Appendix C-2
Public Conservation Investments

Prepared by
The Mountain Empire Action Alliance
Sonoita, Arizona
for

THOMAS MICHAEL POWER, PhD
Consulting Economist
Power Consulting
920 Evans Avenue
Missoula, Montana 59801

For submittal to:
Coronado National Forest
Rosemont Copper Project EIS Project
Reta Laford, Acting Forest Supervisor

August 16, 2010

Appendix C-2: Illustrative Examples of Non-Market Values

In addition to the "cash value" of these public lands discussed in Appendix A-1, there is significant value in the "amenities" and "ecosystem services" provided by these lands. This subsection provides five illustrative examples of these non-market values: recreation visitation and activities, arid grassland research, scenic values, critical wildlife linkages, and dark sky astronomy.

Illustrative Examples

1. Recreation Visitation, Activities, Spending

Coronado National Forest

According to the USFS Region 3 National Visitor Monitoring Results (2008), there were an estimated 2,442,700 visitors to the Coronado in 2007, 488,500 of whom visited the wilderness areas. Over 43 percent of the surveyed visitors listed eleven Pima County Zip Codes as their home address. Moreover, 48.8 percent of surveyed visitors traveled less than 25 miles to visit the Forest, and an additional 20.7 percent traveled between 25-50 miles. These data clearly show that nearly 70 percent of the visitors to the Coronado National Forest lands are Tucson regional and local residents. Also of note is the fact that only 16.8 percent of visitors travel over 200 miles, and thus are clearly from out of the area.

Activities within the Coronado were also monitored in the 2008 study. Table 1, below, shows the ten most frequent activities, the percentage of visitors engaging in the activity, and the percentage who listed the activity as their primary purpose for visiting the Forest. Note that the activities with the highest level of participation involve hiking or walking; viewing natural features, scenery and wildlife; and relaxing, all dependent upon the high amenity value of the Coronado – scenic and accessible landscape, peace and quiet; and the presence of native species.

Table 1: Most Frequent Activities of Coronado National Forest Visitors

Activity		**Percent of Visitors**	
Rank	**Activity**	**Participating in Activity**	**Identifying Activity as Primary Purpose for Visit**
1.	Hiking or Walking	75.6 %	52.2 %
2.	Viewing Natural Features/Scenery	68.2 %	11.2 %
3.	Viewing Wildlife, birds, fish	65.9 %	4.5 %
4.	Relaxing	45.9 %	5.3 %
5.	Driving for Pleasure	23.7 %	5.9 %
6.	Visiting a Nature Center	17.2 %	0.8 %
7.	Nature Study	15.7 %	0.0 %
8.	Picnicking	12.8 %	3.3 %
9.	Viewing Prehistoric Sites	8.5%	0.6 %
10.	Camping at Developed Sites	6.4 %	3.5 %
	Other		13.0 %
Total			100.0 %

Source: National Visitor Use Monitoring Results, USDA Forest Service, Region 3, Coronado National Forest, updated November 2008; Table 13.

The visitations shown in the preceding table have an accompanying economic dimension. The Forest Service also regularly conducts surveys on the type of visitation and the associated spending. Spending data associated with National Forest land recreation is shown in table 2 below. These data are excerpted from the USFS National Visitor Use Monitoring Results, updated April 2010. Of note is the total spending of over $100,000,000 attributed to the over 2 million recorded visitors in 2008. The Draft EIS needs to account for the reduction in this level of economic activity (i.e., cost) that would result from the operation of the proposed Rosemont Mine in the Coronado National Forest.

Table 2: Coronado National Forest Visitation and Spending

Total Visitors: 2,442,700	**Non-Local Visitors**			**Local Visitors**			**Non-Primary Visit**	**Totals**
	Day	Overnight on NF	Overnight off NF	Day	Overnight on NF	Overnight off NF		
Percent of Visits	2.0 %	2.0 %	9.0 %	71.00 %	5.0 %	1.0 %	10.0 %	100.0 %
Total Visitors	48,854	48,854	219,843	1,734,317	122,135	24,427	244,270	2,442,700
People per Party	2.5	2.6	2.6	2.1	2.8	2.3	2.5	
Local Area direct spending per party per visit	$ 73.16	$ 236.75	$ 606.93	$ 37.03	$ 171.47	$ 195.14	$ 37.03	
Total direct spending in Tucson Regional economy	$ 1,429,663	$ 4,448,533	$ 51,318,966	$ 30,581,790	$ 7,479,460	$ 2,072,472	$ 3,618,127	**$100,949,011**

Source: National Visitor Use Monitoring Results, USDA Forest Service, National Summary Report, updated April 2010; Table 15.

Saguaro National Park

Table 3 below shows spending and economic benefits attributable to visitations to Saguaro National Park as detailed in a 2008 report. Assuming an average number of 2.5 people per party, the 700,000 visitors (279,654 parties) to Saguaro National Park would average approximately $85 per visit per party, clearly in line with the $73 per visit per non-local visitor for the Coronado as set forth in the table above.

Table 3: Spending and Economic Impacts of Saguaro National Park Visitors on Tucson Economy 2008

Public Use Data		**Visitor Spending**		**Benefits of Non-Local Visitor Spending**		
Recreation Visits	Overnight Stays	All Visitors	Non-Local Visitors	Jobs	Labor Income	Value Added
699,137	1,599	$ 23,911,000	$ 16,657,000	335	$ 6,652,000	$ 10,296,000

Source: National Park Visitor Spending and Payroll Impacts, 2008.

The Draft EIS needs to account for the reduction in this level of economic activity (i.e., cost) that would result from adverse impacts of the proposed Rosemont Mine on Saguaro National Park visitation.

2. Arid Grassland Research

Las Cienegas National Conservation Area

In 2009 the Las Cienegas National Conservation had 25,900 recorded visitors who enjoyed the important values within the NCA, including the Cienega Creek Riparian Area, the native grasslands, the Empire Ranch Historic Site, and the Appleton-Whittell Research ACEC. Due to the close proximity of the Las Cienegas National Conservation Area to the proposed Rosemont Mine, adverse impacts on recreational visitations will occur.

The Las Cienegas also brings significant research dollars into the local and regional economy. In 2010, the Las Cienegas received a federal grant of approximately $900,000 for grassland restoration and enhancement; a similar grant of $800,000 occurred in 2009. Due to the on-going federal investments in the Las Cienagas, as well as the research projects undertaken from independent funding sources, the economic value of these activities must accounted for and incorporated into the economic analyses of the potential adverse impacts of the proposed Rosemont Mine.

Santa Rita Experimental Range and Wildlife Area

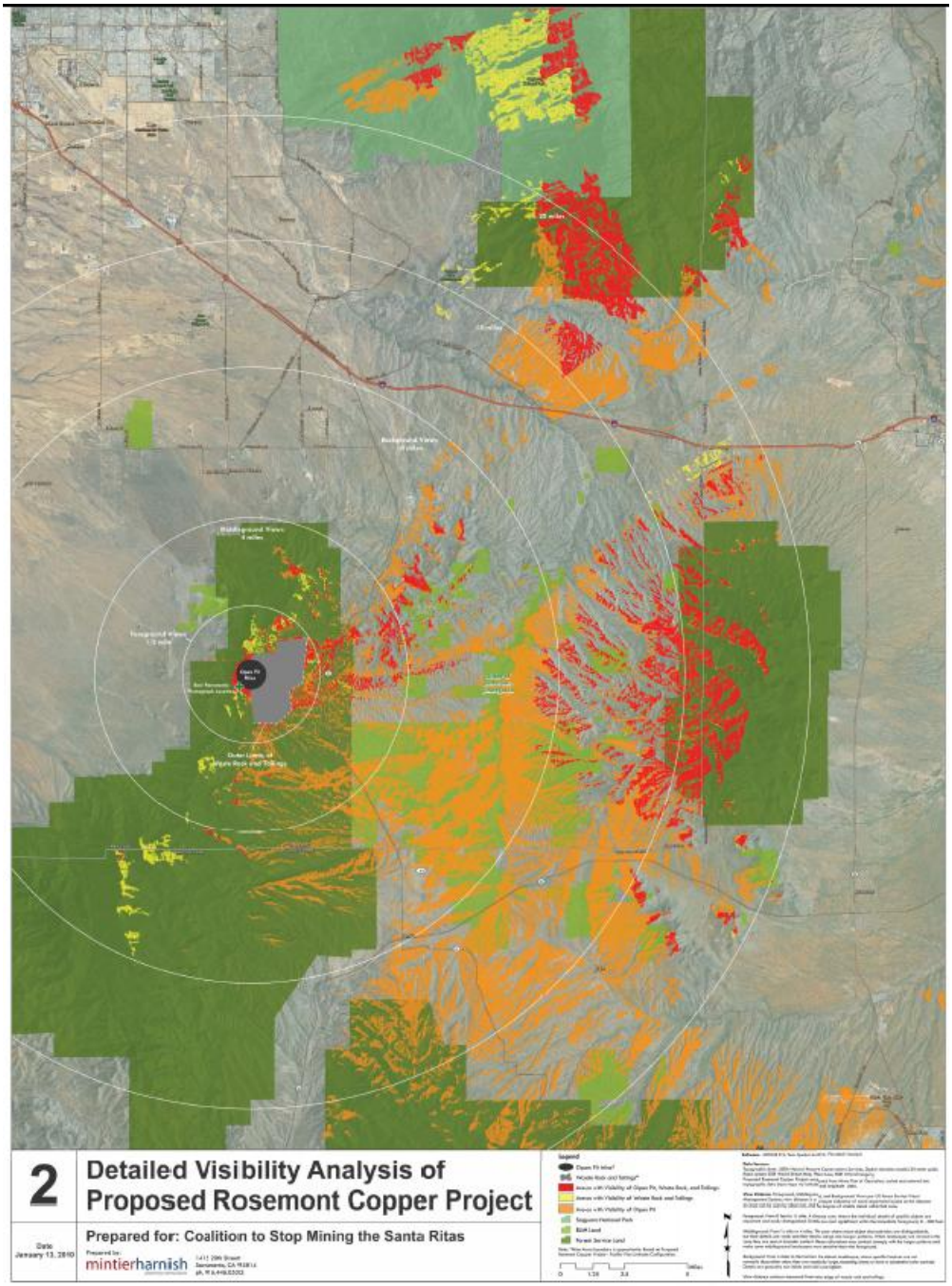
The Santa Rita Experimental Range (SRER) is the premier site for research on improvement and management of semiarid grasslands in the Southwest. In addition to grazing research, SRER provides regional data to assist scientists understand climate change, and has been selected as the core site for the National Ecological Observatory Network. Funded by the National Science Foundation, the project will study how vegetation and greenhouse gas exchange relate to climate changes over a 30-year period. The SRER research database includes a research archive dating to 1902. Using photographic images taken over three- or five-year periods at 83 sites throughout the range, researchers get a long-term perspective on vegetation changes. Over 700 scientific papers have been published on research conducted on the SRER. The range is home to 20 to 30 research projects at any time with 100 scientists working throughout the site. Funding for field studies originates from a wide variety of sources, and SRER does not maintain records on such externals grants. Grants typically take two to three years, and range from several thousands of dollars to long-term studies with funding in excess of $1,000,000.

Although a comprehensive accounting does not exist, it is clear that the SRER contributes a considerable amount to the local and regional economy. More important, however, is the invaluable contributions the facility makes to the maintenance of the semiarid grasslands; grasslands which are, in fact, the very basis of the cattle business in the US Southwest. In light of this direct connection, these significant market and non-market values must be determined and incorporated into the economic analyses of the potential adverse impacts of the proposed Rosemont Mine.

3. Scenic Values

Figure 1 on the following page contains a viewshed analysis prepared by The Coalition to Stop Mining the Santa Ritas and submitted to the Coronado National Forest as a separate scoping comment on the proposed Rosemont mine. Per the legend this graphic, the brightly colored areas show areas from

Figure 1: Viewshed Analysis (Source: Coalition Against Mining the Santa Ritas (2010)



In this figure, the red areas indicate locations from which the proposed mine pit, waste-rock, and tailing deposition would be visible; orange areas indicate areas with visibility of the mine pit (which removes a sizable portion of the east face of Weigles Butte nearly to the summit); and yellow areas indicate locations with visibility of the waste-rock and tailings deposits.

which the proposed mine would be visible. This extensive viewshed includes visibility of the proposed mine pit and/or waste rock and tailings piles from a significant number of public lands:

- Saguaro National Park;
- Vast portions of Coronado National Forest (including at least eight mountain ranges: Rincon, Empire, Whetstone, Huachuaca, Canela Hills, Patagonia, Catalina, and Santa Rita (including the Mount Wrightson Wilderness Area);
- Vast portions of the Las Cienegas National Conservation Area (BLM);
- Scenic State Highway 83; and
- Significant portions of Arizona State Trust Lands (including the Mustang Mountains).

In addition, views of the Northern Santa Rita Mountains from significant portions of the private property to the north, east, and south of the proposed mine site would be adversely impacted by the presence of an industrial mining operation. This includes the towns/communities of Sonoita and Elgin, as well as the southern portion of Vail. This Sonoita Basin and Santa Rita foothills extend over an area 20 miles East-West and 25 miles North-South, thus defining a 500 square-mile viewshed. As is apparent in the preceding figure, views of the proposed project occur throughout this viewshed thus impacting both public and private property throughout the Sonoita Basin.

Visual quality throughout the Sonoita Basin would also be significantly degraded as a result of the scheduled year-round 24-hour day operation. Visibility of the night-lighting required to operate the proposed industrial project under public safety regulations would introduce a highly visible, brightly-lighted industrial presence throughout the night, further reducing the visual quality of the entire Sonoita Basin.

The Draft EIS needs to account for the adverse economic impacts on property values for these public and private lands that would result from the operation of the proposed Rosemont Mine in the Coronado National Forest.

4. Critical Wildlife Linkages/Corridors

In 2006, the The Arizona Wildlife Linkages Workgroup issued a major study identifying Critical Wildlife Linkages throughout the State of Arizona. The Workgroup included the following public agencies and non-profit organizations: Arizona Department of Transportation, Natural Resources Management Group and Environmental Planning Group; Arizona Game and Fish Department, Habitat Branch and Research Branch; Northern Arizona University, School of Forestry; USDA Forest Service, Tonto National Forest; USDI Bureau of Land Management; Federal Highway Administration; US Fish and Wildlife Service; The Sky Island Alliance; and The Wildlands Project.

Of primary concern to the research team is the question of population viability and loss of genetic diversity in areas dependent upon continued linkages or corridors between major habitat areas. Based on a impressive research and mapping program, the Workgroup delineated critical wildlife linkages deemed most at threat within the State. Not surprisingly, wildlife linkages within the Sky Islands of Southern Arizona were prominent within the identified linkages, among them the complex of linkages connecting the Rincon, Whetstone, and Santa Rita Mountain ranges. These critical wildlife linkages are shown in Figure 2 in the body of the report. Data on the acreages of the critical linkages in the vicinity of the proposed Rosemont Mine are shown in Table 4 below.

Table 4: Data on Critical Wildlife Linkages; Vicinity of Proposed Rosemont Mine

Critical Wildlife Linkages		Area (acres)										Study Area		
												Total		Percent
		Distance (5-mile increments) from Proposed Mine										Acres	Square Miles	Total Study Area
Outer Radius of Sucessive 5-mile Rings	Miles	5	10	15	20	25	30	35	40	45	50	Total	640	
Area of Each Sucessive 5-mile Ring	Acres	50,265	150,796	251,327	351,832	386,469	378,391	235,197	173,710	62,195	9,724	2,049,906	3,202.98	
Wildlife Linkages	Acres	1,250	21,200	40,793	69,515	53,051	16,036	358	837	7,794	406	211,240	330.06	10.30%
	Percent	0.59%	10.04%	19.31%	32.91%	25.11%	7.59%	0.17%	0.40%	3.69%	0.19%	100.00%		
Wildlife Linkages (0 - 20-mile Rings	Acres				132,758								207.43	
	Percent			16.51%										

Source: Pima County GIS data base, 2010

The data in the table show that there are 1,250 acres of critical wildlife linkages within 5 miles of the proposed project; 21,200 acres within 5-10 miles; 40,794 acres within 10-15 miles, and 69,515 acres within 15-20 miles. In sum, there are over 130,000 acres of critical wildlife linkages potentially impacted by the proposed Rosemont Mine. It is important to understand that the mine pit, waste rock area, tailings stacks, processing area, as well as the access road and haul road virtually sever the northern portion of the Santa Rita Unit of the Coronado from the southern portion of the management unit. This industrial complex, coupled with the alignment of the Highway 83 corridor immediately to the east, form a virtual barrier for wildlife movement between the Santa Rita and Rincon Mountains, and between the northern Santa Rita and Whetstone Mountains.

As such, the Draft EIS needs to determine the adverse impacts on these critical wildlife linkages and calculate the associated costs that would result from the operation of the proposed Rosemont Mine in the Coronado National Forest.

5. Astronomy and Dark Sky Observing

Rural Pima and Santa Cruz Counties are highly valued by the amateur and professional astronomy communitites for their dark, transparent, and tranquil night skies. Included among the world-class astronomical facilities in Pima and Santa Cruz Counties are the Kitt Peak National Observatory and the Fred Lawrence Whipple Observatory. Also a world-class astronomical facility potentially affected by light pollution from the Mine is the Mount Graham International Observatory located in Greenlee County. All three facilities were created with substantial Federal assistance and receive ongoing research support from a number of Federal agencies with hundreds of millions of taxpayers' dollars. The Tucson region is the center of dark sky observing in the State of Arizona as shown in Figure 2 on the following page. A more detailed graphic showing location in Southern Arizona is contained in Figure 3 on the next page.

Capital investments and improvements, research funding, payrolls, and other economic factors related to astronomy and dark sky observing constitute a significant economic entity within the Tucson region. An excellent source for this important data is contained in **Astronomy, Planetary Sciences, and Space Sciences Research: Opportunities to advance Arizona's Economic Growth**, published by the Arizona Arts, Sciences, and Technology Academy in 2007. Bearing in mind that the following data are statewide numbers, consider the following three excerpts from the summary of findings and recommendations excerpted from the above referenced study:

- The total dollar impact (sales or output) in Arizona that was attributed to Arizona's astronomy, planetary sciences and space sciences was estimated at $252.8 million in FY 2006. This includes $138.6 million in earnings, and $12 million in tax revenues.

- During FY 2006, Arizona's observatories and related research organizations spent a total of $135.4 million on operations, including wages and salaries. An additional $28.8 million was spent on capital investment/construction-related items. Thus, for FY 2006, total expenditures amounted to $164.2 million. Of that amount, $69.3 million was spent in Arizona.

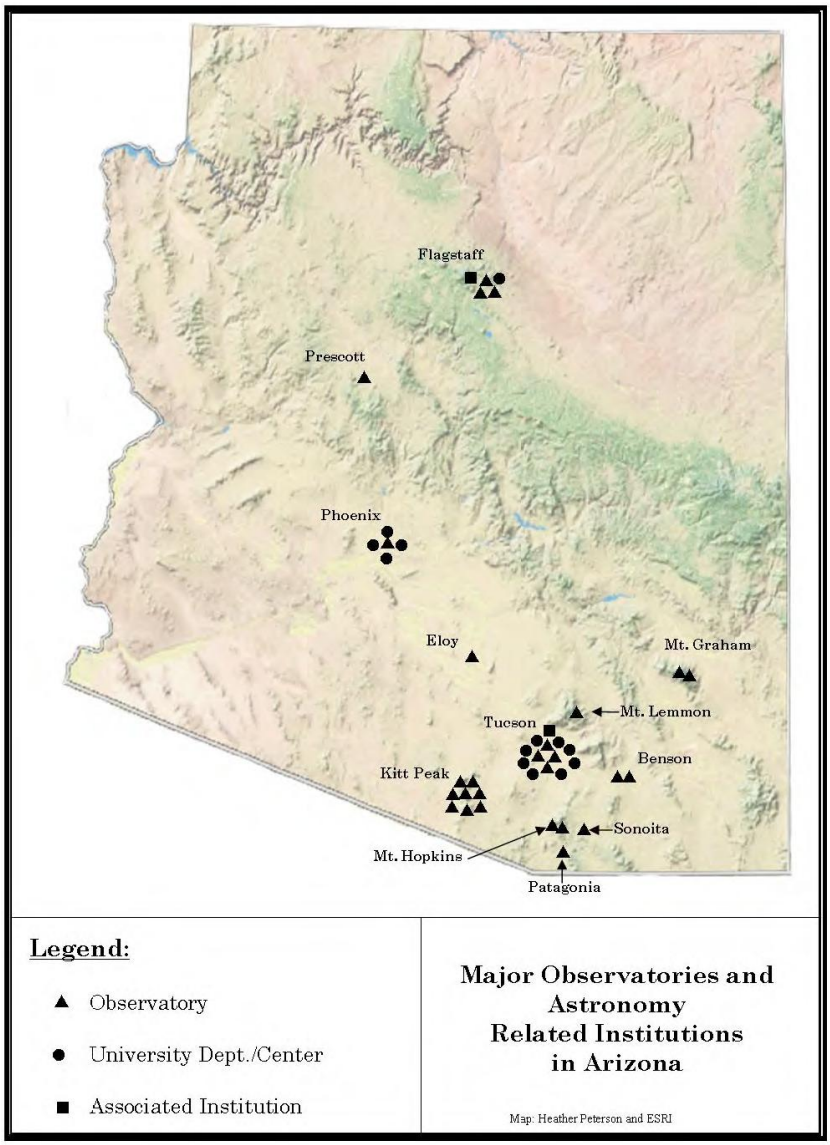
- Observatories, space sciences, planetary sciences and related technology facilities in Arizona received a total of 200,805 visitors during FY 2006, out of which 6,668 were professional visitors and 194,137 were public visitors. Twenty-two percent of the public visitors were from outside Arizona. Out-of-Arizona visitors spent $16.4 million during FY 2006, generating an economic impact of $25.7 million dollars in total. The out-of-state visitors' spending generated 286 jobs and $8.1 million in earnings in Arizona.

These observatories virtually depend on access to dark sky "seeking conditions" for their continued existence -- basically dust and aerosol free, dark skys absent light pollution from developments of all sorts. The tons of dust released into the atmosphere by blasting at the proposed mine, combined with the proposed 24-hour per day, seven days per week operating schedule, combined with the illumination requirements the night shift will severely compromise the region's prized dark night skies. This will place the investment of hundreds of millions of taxpayers' and private contributors' dollars at risk.

Figure 2 on the following page shows the location of major astronomical observatories in Arizona. Principal Optical Observatories in Southern Arizona are shown in Figure 3, page 9. The approximate location of the proposed Rosemont Mine is shown as larger red dot in this figure.

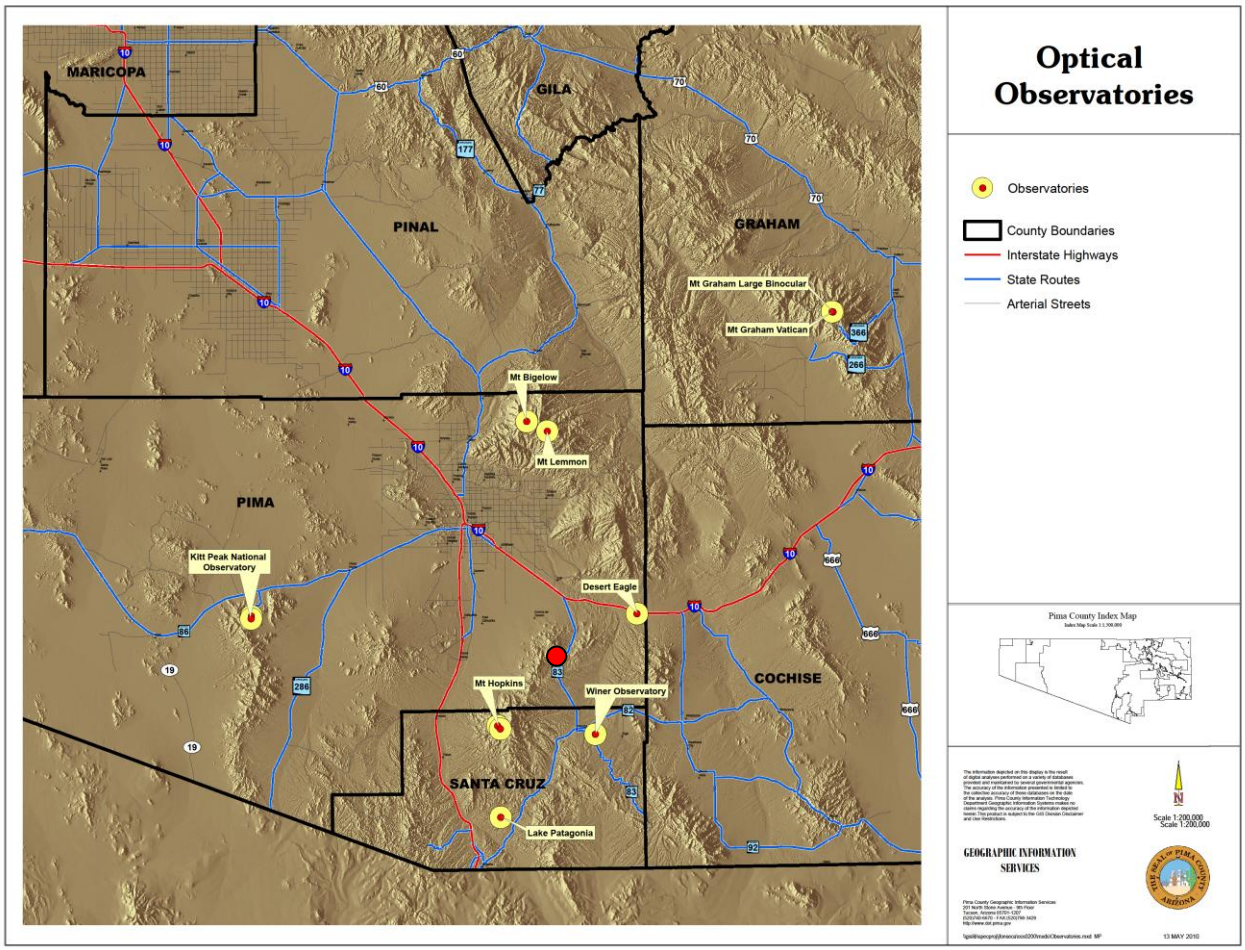
The Draft EIS needs to determine the full range of economic benefits of these important research and educational facilities, and calculate the associated costs that would result from impairing, degrading, and otherwise adversely effecting the operations of these facilities which would result from the operation of the proposed Rosemont Mine in the Coronado National Forest.

Figure 2: Major Astronomical Observatories in Arizona



Source: Astronomy, Planetary Sciences, and Space Sciences Research: Opportunities to advance Arizona's Economic Growth, published by the Arizona Arts, Sciences, and Technology Academy in 2007.

Figure 3: Principal Optical Observatories in Southern Arizona



Source: Pima County