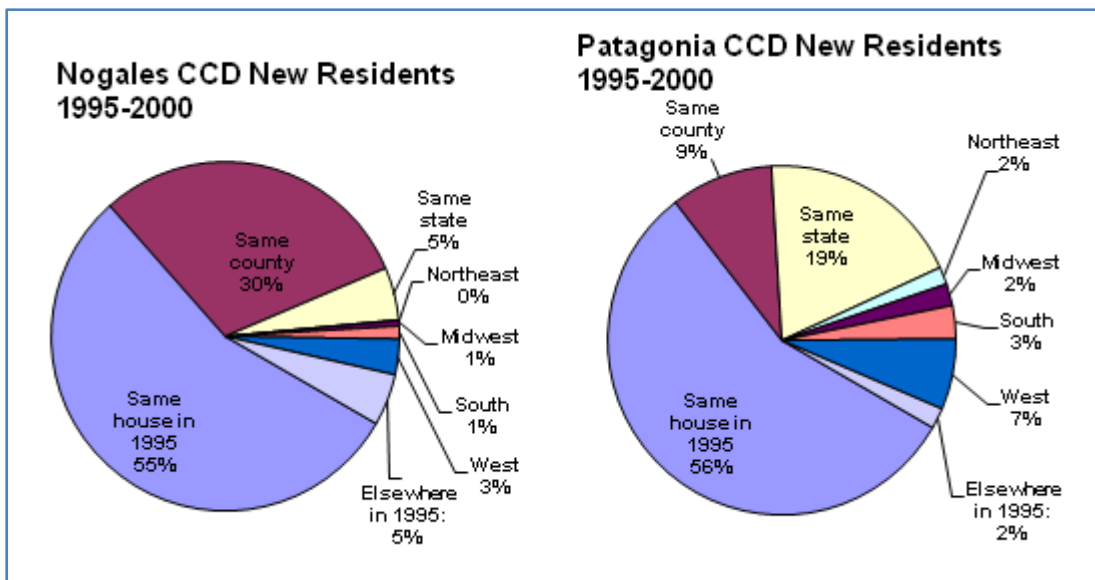


Figure 8: In-migration, Nogales and Patagonia CCDs, 1995-2000



The county has experienced a net in-migration that also has different expressions across the CCDs in the county, as seen in the Figure 8. A total of 15% of the residents in 2000 in Nogales CCD are new, whereas about 34% of the Patagonia residents in 2000 are new. Essentially, Patagonia CCD attracts more residents in proportion to its population.

Educational attainment across the different CCDs in Santa Cruz County also varies, with the Patagonia CCD population generally having a higher proportion of post-secondary education and a smaller proportion of residents with less than high school education, as is shown in Figure 9.

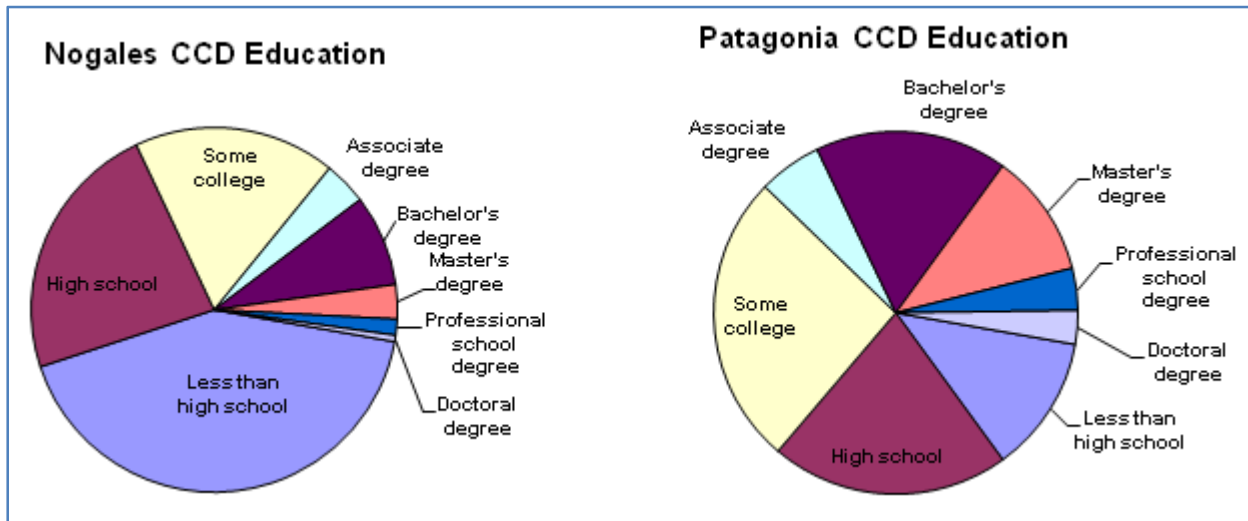


Figure 9: Educational Attainment, Nogales and Patagonia CCDs, 2000



Table 4: Comparison of Employment, Nogales and Patagonia CCDs, 2000

Nogales CCD Top 10 Employment Categories by Industry		Patagonia CCD Top 10 Employment Categories by Industry	
1) Retail trade	18.4%	1) Educational, health and social services:	24.0%
2) Educational, health and social services:	13.3%	2) Arts, entertainment, recreation, accommodation and food services:	12.5%
3) Wholesale trade	9.6%	3) Retail trade	8.9%
4) Arts, entertainment, recreation, accommodation and food services:	9.2%	4) Profess., scientific, management, admin., and waste management services:	8.7%
5) Public administration	8.2%	5) Public administration	8.3%
6) Manufacturing	7.7%	6) Construction	8.3%
7) Construction	7.5%	7) Other services (except public administration)	5.9%
8) Transportation and warehousing, and utilities:	6.5%	8) Manufacturing	5.9%
9) Profess., scientific, management, admin., and waste management services:	6.3%	9) Finance, insurance, real estate and rental and leasing:	5.4%
10) Finance, insurance, real estate and rental and leasing:	5.9%	10) Agriculture, forestry, fishing and hunting, and mining:	5.0%
Total of Top 10	92.6%	Total of Top 10	92.8%
Top 10 Employment Categories by Occupation		Top 10 Employment Categories by Occupation	
1) Sales and related occupations	17.0%	1) Professional and related occupations:	25.3%
2) Office and administrative support occupations	16.8%	2) Management, business, and financial operations occupations:	14.6%
3) Management, business, and financial operations occupations:	12.1%	3) Office and administrative support occupations	11.9%
4) Professional and related occupations:	11.4%	4) Sales and related occupations	9.7%
5) Transportation and material moving occupations:	8.0%	5) Food preparation and serving related occupations	6.6%
6) Production occupations	7.6%	6) Construction and extraction occupations:	6.1%
7) Construction and extraction occupations:	6.1%	7) Protective service occupations:	4.4%
8) Food preparation and serving related occupations	4.6%	8) Personal care and service occupations	3.8%
9) Building and grounds cleaning and maintenance occupations	4.5%	9) Building and grounds cleaning and maintenance occupations	3.7%
10) Installation, maintenance, and repair occupations	3.7%	10) Transportation and material moving occupations:	3.5%
Total of Top 10	92.0%	Total of Top 10	89.7%

Sources of income by industry and by occupation are also quite different across the two CCDs, as can be seen in Table 4. Retail and wholesale trade are much more important in the Nogales CCD. The Patagonia CCD has nearly twice the percentage of educational, health, and social services employees, and significantly greater percentages of arts, entertainment, recreation, accommodation, and food services, and professional services employees as in the Nogales CCD.

When employment is sorted by occupation (bottom half of Table 4), it can be seen that the Patagonia CCD has more than twice the percentage of professional and related occupations.

In addition to occupational differences, where people work and how long they commute to arrive at the workplace is quite different across the two CCDs. Ten percent of Patagonia CCD residents work at home, while only 3.3% of Nogales CCD residents do so. A significantly greater percentage of Patagonia CCD residents commute to work outside the county, 28% versus 7% for Nogales CCD. The



proportions of commute times longer than 45 minutes indicate that a greater percentage of Patagonia CCD workers are commuting to Tucson and Sierra Vista to work.

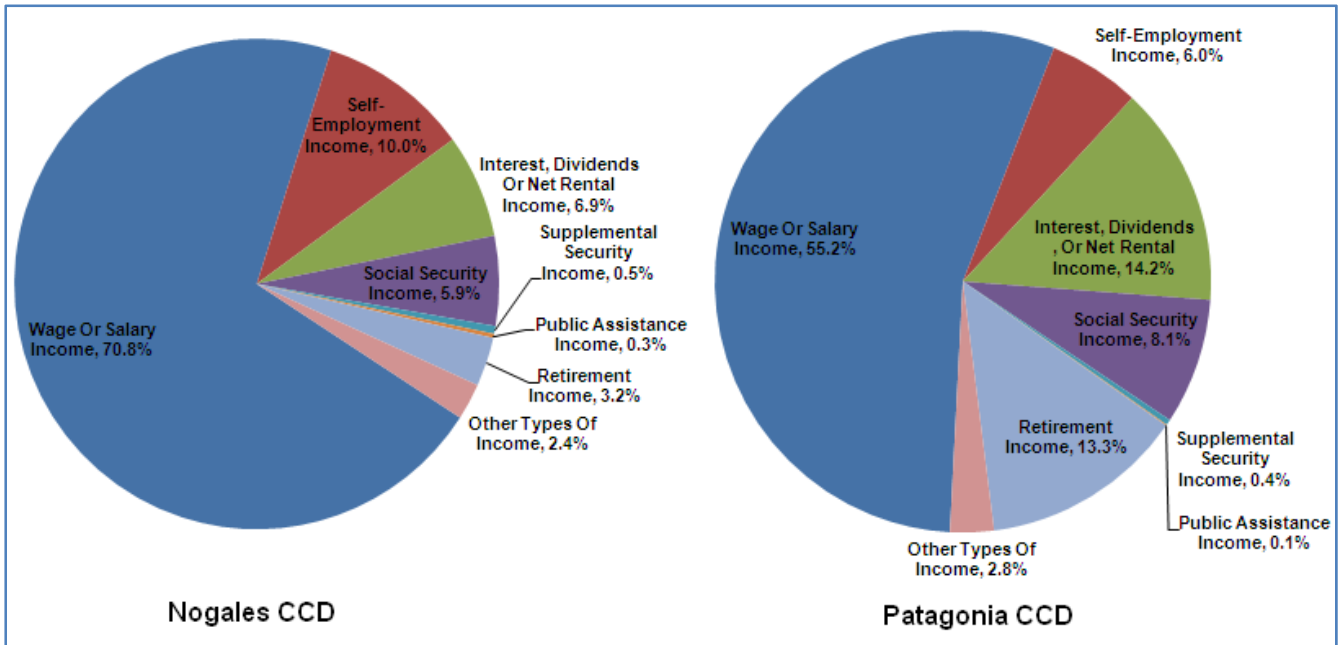


Figure 10: Income Sources, Nogales and Patagonia CCDs, 2000

As can be seen in Figure 10, investment and retirement income sources make up significantly greater percentages of personal income in the Patagonia CCD .

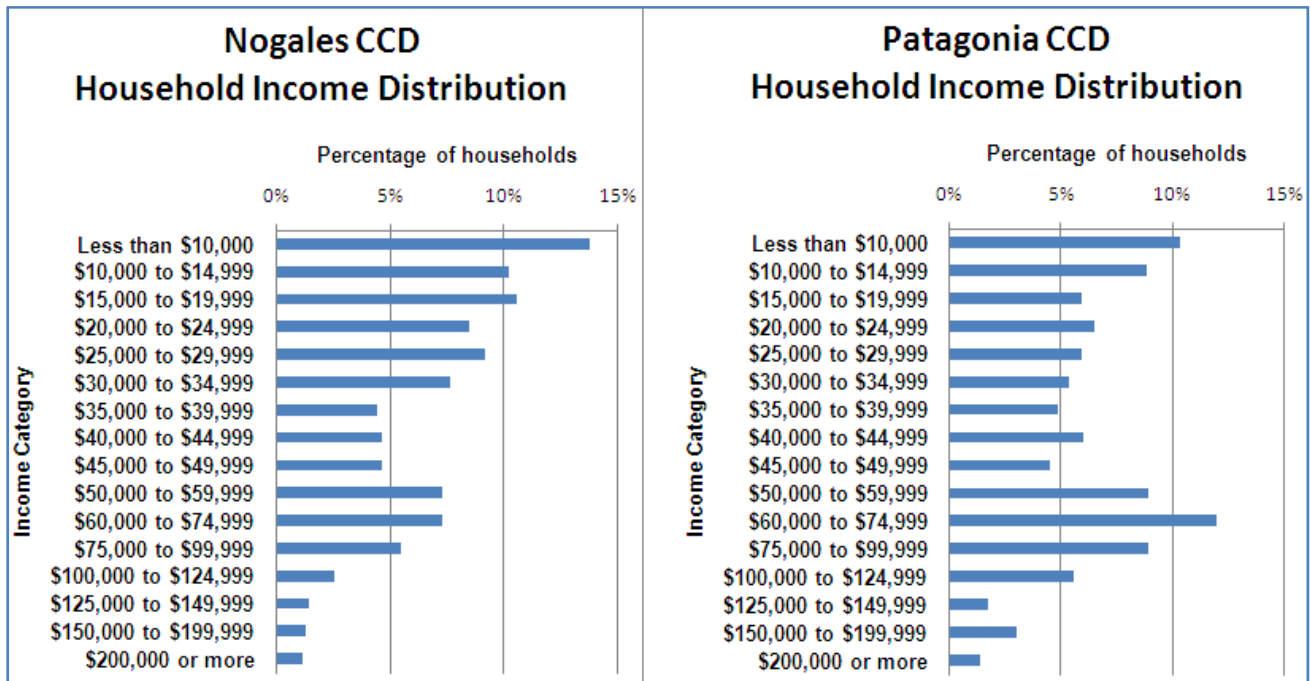


Figure 11: Household Income Distribution, Nogales and Patagonia CCDs, 2000



Figure 11, which shows household income distribution, indicates that the Patagonia CCD has a greater proportion of high-income households and a lower proportion of low-income households.

Housing data show that the median owner-occupied house value in 2000 was \$172,200 in Patagonia CCD and \$92,600 in Nogales CCD. The proportion of second homes is also much different between the two CCDs, with Patagonia CCD data indicating 10.2% of the houses are vacant units for seasonal, recreational, or occasional use and 1.5% in Nogales CCD.

Interpretation of economic data for Santa Cruz County sub-areas

It is clear from the foregoing data that the Nogales/Santa Cruz River corridor hosts a much different economy than the Patagonia/Sonoita/Elgin area.

Some significant observations regarding the economy in the Patagonia CCD include:

- The economy in the Patagonia CCD is certainly much smaller.
- The older population, large share of retirement and investment income, percentage of second homes, in-migration, and commuting data clearly indicate that the area has a small but developing amenity economy.
- People are moving in to retire or to live and commute to Tucson, most likely because of the high quality of life in the area.
- Occupation and income source data, household income distribution, and educational attainment figures show an incipient knowledge economy. This is still a relatively small part of the economic picture in Patagonia CCD, but one that is likely to continue to develop.

As the Patagonia CCD hosts a developing amenity and knowledge-based economy, it is particularly susceptible to any activities, such as mining, that might degrade the quality-of-life enjoyed by current residents and that attracts visitors and new residents who support the local economy.

Tourism and Travel

The tourism and travel sector is not present as an explicit category in the SIC and NAICS. To understand this sector of the economy, one approach is to model, in an integrated manner, data from particular industries, such as hotels and lodging or amusement, along with tax data. Such a model was employed in a study commissioned by the State of Arizona Office of Tourism by Dean Runyan Associates to analyze tourism in the state during the period 1998 to 2006 (Dean Runyan 2007). The report was released in June, 2007. The study provides estimated direct, indirect, and induced visitor spending, employment, personal income, and government tax revenue generated by travelers to Arizona. Dean Runyan Associates used their proprietary Regional Travel Impact Model to estimate direct impacts resulting from spending by visitors to the state. The estimates are presented for the



entire state and are also broken down by county. In this report, the focus will be on the direct impacts, as the accuracy of county-level indirect and induced impacts is difficult to ascertain.

Travel and tourism are a very important export component of Arizona's economy in that they bring income from outside the state. Figure 12, from Dean Runyan Associates indicates that travel and tourism is the second largest single export component of Arizona's economy. Most of the travel spending in the state (about 75%) occurs in Maricopa and Pima counties. However, travel spending is actually *more* important in the rural counties because it is a much larger proportion of the local economies than it is in the major metropolitan areas.

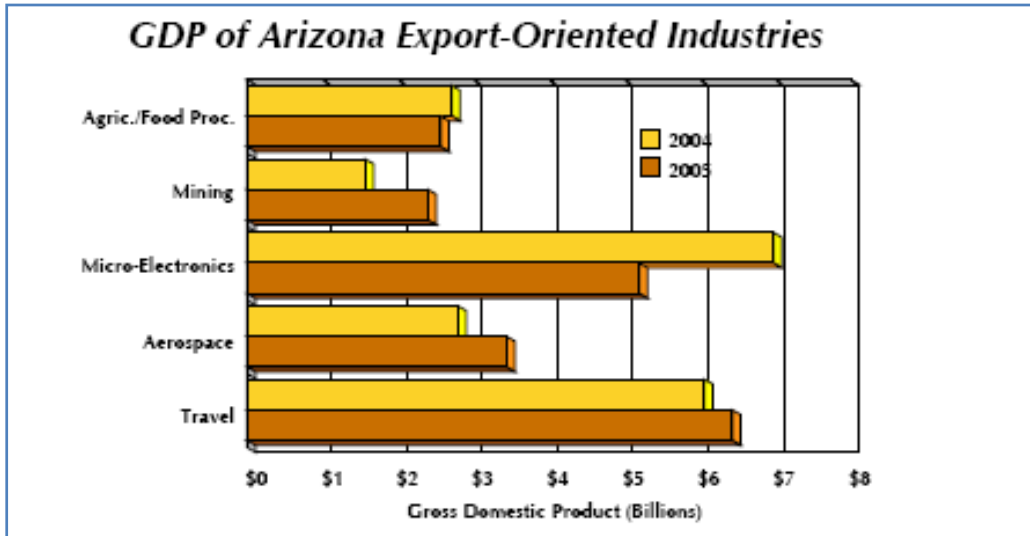


Figure 12: Travel Spending in Relation to Other Export Industries in Arizona
(Dean Runyan, 2007)

Tourism is likely to increase in the region in the coming decades, due in part to two new initiatives that would highlight the area's natural and cultural attributes to a wider range of potential visitors. Geotourism is a concept put forth by the National Geographic Society and is defined as "tourism that sustains or enhances the geographic character of a place – its environment, culture, aesthetics, heritage, and the well-being of its residents." Incorporating and extending the concept of ecotourism, it considers that tourism revenue can promote conservation, culture, and history. The Sonoran Desert region generally, and the area of focus for this report specifically, have abundant cultural and natural attributes that appeal to the tourist market: scenic landscapes, rich biodiversity, interesting history, and a mix of cultures. The region has more plants and animals than any other desert in the world, a system of historic Spanish missions and presidios, important bird habitats and migration routes, important archaeological sites, and one of North America's longest-inhabited areas – the Santa Cruz River Valley. These attributes and qualities are a major tourist draw for the area.

In 2005, the state of Arizona and the state of Sonora in Mexico signed a National Geographic Geotourism Charter to promote sustainable tourism and destination stewardship in the Sonoran Desert region. The project, which is a collaboration among the Sonora and Arizona offices of tourism, the U.S.



Bureau of Land Management, and the Sonoran Institute has produced a geotourism map-guide highlighting interesting destinations for tourists and travelers — several in the area of the Santa Rita and Patagonia Mountains. The map-guide is expected to bring further attention and tourists to the region in the near future.

The proposed Santa Cruz Valley National Heritage Area also encompasses the region of focus for this report. According to the definition by the National Park Service, a National Heritage Area is a place designated by the United States Congress where natural, cultural, historic, and recreational resources combine to form cohesive, nationally distinctive landscapes arising from patterns of past and present human activities shaped by geography. The Santa Cruz Valley National Heritage Area bill was passed by the U.S. House of Representatives on October 24, 2007. This designation, when completed, will bring additional heritage and nature tourism, create employment, and contribute to the tourism and travel spending in the area.

Tourism Impacts in Pima County

Total direct travel spending in Pima County in 2006 was estimated at \$2.26 billion. A graph of estimated total direct travel spending in Pima County for the period 1998 – 2006 is shown in Figure 13. (Note: 2006p indicates preliminary results.) The employment impact of tourism is substantial, generating an estimated 25,870 jobs in Pima County in 2006, which accounted for more than 5% of total county employment.

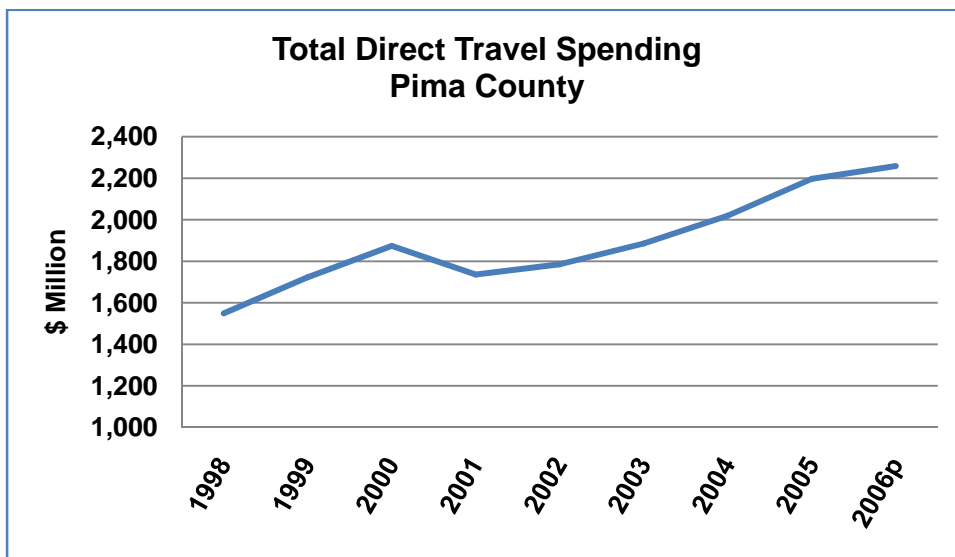


Figure 13: Total Direct Travel Spending, Pima County, 1998 - 2006



Over the last nine years, food and beverage and retail sales are consistently the highest two direct spending categories, as can be seen in Figure 14. In the last two years, food and beverage has risen above retail sales to be the leading category.

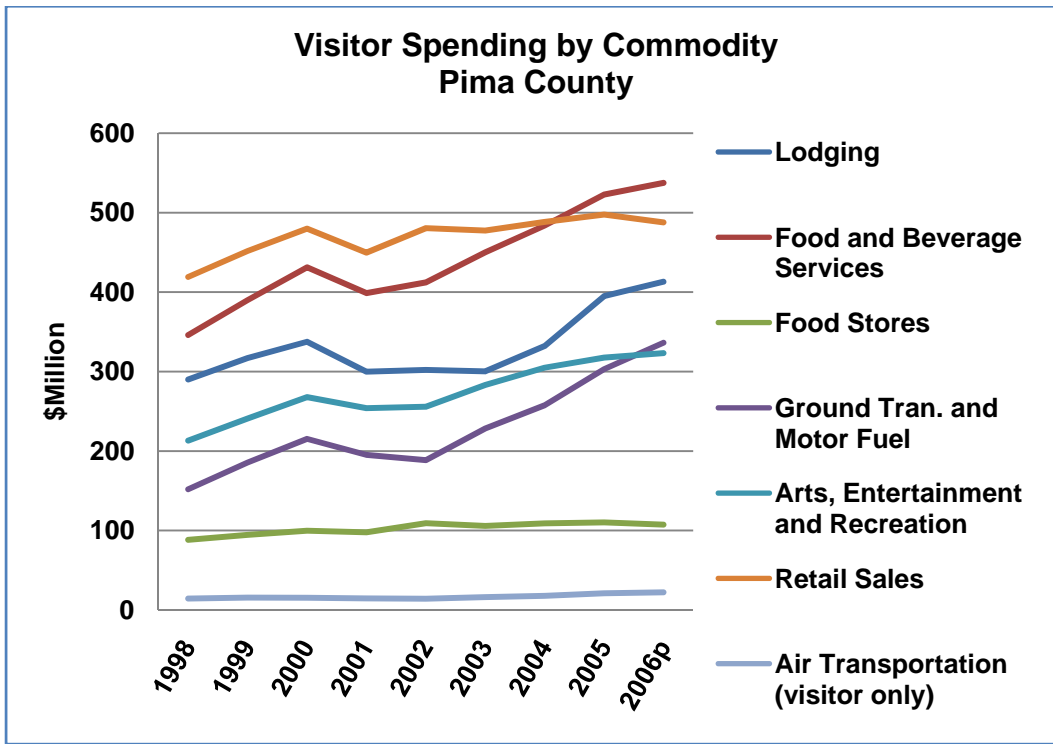


Figure 14: Visitor Spending Categories, Pima County, 1998 - 2006

The travel industry generates a significant proportion of state and local government revenues through the collection of state and local sales tax, lodging tax, and motor fuel tax on visitor spending. An

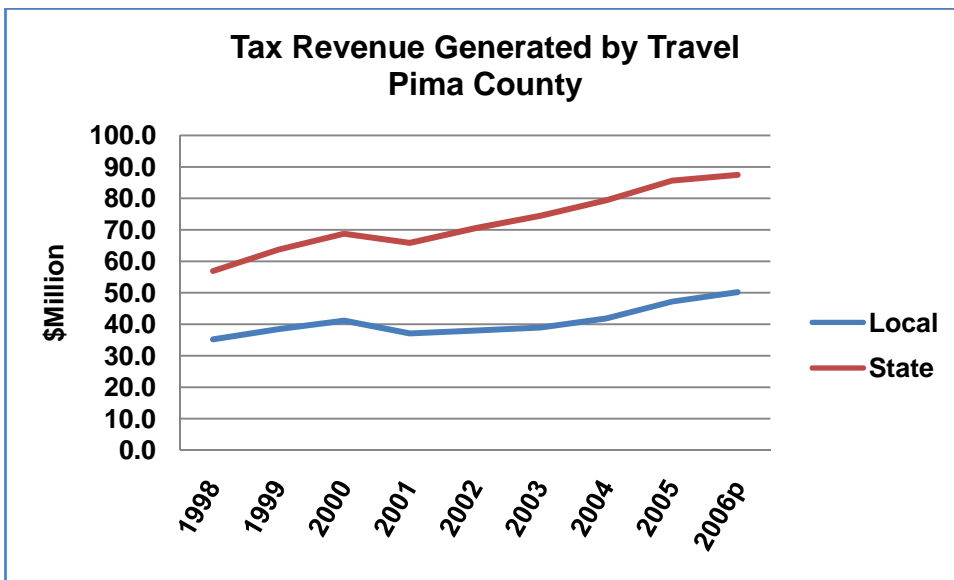


Figure 15: Travel-generated Tax Revenue, Pima County, 1998 - 2006



important aspect of tax receipts generated by travel spending is that the taxes are paid by visitors instead of residents. In Pima County, estimated total direct government revenue for 2006 was \$137.6 million. Figure 15 shows state and local tax revenue generated by the travel industry from 1998 - 2006.

To summarize, direct travel spending in Pima County is an important component of the county economy, accounting for over 5% of total employment and 4% of total wages and salary disbursement in the county.

Tourism Impacts in Santa Cruz County

Total direct travel spending in Santa Cruz County in 2006 was estimated at \$254.2 million. A graph of estimated total direct travel spending in Santa Cruz County for the period 1998 – 2006 is shown in Figure 16. (Note: 2006p indicates preliminary results.) Tourism generated an estimated 2,130 jobs in the county in 2006, which accounted for more than 12% of total county employment.

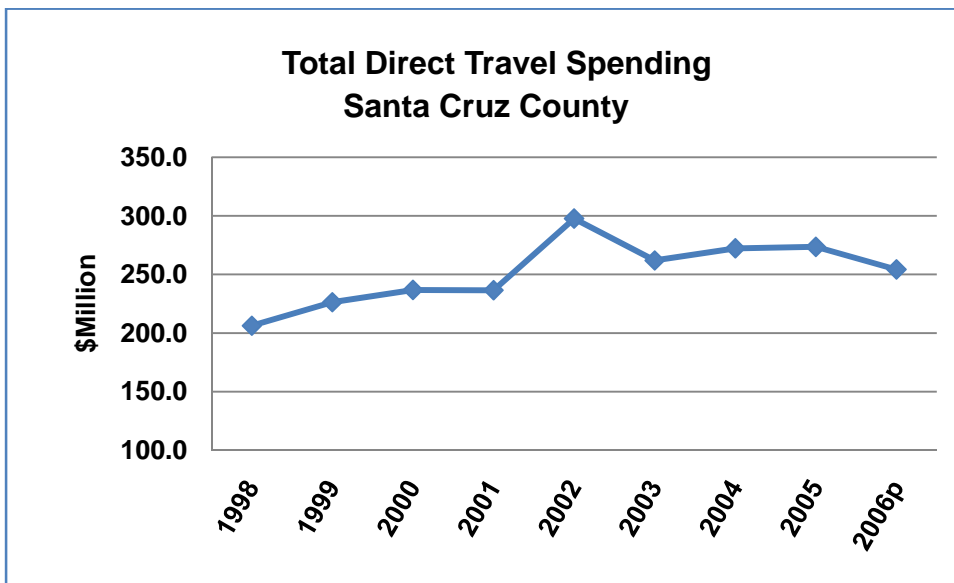


Figure 16: Total Direct Travel Spending, Santa Cruz County, 1998 - 2006

Visitor spending in Santa Cruz County is dominated by retail sales and food stores. Much of this is due to visitors from Mexico crossing the border into the county for groceries and other retail goods, as seen in Figure 17. Statewide, 17% of the day traveler spending is due to travel across the U.S.-Mexico border.



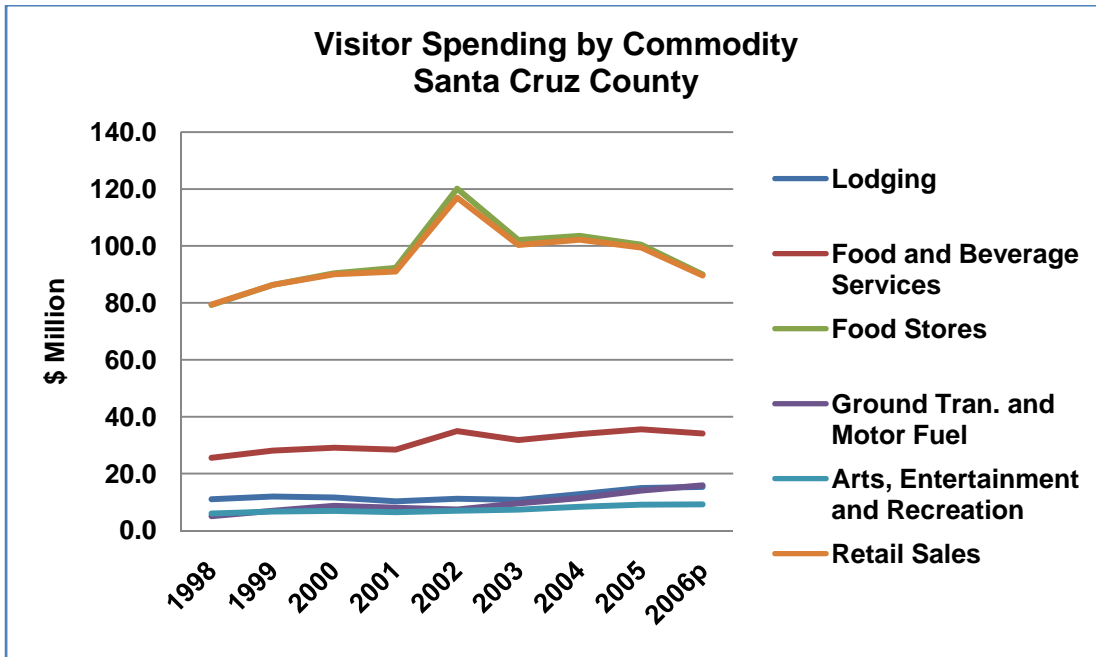


Figure 17: Visitor Spending Categories, Santa Cruz County, 1998 - 2000

Estimated total direct government revenue generated in Santa Cruz County in 2006 was \$13.3 million. Figure 18 shows state and local tax revenue generated by the travel industry from 1998 to 2006.

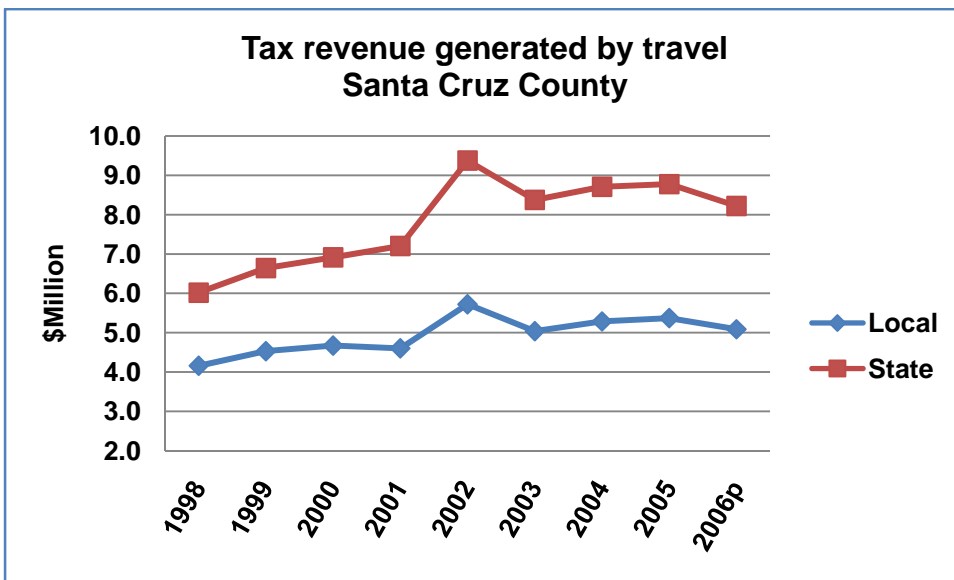


Figure 18: Travel-generated Tax Revenue, Santa Cruz County, 1998 - 2006

Travel spending is a very important sector of the economy in Santa Cruz County, directly generating more than 12% of the jobs in the county, and responsible for about 11% of total wages and salaries.



The Dean Runyan Associates travel spending study does not provide data for sub-county areas. However, some information regarding tourism in the eastern portion of Santa Cruz County and the far southeastern corner of Pima can be obtained from an informal survey of businesses conducted in the Sonoita-Patagonia-Elgin area by the Save the Scenic Santa Ritas organization. A short questionnaire was given to local area business owners.

A total of 38 businesses and two non-profit organizations responded to the survey. The results indicate that 23 of the 38 businesses (61%) and both of the nonprofits have visitors as customers. Thirteen of the businesses (34%) reported more than three-quarters of their customers were visitors and five reported that all of their customers are visitors. Sixteen of the 38 businesses (42%) reported that none of their customers were visitors to the area. Using total reported customers and estimated percentage of visitors in the customer base, it is possible to estimate that 155,600 visitors per year to the area were customers of local businesses or nonprofit organizations. Also, the businesses reported in the aggregate that about 50% of their customers were out-of-area visitors.

The total number of employees reported as employed by the businesses having visitors as customers was 133. The total number of employees of the businesses reporting visitors as more than three-quarters of their customers was 52.

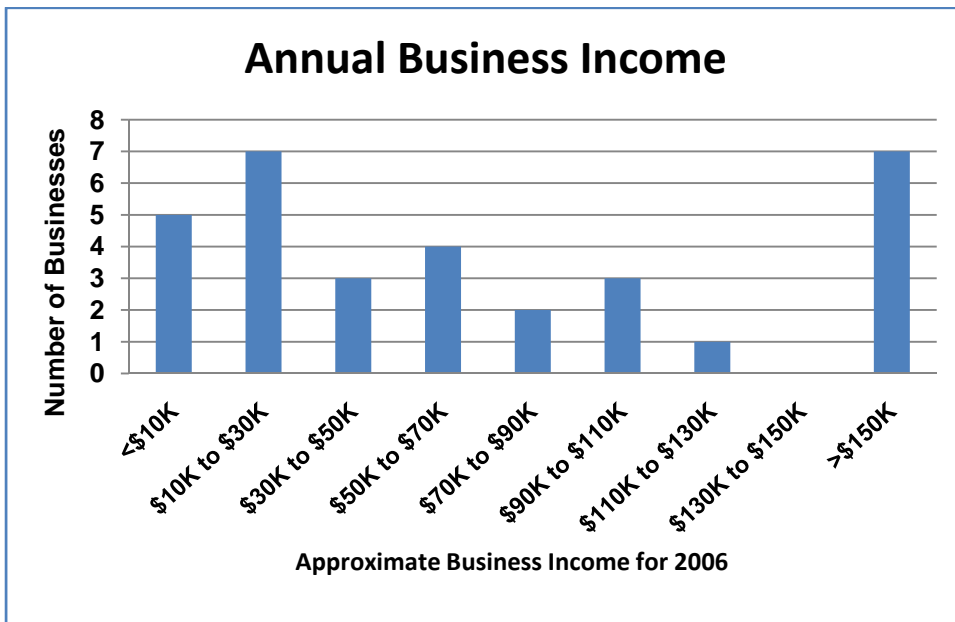


Figure 19: Annual Business Incomes, Sonoita/Patagonia/Elgin Area, 2006

Annual business incomes of the respondents ranged from less than \$10,000 to more than \$150,000. Figure 19 shows the annual business income distribution for the respondents.



Customer activities reported can be seen in Figure 20. The categories are birding, hunting, hiking, other outdoor recreation, visiting local wineries, short visits or extended stays by out-of-state wintertime travelers (snowbirds), short “getaways,” or visiting the Tree of Life Rejuvenation Center. Most of the visitors engaged in outdoor recreation activities.

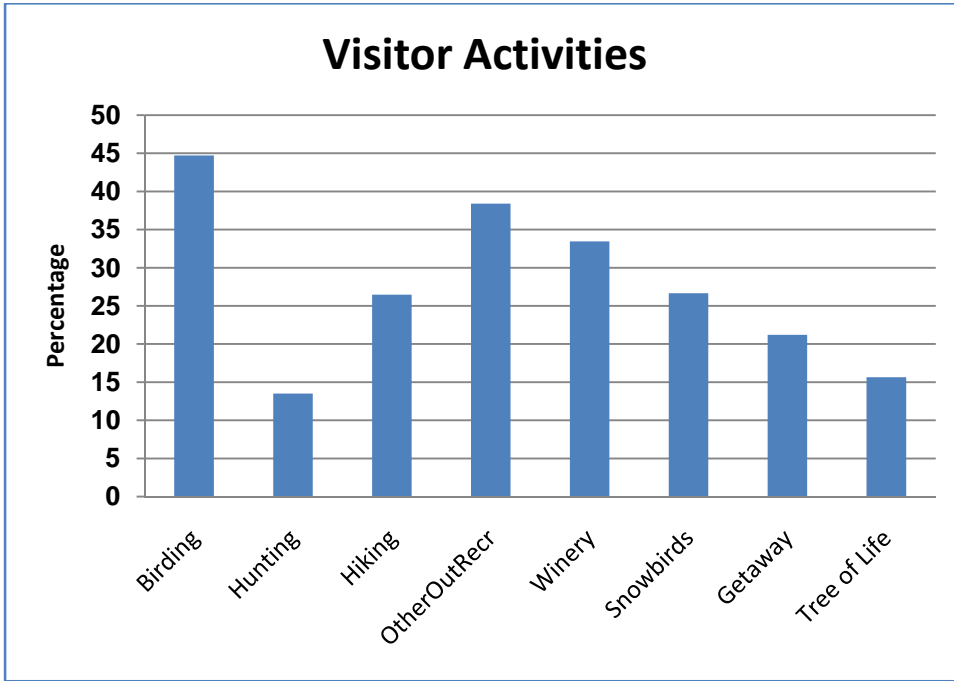


Figure 20: Visitor Activities, Sonoita/Patagonia/Elgin Area, 2006

Hunting, Fishing and Wildlife-Viewing Impacts

Hunting, fishing, and wildlife viewing are outdoor recreation activities that generate important levels of economic activity across Arizona due to spending by residents and non-residents. The Arizona Game and Fish Department has commissioned two studies on economic impacts of outdoor recreation activities based on 2001 data – one for hunting and fishing and the other for wildlife viewing (Silberman 2002; Southwick Associates 2003). The reports contain county-level breakdowns of direct, indirect, and induced impacts. Only direct impacts will be presented here.

Pima County

In 2001, direct spending generated by hunting and fishing activities totaled \$84.5 million. The breakdown is as shown in Figure 21. Most (81%) of the spending was on equipment. State tax revenues realized on this spending were \$5.4 million.

Expenditures associated with wildlife viewing in the county in 2001 amounted to \$173.5 million and generated about \$9.9 million in state tax revenue.



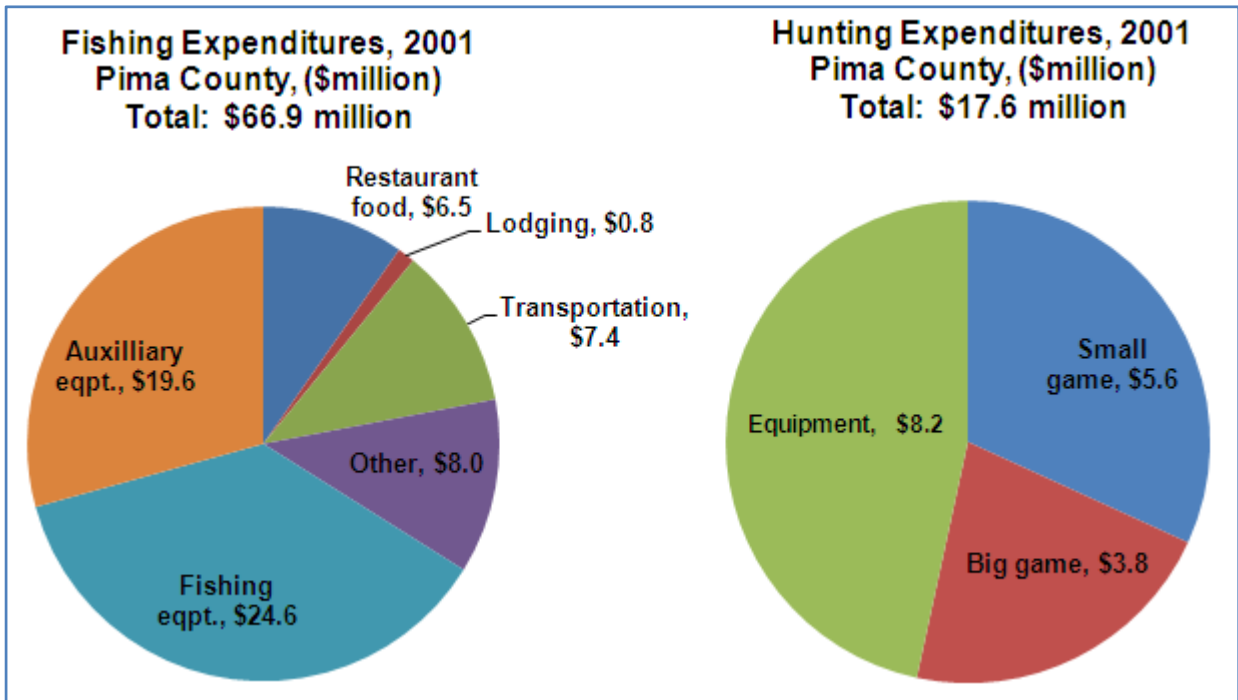


Figure 21: Hunting and Fishing Activity Expenditures, Pima County, 2001

Santa Cruz County

Direct spending in Santa Cruz County in 2001 generated by hunting and fishing totaled \$13.9 million. As shown in Figure 22, the spending on equipment was about 46%. State tax revenues realized on this

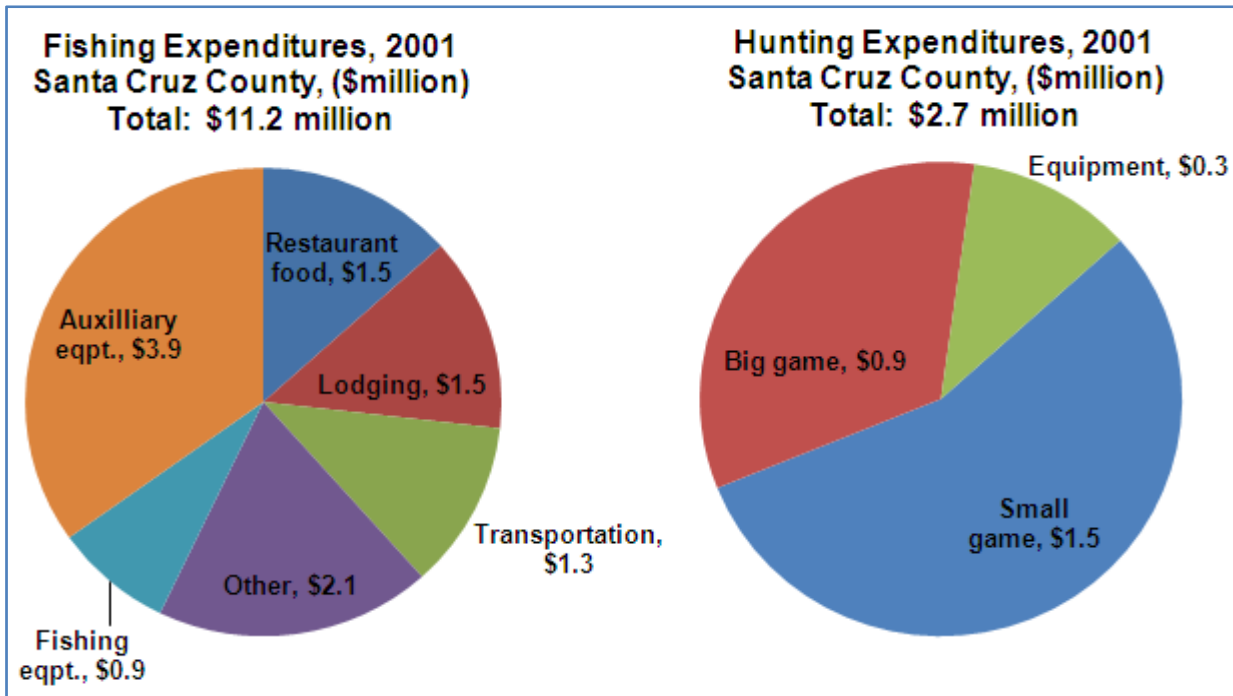


Figure 22: Hunting and Fishing Activity Expenditures, Santa Cruz County, 2001



spending were \$919,900. A greater proportion was spent on lodging and restaurant food in Santa Cruz County than in Pima County.

Wildlife viewing generated expenditures in the county in 2001 amounted to \$11.9 million and generated about \$700,000 in state tax revenue.

Birding is a significant component of wildlife viewing in southeastern Arizona. According to the results of the business survey referenced above, 45% of the visitors in the Sonoita/Patagonia/Elgin area were involved in birding activities. U.S. Fish and Wildlife found in a 2001 study that 84% of all away-from-home wildlife watchers are birders (LaRouche 2001). A study published by the University of Arizona found that non-resident birding visitors to the Upper San Pedro River Basin (about 30 miles east of Sonoita) numbered between 26,000 and 44,000 per year (Orr and Colby 2002). The visitors purchased food and beverages, lodging, fuel, field gear, and other supplies, and admission fees. Their direct spending was estimated at \$10.1 to \$16.9 million per year. The visitors tend to be affluent and well-educated. Over half of those surveyed indicated that they are repeat visitors to the area.

The upper Santa Cruz River basin, much of which is within the area of focus for this report, is another well-known world-class birding area, generally having very similar habitat and bird species to those in the upper San Pedro River basin. No similar study of the economic impacts of birding in Santa Cruz County has been done; but while not directly applicable to the upper Santa Cruz basin, the results of the Orr and Colby study give an indication of the economic impact of birding visitors to the area.

Off-highway Vehicle Recreation Impacts

Arizona's extensive backcountry, with its abundant unpaved roads and jeep trails, provides excellent terrain for off-highway vehicle (OHV) recreation. A study published in 2003 by the Arizona Game and Fish Department and Arizona State Parks, estimated that OHV activities directly generated almost \$3 billion in retail sales in the state and added \$187 million to state tax revenue (Silberman 2003). The spending was primarily on vehicles, equipment and parts, fuel, lodging, restaurants and bars, food, and liquor. The recreational trip activities involved driving backroads, sightseeing, hiking, picnicking, and camping.

Pima County

Direct retail sales generated by OHV recreation in Pima County in 2002 amounted to nearly \$324 million. More than three-quarters of that total was for vehicle and equipment expenditures, as can be seen in Figure 23. State taxes on total expenditures amounted to \$17.7 million. Aside from driving, the most popular trip activity was sightseeing. According to demographic data acquired from the survey, 34.3% of OHV recreationists in Pima County had a household income greater than \$75,000 and 33% held a college degree.



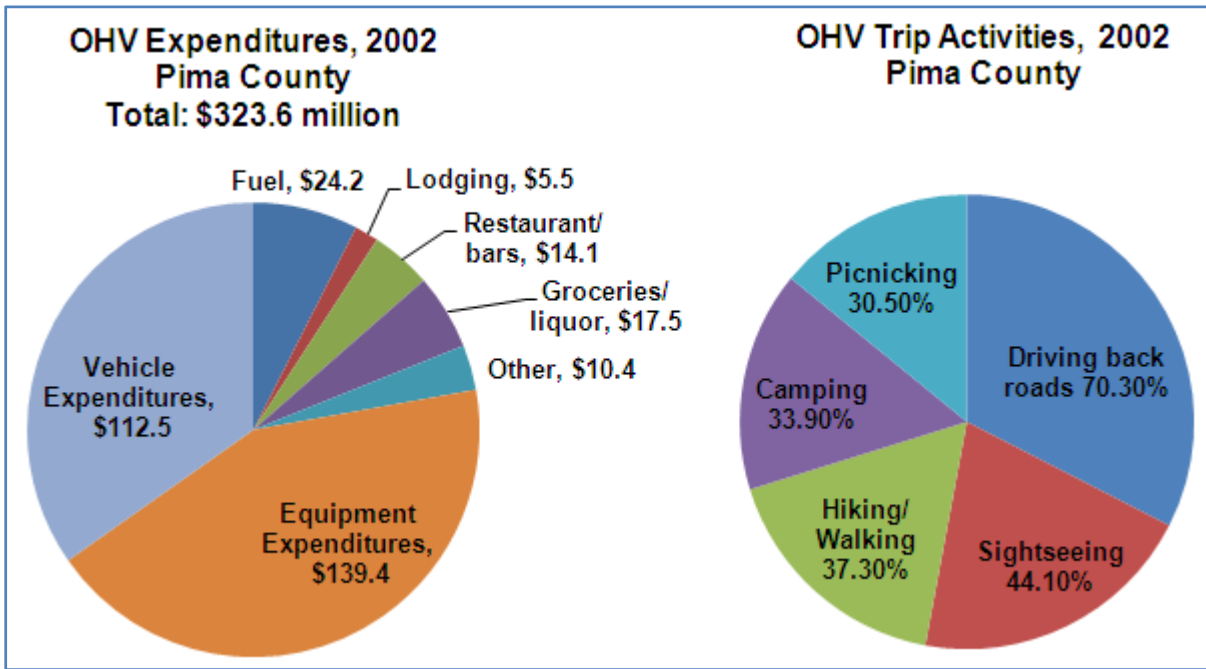


Figure 23: OHV Expenditures and Trip Activities, Pima County, 2002

Santa Cruz County

In Santa Cruz County, total direct OHV expenditures in 2002 were \$27.3 million. The distribution of those expenditures was quite different than in Pima County. Vehicle and equipment expenditures accounted for about one-quarter of the total, while fuel, lodging, restaurants, groceries, and other were much greater proportions of the total than in Pima County, as can be seen in Figure 24. Next to driving,

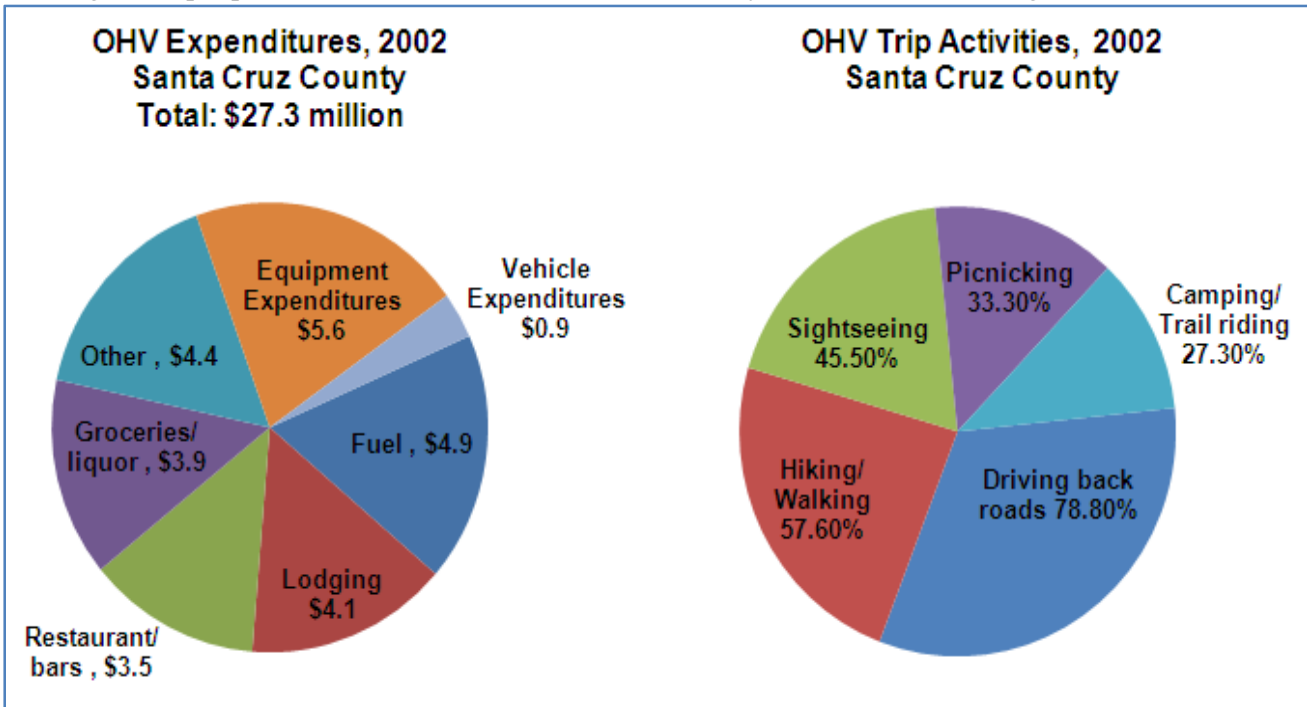


Figure 24: OHV Expenditures and Trip Activities, Santa Cruz County, 2002



the most popular activity was hiking/walking. About 48% of OHV recreationists in Santa Cruz County had college degrees, second in the state to Coconino County. Also, 35.7% had annual earnings in excess of \$75,000, second only to Maricopa County.

Interpretation of Outdoor Recreation Activity Economic Data

Outdoor recreation is clearly an essential and significant component of the economies of Pima and Santa Cruz counties. The excellent climate, unspoiled vistas, unique habitats, and unrivalled biodiversity are key reasons that so many people are drawn to the area to enjoy such a wide range of outdoor activities. Due to the magnitude of the direct outdoor recreation activity expenditures and tax revenues relative to the size of the local economy, the economic impact of outdoor recreation activities is relatively more important in Santa Cruz County than in Pima County.



Analyzing Local Economic Impacts

The economic impacts of new business activity flow into a local economy based primarily on employee compensation, purchases made by the new business, and taxes paid to local governments. The more local businesses are able to supply the needs of the employees and the new business, the greater the local economic impact of the new business. Purchases made outside of the local area represent leakages of money out of the local economy. Profits of the new business also leak out of the local economy if the owners or stockholders reside outside of the local area.

For the purposes of this report, the local economy has been defined as Pima and Santa Cruz counties. As a result of the relatively large and robust economy that exists in the Tucson metropolitan area, and due to the fact that it has a fairly well-developed set of firms that provide supplies and materials to current large-scale mining operations within the county, much of the employee compensation and purchases that would be made by any proposed mining project would flow directly into the local economy.

In order to measure local economic impacts, this report will focus on projected wages and salaries, business purchases, and taxes collected by local municipal and county governments.

Multiplier Analysis

Economic multipliers are often used to estimate total economic impacts of a project or new business activity. The concept is that employee wages and business purchases have a “ripple effect” in an economy. The new business will purchase some of its required materials, supplies and services in the local economy and those local businesses will hire some new employees, creating what are known as indirect effects. Employees at the new business or project will likewise spend a portion of their wages at local stores and businesses, creating what are termed induced effects. In this way the economic impact of the new business or project spreads in the local economy like a ripple spreads out across a pond. The portions of employee wages and business purchases that are made outside of the local economy result in leakages out of the local economy. In order to estimate the total economic impacts due to this ripple effect, economic multipliers are used in conjunction with the direct employment, wages, business purchases, and taxes paid. The direct impacts are multiplied by the economic multiplier to yield an estimate of the overall economic impact of the new business or project. Multipliers are generated by economic input-output models that account for linkages between sectors in an economy.

Economic multipliers are often misused and thereby result in overestimation of economic impacts. One common misuse is initial overestimation of direct jobs, wages, business purchases, and taxes. The initial errors are then multiplied and expanded with the multipliers. Another misuse is to use multipliers for areas that have significant leakages. If much of the indirect and induced economic activity is outside of the boundaries of the local economy, the multiplier effect is much smaller. In addition, the assumptions necessary to estimate multipliers using input-output models do not accurately capture the ability of economies to dynamically adjust to changing conditions.



As stated above in the section characterizing the economies of Pima and Santa Cruz counties, multipliers will not be used in this report due to the high level of uncertainty with respect to indirect and induced economic effects calculated using input-output models at the county and sub-county level.

An economic impact analysis of the proposed Rosemont project was prepared by the Western Economic Analysis Center (WEAC) (Leaming 2007). The analysis employed multipliers to estimate total impacts of the project on Pima County, the State of Arizona, and the entire U.S. This report will refer to only the Pima County economic impacts from the WEAC report.

Potential Local Economic Benefits and Costs From the Proposed Rosemont Project

The following sections describe potential local economic benefits and costs associated with the Rosemont project proposed by Rosemont Copper Corporation. While a comprehensive social cost-benefit analysis is beyond the scope of this report, it will critically examine potential economic benefits to the local economy claimed by Rosemont, along with potential costs to households, businesses, and governments. As not all of the impacts of the project are easily quantified, some will be presented in comparative analyses. Previous studies of economic impacts of mining by Thomas Michael Power provide a very useful analytical framework for understanding how mining activities interact with local economies (Power 1996; Power 2002; Power 2007). Much of Power's analytical framework has been employed in this study.

Proposed Rosemont Project

Information for the following description of the proposed project was drawn from the Mine Plan of Operations (MPO) filed with the U.S. Forest Service on July 11, 2007, and Volume 1 of the Rosemont Copper Project Feasibility Study (FS)(Huss, Rose et al. 2007; Westland Resources 2007).

The Rosemont Copper Project (Rosemont) is a proposed open-pit mine for copper, molybdenum, and silver that would be located in the northern portion of the Santa Rita Mountains (see Figure 1 for project location and boundaries). The project has been proposed by Rosemont Copper Company, which is a wholly-owned subsidiary of Augusta Resource Corporation, based in Vancouver, British Columbia, Canada and Denver, Colorado.

Augusta owns approximately 132 patented mining claims, 850 unpatented mining claims, and 14 parcels of fee lands in area. The total project area comprises approximately 14,880 acres. The proposed project would include an open pit occupying about 950 acres with an additional 2,895 acres for waste rock, tailings, and leach pads; and 355 acres for plant facilities and access roads.

Primary mine access would be via a 3.7-mile road on the east side of the project from Arizona State Highway 83 between mileposts 46 and 47. Extensive modifications to Highway 83 would be necessary to effect mine access. A secondary access road on the west side would connect to Santa Rita Road at its



intersection with Helvetia Road, traversing the ridge of the Santa Rita Mountains to the project.

If the mine operated for its full proposed life of 25 years, according to the MPO, ultimate open pit dimensions at project end would be approximately 6,500 feet in the north-west direction, 6,000 feet in the east-west direction, and somewhere between 1,800 and 2,900 feet deep.

On average, 75,000 tons of ore and 195,000 tons of waste would be processed daily, for a total of approximately 270,000 tons of material removed from the open pit daily. At this average mining rate, the project would operate for about 19 years. Pre-production and closure activities would extend the total project life to about 25 years.

The proposed project would produce about 230 million pounds of copper, 5 million pounds of molybdenum, and 3.5 million ounces of silver per year.

During the pre-production construction phase of about 18 months, employment would rise from 125 people in month two to a peak of about 900 people in months seven through 12, declining to 225 in month 16. After this, production employment would be approximately 456 employees for the proposed 19-year production period. The project would operate 24 hours per day, seven days per week, 365 days per year.

The project would require an operating load of 106 megawatts (mW) of electricity, demanding approximately 929 gigawatt-hours (gWh) of electricity each year.

Water requirements of the proposed project would total approximately 5,000 acre-feet or about 1.63 billion gallons per year. Augusta proposes to acquire this water by pumping groundwater from wellfields that would be located west of the project area along Santa Rita Road northwest of the Santa Rita Experimental Range and in other unspecified locations. Water would be delivered to the project site in a 20-inch pipeline that would traverse Arizona State Trust land. The MPO includes provisions to import surface water via the CAP canal system to offset the groundwater used during the operation of the mine. A net 5% more water would be imported.

Potential Local Economic Benefits

Local economic impacts of the proposed Rosemont copper mine would derive primarily from three sources during the construction, production, and closure phases of the operation:

- employment;
- purchases; and
- local taxes.

The local economic impacts would accrue to households, businesses, and municipal, county, state, and federal governments. As this study focuses on local economic impacts, state and federal government impacts will be only partially addressed.



Employment

According to the MPO, the average staffing level for the mine would be 456 employees (Westland Resources 2007). This is based on the estimated staffing requirement for year two of the project. These would be fulltime employees in either hourly or salaried positions.

The BEA provides employment and compensation data for the Tucson Metropolitan Statistical Area (MSA), which consists of all of Pima County. Compensation is defined by the BEA as wages and salaries plus supplements to income, which are contributions made by the employer for pensions, insurance, and government social insurance (Social Security, unemployment insurance, workers' compensation, etc.) As such, compensation overestimates the actual amount of money that directly flows into the local economy.

In 2005 (the most recent year for which MSA-level data are available), total employment in the mining industry in the Tucson MSA was 2,032 and total compensation was \$91,074,000. Dividing total compensation by total employment yields an average annual compensation value of \$44,820. For comparison, statewide average annual compensation in Arizona for the mining industry in 2005 was \$51,397; the figure was \$61,407 for the U.S. as a whole. The Arizona and U.S. figures are higher partly because they include oil and gas industry workers, who generally receive higher wages and salaries than mining employees.

For comparison, U.S. Department of Labor Bureau of Labor Statistics (BLS) data indicate the national average annual wage for all occupations in metal ore mining in May 2006 was \$48,190. This is based on data collected "from employers of all sizes, in metropolitan and nonmetropolitan areas in every state and the District of Columbia."

The MPO states that the second year of mining operations estimate of 456 employees is considered the average staffing level for the proposed mine life (Westland Resources 2007). According to the "combined base case" Table 1-55 spreadsheet in the FS, total staffing levels at the operation from year two through year 15 range from 419 to 459, with an average of 438 (Huss, Rose et al. 2007). For the purposes of this report, the figure 456 total employees will be used. Assuming that 90% of the employees (410) would reside within Pima and Santa Cruz counties, this is slightly more than eight-hundredths of one percent (0.08%) of total employment in Pima and Santa Cruz counties combined (503,563) for the year 2005.

The economic impact analysis produced by WEAC used economic multipliers to project local jobs totaling 1,700 resulting from the proposed project (Leaming 2007). If we accept this figure as realistic, this would amount to three-tenths of one percent (0.3%) of the 2005 total employment in the two counties combined.

Multiplying the estimate of 456 employees by average annual compensation for the mining industry in the Tucson MSA in 2005 of \$44,820 yields \$20,437,920, or about \$20 million, as the annual economic impact on households. This amount includes payments made for health insurance, workers'



compensation, unemployment insurance, and social security. Actual "take-home pay" would be approximately 80% of total compensation, or about \$16 million per year. This amount would flow primarily into the areas where the mine employees reside. It seems likely that most of the employees would reside in the Tucson area, with a smaller portion in Santa Cruz and Cochise counties and elsewhere. Assuming further that 90% of the employees would reside in Pima and Santa Cruz counties, yields a figure of \$14.7 million in wages and salary that would flow into the local economy. This is approximately one-tenth of one percent (0.1%) of total wages and salary paid in Pima and Santa Cruz counties combined (\$14.03 billion) for the year 2005.

Personal income growth over the last five years in Pima and Santa Cruz counties has averaged about \$641.8 million per year in real terms. The estimated \$14.7 million of new wages and salaries resulting from the proposed Rosemont project would represent a little over one week of the average level of recent local economic growth (as measured by personal income).

The multiplier analysis used by WEAC projected total annual personal income of \$71.7 million from the proposed Rosemont project (Leaming 2007). This would amount to three-tenths of one percent (0.3%) of the 2005 total personal income in the two counties combined (\$27.5 billion), and about 1.5 months of local economic growth at the level typical of the last 5 years.

It is clear that local household impacts from the proposed project (even if we accept the much larger figures from the WEAC multiplier analysis) are extremely small in comparison to total employment, wages/salaries, and personal income of the local economy.

Business Purchases

Using figures from the "combined base case" Table 1-55 spreadsheet in the FS (Huss, Rose et al. 2007), it is estimated that during the production period of the proposed mine, \$125 million to \$176 million, averaging \$155 million per year, will be spent on power, fuel, materials and supplies. Much of this will be spent in the local economy. Assuming 90% of these purchases would be procured from local businesses would yield a total of approximately \$140 million in annual direct local business economic impact. This is approximately one-half of one percent (0.5%) of the total market value of final goods and services produced (aka Gross Domestic Product - GDP) in the Tucson MSA (\$27.077 billion) in 2005. This small percentage is actually an overstatement of the importance of the local economic impact since GDP is net of the cost of intermediate inputs and the local impact is a gross figure.

The WEAC multiplier analysis projects total direct, indirect, and induced annual local business sales of \$168.5 million, which would represent about six-tenths of one percent (0.6%) of the Tucson MSA GDP in 2005(Leaming 2007).

Local business impacts from the proposed project would represent a very small fraction of the local economy as measured by local GDP.



Local Taxes

The proposed project would incur several types of local taxes, including:

- mining severance taxes;
- property taxes; and
- county and municipal taxes on purchases.

The “combined base case”, Table 1-55 spreadsheet in the FS, contains direct information on mining severance and property taxes, as well as additional information that can be used to determine state and federal income taxes and the various sales taxes (Huss, Rose et al. 2007).

Mining severance taxes in Arizona are currently levied on value of mineral production. The tax is calculated as 2.5% of the severance base, which is “fifty per-cent of the difference between the gross value of production and the production costs.”(State of Arizona 2007). Augusta has estimated annual severance tax to range from about \$3.5 million to \$6.5 million per year, with an average over the mine life of approximately \$5.8 million. Severance taxes collected in Arizona are shared among the state, counties and municipalities based on a complex formula dependent upon the relative amount of taxes collected each month and population. About 80% of the total collected goes into the state general fund, the remaining 20% is distributed among counties and municipalities. Due to the shared distribution and the proportion of total statewide severance taxes paid by operations in Pima and Santa Cruz counties, a very small percentage of the mining severance taxes that would be paid by Rosemont would return to Pima County, Santa Cruz County, and the municipalities therein. For the purposes of this report, 1% will be used, although this is likely overstating the amount. This means an annual average of about \$58,000 of the estimated severance tax would return to local governments.

Total property tax liability is estimated by Augusta to be \$3.5 million annually. This entire amount would accrue to Pima County, where the proposed project is located. None of these taxes would be available to address potential impacts of the proposed project that could occur in Santa Cruz County. The \$3.5 million in annual property tax would represent about 1.2% of total property taxes collected in Pima County in 2006 (Burke 2006).

Sales taxes, known in Arizona as transaction privilege taxes (TPT), would be collected on most purchases made by the proposed project in the local economy. Pima and Santa Cruz counties collect TPT on various types of purchases. The rates are 0.5% and 1% for the two counties, respectively. The 0.5% tax in Pima County is an excise tax and is all distributed to the Regional Transportation Authority. Most of the locally purchased power, fuel, materials, and other supplies would likely be purchased in Pima County.

Applying the 0.5% sales tax rate to an average of \$140 million in local mine purchases would yield \$700,000 in annual county sales tax. Further assuming that all of the \$140 million would be spent in the city of Tucson, with a 2% sales tax, would yield another \$2.8 million in annual sales tax. Using these assumptions, potential total local sales taxes would be about \$3.5 million, \$700,000 of which would be used by the Regional Transportation Authority. The \$700,000 of county sales tax would represent



about 1% of total RTA excise tax revenue in 2006 (\$73.1 million) (Pam Reinke, Pima Association of Governments Finance Manager, personal communication, 16-Nov-2007). The \$2.8 million of city sales tax would represent about 1.4% of the total sales tax collected in Tucson in 2006 (Douthitt 2006).

The WEAC multiplier analysis projects total direct, indirect, and induced annual local taxes of \$16 million, which would represent about 1.2% total combined revenues of Pima County and the City of Tucson in 2006 (Leaming 2007).

In summary, estimated total local tax revenues from the proposed project would be approximately \$7.1 million annually, representing about 1.3% of total property, excise, and sales taxes collected in Pima County and the City of Tucson in the 2005/2006 fiscal year. The \$7.1 million would represent approximately one-half of one percent (0.5%) of total combined revenues for the two governments (\$1.38 billion) (Burke 2006; Douthitt 2006). These comparisons highlight the fact that projected tax revenues from the proposed project would represent an insignificant contribution to local governmental revenues.

It is also important to remember that, in general, taxes pay for services provided by governments, such as schools, transportation infrastructure, as well as police and fire protection, among others. As population and business activity increases, governments incur additional costs for providing these services. An increase in tax revenues provides information about only one side of the fiscal balance; it does not inform us about the cost of the additional services that will be required.

Potential Costs

Economic impact analyses generally present only one side of the equation, neglecting to account for potential costs associated with project development. When evaluating any project that will have significant and long-term economic impacts in a local economy, it is important to consider the cost side of the equation as well as the benefit side. The following sections will present some of the costs that could be expected to be incurred in the local economy if the proposed Rosemont project went forward. These costs would accrue to individuals, businesses, and governments in the local area.

Increased Education Costs

If the proposed project attracts new employees, and if these employees have school-age children, there will be increased education costs borne by local school districts. Assuming 410 new local employees, using the rationale above in the employment section, and further assuming that half of those employees will have two school-age children, yields 410 new pupils. According to a recent U.S. Census Bureau study on public education finances, average spending per pupil in Arizona in 2004-05 was \$6,261 (U.S. Census Bureau 2007). Multiplying this by 410 new pupils gives an annual cost increase of approximately \$2.7 million to educate these students. Most of this cost would likely be incurred in Tucson, where most of the mine employees would reside. If the total new jobs figure of 1700 from the WEAC multiplier analysis is used, and the assumption is made that half of those employees had two children, the total increase in annual education costs would be over \$10 million.



Costs Associated with Increased Traffic on State Route 83

The MPO filed by Augusta states that all supplies and materials shipped to the mine site as well as shipments of copper and molybdenum concentrates from the proposed mine would be via State Route 83 (SR 83). Total weekly round-trips of supplies, materials and concentrates on SR 83 would be 582. Employees would also commute to the mine site via SR 83 at the rate of 62 round trips per day, or 434 per week, assuming all employees use vanpooling at five employees per van. This is a total of 1,016 round trips per week on SR 83. Most of the trips would be on the portion of SR 83 from Interstate 10 to the proposed mine access road between Milepost 46 and 47, a distance of approximately 12 miles.

Highway Maintenance Costs

The section of SR 83 from Milepost 46 north to I-10 required a total of \$106,408.63 in maintenance costs from October 31, 2004 and October 31, 2007, according to Arizona Department of Transportation records (Hendrix 2007). Increased traffic on this section of highway, especially heavy truck traffic necessary to deliver supplies and materials to and from the proposed project, would require increased maintenance.

Societal Costs of Motor Vehicle Transportation

In addition to direct driver expenses (fuel, maintenance, insurance, registration, etc.) driving generates significant societal costs. Among these are:

- accidents
- state and local construction, improvements and repair
- state and local highway maintenance and operations
- parking (commercial and employer-paid, including government tax)
- waste disposal
- air pollution damage (health costs, crops, trees, materials, etc.)
- external resource consumption costs
- road noise (property value decrease and abatement)
- CO2 increase (motor vehicles only)
- water pollution and hydrologic impacts
- transportation diversity and equity
- barrier effects on pedestrians and bicycles
- land use impact costs
- roadway land value
- congestion cost

These societal costs of driving have been summarized by Commuter Solutions in a document entitled "The True Cost of Driving." They estimated total societal cost per mile for driving to be approximately \$0.33 per vehicle mile traveled (Commuter Solutions 2001).

Using transportation data from the Augusta MPO (summarized above) the estimated 1,012 weekly round trips on SR 83 at 24 miles per trip, yields an estimated 1,267,968 vehicle miles traveled. The



societal costs of these miles, at \$0.33 per mile, amount to approximately \$418,000 per year. This is likely an underestimate as the \$0.33 per mile is based on passenger vehicles and more than half of the trips estimated in the MPO are due to deliveries made with large trucks.

Travel-time Costs

In addition to these societal costs, increased commute times on SR 83 from the I-10 junction to the Sonoita and Patagonia area will result in a real cost to travelers on that highway. In 1997, the U.S. Department of Transportation estimated the average value of intercity travel time for all purposes (business and personal) to be \$12.20 per hour in 1995\$ (Weisbrod, Vary et al. 2001). In 2005\$ that value is \$15.64 per hour or \$0.26 per minute. According to Arizona Department of Transportation travel count data, 2006 average annual daily traffic was 2,400 vehicles on SR 83 from I-10 to Sahuarita Road, and 2,000 vehicles from Sahuarita Road to Sonoita (Arizona Department of Transportation 2007). If we assume that the increased truck traffic from the proposed Rosemont project added five minutes to the travel time between I-10 and Sonoita, the total annual costs to travelers of the increased travel time would be approximately \$949,000.

Increased Accident Risk

All shipments supplies, materials, and concentrates to and from the proposed project site would be via SR 83. According to the MPO, this would require approximately 582 round-trips per week, or a daily average of about 83 round trips. It is likely that most of shipments would be via highway tractor trailer rigs. As indicated in the MPO, an attempt will be made to schedule shipments so as to avoid high-traffic periods in the early mornings and afternoons of weekdays when school buses are also using the highway.

According to information from the Vail School District, school buses are on SR 83 weekdays from 6:18 am through 1:20 pm and again from 3:12 pm thru 7:15 pm, for a total of approximately 11 hours/day during the school year. Other school bus traffic is also on SR 83 at various times for sport events, field trips, and other special events. Even though the MPO indicates shipments and employee van pools will be scheduled in order to reduce the number of conflicts with truck and employee traffic during school bus hours, with buses on the road 11 hours out of every day, there will be considerable co-usage of the road and significant potential for vehicle accidents.

The Federal Motor Carrier Safety Administration compiles statistics on truck accidents, and according to a recent report, in Arizona in 2006 there were 3,345 fatal and not-fatal truck accidents which caused 134 fatalities and 2,671 injuries. Most of these accidents occurred in good weather, with no adverse road conditions, and in daylight. Approximately 68% of the fatal and 75% of the non-fatal accidents occurred between 6:00 am and 6:00 pm. About 30% of the fatal accidents occurred on principal arterial roadways like SR 83. Undivided highways with two-way traffic accounted for 29% of the fatal accidents and 24% of the non-fatal accidents(U.S. Department of Transportation 2007). Given these statistics and the increased truck traffic that would result from the proposed project, there would likely



be a significant increase in accident risk on SR 83. This is something to be carefully examined and considered, especially in light of the presence of school children on the highway during high accident-risk periods.

Potential Property Value Decreases

Studies have established that viewshed degradation and pollution lower property values (Harrison and Rubinfeld 1978; Kim 1994). A study of property value impacts in Green Valley, Arizona, resulting from dust pollution and viewshed degradation associated with open-pit copper mines in that community found that both of these factors decreased property values significantly (Kim and Harris 1996). The impact of dust pollution on property values was determined to be much greater than that caused by viewshed degradation. The average property value decrease due to both of these factors was estimated to be \$18,000 (1992\$)(Kim and Harris 1996). This would equate to approximately \$25,000 in 2005\$. While these specific values are not directly applicable to the proposed Rosemont project, this study and others indicate that significant property value decreases would likely occur as a result of the proposed Rosemont project. Another factor that could negatively affect property values is the noise pollution that would be present from blasting activities at the proposed project.

Potential Displacement of Economy Associated with Visitors and Outdoor Recreation

As discussed above in the sections characterizing the local economy, a significant proportion of economic activity in the area of the Santa Rita and Patagonia Mountains derives from visitor spending. To summarize the estimated direct economic impacts:

- Pima County
 - Total direct travel spending in 2006 was estimated at \$2.26 billion.
 - 25,870 tourism-related jobs in 2006 accounted for more than 5% of total county employment.
 - Estimated total direct government revenue from tourism for 2006 was \$137.6 million.
 - Direct spending generated by hunting and fishing activities totaled \$84.5 million.
 - State tax revenues realized on hunting and fishing activities were \$5.4 million.
 - Expenditures associated with wildlife viewing in 2001 amounted to \$173.5 million and generated about \$9.9 million in state tax revenue.
- Santa Cruz County
 - Total direct travel spending in 2006 was estimated at \$254.2 million.
 - 2,130 tourism-related jobs in 2006 accounted for more than 12% of total county employment.
 - Estimated total direct government revenue from tourism in 2006 was \$13.3 million.
 - Direct spending generated by hunting and fishing activities totaled \$13.9 million.
 - State tax revenues realized on hunting and fishing activities was \$919,900.
 - Wildlife viewing generated expenditures in the county in 2001 amounted to \$11.9 million and generated about \$700,000 in state tax revenue.



The direct economic impacts from tourism and outdoor recreation in the two counties total approximately \$2.95 billion. Although it is not possible to know how much tourism and outdoor recreation activity would be displaced by an open-pit copper mine at Rosemont, if the proposed project displaced only 1% of this activity, the economic losses would be greater than the entire annual payroll of the proposed project. This is a risk that should be carefully considered.

Electrical Power Usage

The electrical power consumption of the proposed project is estimated to be approximately 929 gigawatt-hours per year. Arizona households used an average of 13,604 kWh annually in 2004 (Limerick and Geller 2007). The annual electrical power consumption of the proposed project would be equivalent to the annual electrical usage of about 68,000 households.

Water Usage

According to the MPO the proposed project would use approximately 1.63 billion gallons of water per year. Average single-family residential use in Tucson is approximately 120 gallons per capita per day or 43,800 gallons per capita per year (Tucson Water 2004). At this rate, the 1.63 billion gallons that would be consumed by the proposed project could alternatively provide water for about 37,000 people.

Potential impacts on local surface and groundwater resources from developing the proposed open pit and associated water supply system include:

- contamination of surface and groundwater with toxins;
- decreased flow or drying up of springs, seeps, wetlands, and streams;
- increased sediment load in streams; and
- changes in aquifer recharge, among others.

All of these impacts would produce significant economic costs that could be reflected in decreased tourism and outdoor recreation, increased water treatment requirements, increased domestic and agricultural water pumping costs, impacts on transportation infrastructure, and wildlife habitat destruction.

Carbon Dioxide Emissions

The proposed project would increase carbon dioxide emissions through the operation of diesel-powered mine equipment, electricity consumption, and increased vehicle usage for deliveries to and from the project, as well as employee transportation.

According to the MPO, diesel usage at the project would be approximately 9 million gallons per year. According to EPA figures, each gallon of diesel fuel results in the release of 22.2 pounds of carbon



dioxide (U.S. Environmental Protection Agency 2005). Diesel usage at the proposed project would result in the release of about 200 million pounds of carbon dioxide annually.

The electrical power for the proposed project would likely derive primarily from coal-fired power plants, which produce about 2.1 pounds of carbon dioxide per kWh (U.S. Department of Energy 2000). The 929 gWh of annual electrical demand for the proposed project would result in the release of about 1.95 billion pounds of carbon dioxide annually.

Increased travel for materials, supplies, and concentrate shipments would result in an estimated 582 round trips per week. Assuming the trips would originate in Tucson and result in a 60-mile round trip, they would yield a total of 1,815,840 miles of travel. At an average of 5.5 miles per gallon for large tractor-trailer trucks, and 22.2 pounds of carbon dioxide per gallon of diesel consumed, a total of 7.3 million pounds of carbon dioxide would be released per year.

Employee travel to and from the proposed project would generate an estimated 434 round trips per week or 1.35 million miles annually, assuming five-person vanpools. At an average fuel consumption of 20 miles per gallon, and assuming 19.4 pounds of carbon dioxide per gallon of gasoline consumed, this would cause the release of an additional 1.3 million pounds of carbon dioxide (U.S. Environmental Protection Agency 2005).

In total, approximately 2.16 billion pounds or about 982,000 metric tons of carbon dioxide per year would be released as a result of the proposed project. This is about 1.1% of total carbon dioxide emissions in the state of Arizona (2003 data), a significant increase (U.S. Department of Energy 2007) .



Summary of Potential Costs Associated with the Proposed Rosemont Project

The proposed Rosemont project, if developed as presented in the MPO and FS, would produce significant costs for local individuals, businesses, governments, and society in general. These include:

- estimated increased costs to local school districts of between \$2.7 and \$10 million per year;
- highway maintenance costs on SR 83;
- annual societal costs associated with increased driving of at least \$418,000;
- increased costs to travelers on SR 83 of approximately \$949,000 annually;
- decreased property values for those residential properties impacted by degraded viewsheds and dust pollution; and
- decreased revenues from outdoor recreation and tourism.

The last bullet above may be the most significant, since direct local economic impacts resulting from tourism and outdoor recreation total about \$2.95 billion. Even a very small decline in this activity due to the presence of mining in the area could generate costs to the local economy far in excess of any positive economic impacts.

In addition to those listed above, there would be significant economic costs associated with environmental effects on surface and groundwater, electrical power generation, and increased carbon dioxide emissions.



SUMMARY AND CONCLUSIONS

The local economy in Pima and Santa Cruz counties in many ways exemplifies the changing economy of the West. People are moving to the rural West to live, work, and conduct business primarily due to quality-of-life considerations or amenities such as clean air and water, outdoor recreational opportunities, low crime rates, and a pleasant climate, among others. An important aspect of the changing economy is the decline in relative importance of the extractive industries like mining and the fact that the economy in the West is no longer dependent on resource extraction, with only a few exceptions. Another very significant trend in the West in general and locally is that retirement and investment income have become important economic drivers in rural areas.

Specific findings about the local economy include:

- Pima County has a robust, diverse economy, with a strong knowledge economy component. The relative importance of the agriculture and mining industries in the county is very small. Agriculture and mining account for 0.4% each of employment, and 0.1% and 0.5%, respectively, of total personal income in Pima County.
- The economy of Santa Cruz County is much smaller than that of Pima County. Over the last 15 years, the growth in personal income in Santa Cruz County has been primarily due to an increase in income from government, non-labor sources, and wholesale trade. Most of the county's economic activity occurs in Nogales and along the Santa Cruz River corridor to the north.
- Sub-county areas in Santa Cruz County are very different socioeconomically. The Patagonia Census County Division has characteristics of an "amenity-based" economy and an incipient knowledge economy, including in-migration, high educational attainment, higher household income, the presence of second homes, and a significant proportion of residents that work in their homes.
- Tourism and travel spending are very important components of the economy in both Pima and Santa Cruz counties. These activities are relatively more important in Santa Cruz County because of their magnitude relative to the size of the county economy.
- Outdoor recreation activities contribute significantly to the economy of both counties.

The potential local economic benefits from the proposed Rosemont project are small in comparison to the magnitude of the local economy. Local economic impacts would derive primarily from employment, wages and salaries, business purchases, and taxes paid to local governments. Specific estimate impacts include:

- jobs during the operational period of the proposed project, representing between eight-hundredths of one percent (0.08%) and three-tenths of one percent (0.3%) of total employment in Pima and Santa Cruz counties combined for the year 2005;
- wages/salaries of approximately one-tenth of one percent (0.1%) of total 2005 wages and salary in the two counties combined, or up to three-tenths of one percent (0.3%) of the 2005 total personal income in the counties, representing from one to six weeks of the average level of economic growth in the two counties over the last 5 years;



- local business economic impact ranging from less than five-tenths of one percent (0.5%) to six-tenths of one percent (0.6%) of the 2005 GDP of the Tucson MSA;
- estimated total local tax revenues representing about 1.3% of total property, excise, and sales taxes collected in Pima County and the City of Tucson in the 2005/2006 fiscal year and between one-half of one percent (0.5%) and 1.2% of total combined revenues for the two governments.

The proposed Rosemont project would produce significant costs for local individuals, businesses, governments, and society in general, including:

- estimated increased costs to local school districts of between \$2.7 and \$10 million per year;
- highway maintenance costs on SR 83;
- annual societal costs associated with increased driving of at least \$418,000;
- increased costs to travelers on SR 83 of approximately \$949,000 annually;
- decreased property values for those residential properties impacted by degraded viewsheds and dust pollution;
- decreased revenues from outdoor recreation and tourism; and
- economic impacts associated with environmental effects on surface and groundwater, electrical power generation, and increased carbon dioxide emissions.

The decreased revenues from outdoor recreation and tourism may be the most significant, since direct local economic impacts resulting these total about \$2.95 billion. Even a very small decline in this activity due to the presence of mining in the area could generate costs to the local economy far in excess of any positive economic impacts.

Quality of life is one of the most important drivers of the local economy in the area of the Santa Rita and Patagonia Mountains. The abundant protected public lands in the area such as the Mt. Wrightson Wilderness, Las Cienegas National Conservation Area, and the San Rafael Ranch Natural Area provide key environmental amenities that are important contributors to quality of life. As such, these protected public lands are significant economic assets for local and regional economic development.

The proposed Rosemont mine and other mining activities in the area could offer important economic benefits in the form of employment, business purchases, and taxes paid to local governments. The project could also generate significant costs in the form of decreased revenues from outdoor recreation and tourism, decreased property values, increased commuting costs, habitat destruction, surface and groundwater impacts, and permanent environmental degradation that could seriously impact future sustainability of the local economy long after the mine has closed and its positive economic impacts have dissipated.

As of the publication date of this report (November 30, 2007), the U.S. Forest Service has not approved the Mine Plan of Operations filed by Augusta Resource Corporation. The local community should compare potential benefits and costs to determine whether this and other proposed mining projects are justified. It must consider whether there are ways to change the mining plan to minimize or eliminate risks to the local environment and economy. These issues have to be critically examined as the decisions made will strongly impact the area's future economic prosperity and sustainability.



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