

Review of

**“Draft Economic Analysis for Proposed Designation of
Critical Habitat for Jaguar”**

Prepared by Industrial Economics, Inc. for the U.S. Fish and Wildlife Service
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Comments of

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1. Introduction

The U.S. Fish and Wildlife Service (FWS) contracted with Industrial Economics, Incorporated (IEI) to evaluate the potential economic impacts associated with the designation of critical habitat for the federally listed jaguar.¹ That report was prepared in support for the FWS's proposed rule designating such critical habitat in Arizona and New Mexico.

IEI found that the incremental costs associated with that critical habitat designation would be quite modest, primarily involving additional administrative costs associated with consultation with other agencies and organizations.² The estimated costs associated with the designation of the jaguar critical habitat were estimated to be low for two reasons. First, government agencies would seek to protect the jaguar and jaguar habitat regardless of whether there was a formal designation of that habitat because the jaguar is a listed species under the Endangered Species Act (ESA). The baseline expenditures to which government agencies were already committed would be similar to the conservation activities required by designated critical habitat. Second, most existing and expected activities on jaguar critical habitat were not expected to be incompatible with jaguars continuing to use that existing habitat.

IEI identified one exception to this conclusion that the incremental costs associated with designating critical jaguar habitat would be quite low: The potential impact on the viability of large proposed metal mines in critical habitat Unit 3, the Patagonia Unit. IEI devoted Chapter 5 of its report to discuss the "Potential Economic Impacts to Mining Activities." Both the proposed Rosemont Mine and the Hermosa Project have a large enough footprint that they could cause potential adverse modification of the proposed designated jaguar habitat and require mine modifications and other mitigation measures.

IEI notes that the U.S. Forest Service's (USFS's) Draft Environmental Impact Statement on the Rosemont Mine concluded that the loss of jaguar habitat resulting from the proposed mine would be relatively small (0.1 percent).³ However, IEI cites Rosemont Mine's concerns that "feasible alternatives that may avoid adverse modification of critical habitat do not exist. The company is therefore concerned that the designation of critical habitat will result in substantial impacts to the mine."⁴ From this, IEI concludes:

Therefore, the incremental impact of the [critical habitat] designation could include the total loss of economic benefits expected to result from production at the Rosemont mine. At this time, we are unable to predict the probability that the conservation measures requested to avoid adverse modification of jaguar habitat would be so costly that Rosemont would

¹ "Economic Analysis of Critical Habitat Designation for the Jaguar," Draft, June 18, 2013.

² Across all six critical habitat units, the annualized incremental costs that were quantified totaled \$31,000. Exhibit ES-2, p. ES-4.

³ Paragraph 155.

⁴ Ibid.

choose not to continue production. However, as described above, the USFS has proposed conservation efforts in its Biological Assessment of the Rosemont Mine that are unlikely to be so costly as to prevent production. (Paragraph 155)

Because of the uncertainty as to whether critical habitat designation would impose quite modest additional costs on the Rosemont Mine or costs so high that the mine would be abandoned, IEI analyzed two scenarios: one that assumed no significant costs on Rosemont and the other that assumed that the Rosemont Mine would not be able to proceed. The same scenarios were assumed for the Hermosa Project.

For the scenario under which these two proposed mines would not be able to proceed if the mine impact areas were designated jaguar critical habitat, IEI used studies sponsored by the mining companies, and subjected to no independent review and validation, to estimate the incremental economic losses (costs) associated with that critical habitat designation. Those critical habitat costs were estimated to be huge:

- Rosemont Mine: \$1.2 to \$2.5 billion per year in lost economic activity, the loss of as many as 9,000 jobs, and the loss of as much as \$307 million in annual revenues to governments. (Highlighted text following paragraph 156)
- Hermosa Project: \$3.96 billion in lost revenues and 152 mining jobs lost. (Paragraph 158)

2. The Accuracy and Reliability of the IEI Incremental Mining Costs Due to Jaguar Critical Habitat Designation

The IEI estimates of incremental mining costs are both conceptually flawed and rely on self-serving mining company information. In this section we will discuss the conceptual flaws associated with IEI's estimates of the incremental mining costs. In the next section we will look at the accuracy and reliability of the source of IEI's estimates: the mining companies themselves.

A. Apparent Quantification of Unquantified Impacts

IEI admits that it has not actually quantified the incremental costs of critical habitat designation on proposed mining activities. It has estimated the cost ***if*** critical habitat designation leads to an abandonment of these proposed mines. But IEI does not know if that is likely to be true or how probable that outcome might be. It cites the USFS Draft EIS as saying critical habitat designation is unlikely to limit the mining, but IEI also cites the Rosemont Mine as saying that it believes that critical habitat designation could seriously burden the mine.

In IEI's "Summary of Forecast Incremental Impacts by Activity" in the Executive Summary (Exhibit ES-3), IEI lists under the heading of "potential ***unquantified*** impacts" (emphasis added) the following unquantified impact of critical habitat designation:

“If mining plans move forward and an adverse modification decision is made, potential impacts on operations at Rosemont or Hermosa mine could result.”

Note the qualifications and uncertainty:

- i Both mines turn out to be financially viable.
- ii Both mines are able to get permitted.
- iii Both mines are found to cause adverse modifications of critical habitat.
- iv The required mitigation to protect critical habitat is so costly that there are “potential impacts on the operations” of the mines.
- v Those potential impacts are so great, both mines are abandoned.

Because of all of these uncertainties, IEI’s quantification of the incremental costs *if* the designation of jaguar critical habitat blocks the construction and operation of both mines is not, as it admits, an actual quantification of the incremental costs associated with critical habitat designation. Pointing out that there is a chance, with a probability somewhere between zero and 100 percent, that a cost might be incurred, does not provide useful information. Despite this admission by IEI, it then proceeds to repeatedly provide **quantified** estimates of these costs. This is both contradictory and confusing.

B. Confusing Economic Activity with Economic Value

IEI repeatedly and incorrectly uses measures of gross economic activity as an indication of economic value and, therefore, cost. For the Hermosa Project, IEI uses total revenues over the life of the mine to measure the potential incremental costs associated with jaguar critical habitat designation (paragraph 158). For the Rosemont Mine, IEI reports “estimates that the Rosemont Mine will result in an average annual increase in local economic activity” of \$1.2 to \$2.5 billion per year depending on the geographic area studied (paragraph 132 and highlighted box following paragraph 156).

i. IEI’s Estimate of the Value of the Output of the Hermosa Project

IEI chose to measure the economic value that would be lost *if* jaguar critical habitat designation led to the abandonment of the Hermosa Project by using the market value of the mine’s production, not the contribution to the local economy. That value of production was established by estimating the metal content of all the ore that was projected to be removed by the mine and multiplying it by the expected market value of those metals.⁵ This came to \$3.96 billion. Of course, this is not the money that would circulate in the local economy. In addition, it was not the money that the owners of the mine would receive either. In fact, this estimate of market value of output was just the first step in the M3 Engineering and Technology Corporation analysis of the commercial potential of the Hermosa mine. That Hermosa analysis proceeded to subtract the costs of operating the mine. That reduced the value to \$1.8 billion. The capital costs of

⁵ Refining, treatment, and transportation costs were subtracted.

building and maintaining the mine also were taken into account, reducing the net value created to about \$1.0 billion. Hermosa also took into account the time value of money and the fact that most of the capital costs were incurred upfront but the revenues from the sale of ore concentrates would only come over a 16-year period. Using a 7.5 percent discount rate, that reduced the net value of the operation to \$528 million.⁶ That is, the net value of the operation as estimated for Hermosa was actually about one-eighth of the value that IEI chose to use. All of these values were in the table from which IEI obtained its number. IEI simply chose the largest of the numbers available, not Hermosa's valuation of the mine.

The IEI approach to establishing the economic value of the Hermosa mine assumes that the metal ore concentrates are costlessly delivered to the surface of the earth without the need for any investment or the incurrence of any operating costs. This is obviously not how anyone who was considering purchasing the rights to develop that mineral site would value it. That is only the first step in such a valuation. That was the purpose of the document and table that IEI was citing.

It should also be pointed out that IEI correctly calculates the discounted net present value of the costs it estimates. It does not simply sum those costs over the years (p. 2-18). Yet in reporting on the "loss" if the Hermosa Project were not to proceed, it erroneously provides an undiscounted value that is a cumulative total from summing metal ore concentrate values over 16 years.

The two dramatically different views of "economic benefit" are clear here. Hermosa Mine was trying to estimate what the net economic value was that it could extract from this particular ore deposit. I.e. could an acceptable profit be earned. Economists, too, would look at that, possibly adding in non-market costs and benefits into the calculation. In this economic and business context costs clearly matter. They are not benefits. The economic impact approach, however, treats all dollars of value created locally as a local benefit. Thus hiring and paying workers is a local benefit and the purchase of supplies from local businesses is a local benefit. Mine company costs become local benefits. However, as discussed above, even then the value of equipment and supplies imported into the area would not be treated as a local benefit. The same *might* be said about workers who commute in from the outside and return to their homes at the end of the work day or, even, workers who move into the region to take the jobs.

ii. The Economic Activity Associated with the Rosemont Mine

For the Rosemont Mine, IEI measured the "loss" if the mine was not able to proceed due to limitations associated with jaguar critical habitat designation by using the incremental "value of economic activity," which was measured by the gross market value of the output of the mine. It accepted values contained in a study funded by the Rosemont Mine and based on the mining company's characterization of how the mine

⁶ Table 22-7, p. 126, Hermosa Project Preliminary Economic Assessment, Santa Cruz County, Arizona, Revision 1, November 12, 2012, M3-PN120076, prepared by M3 Engineering & Technology Corporation for Wildcat Silver.

would operate.⁷ Gross value of sales is not the way economists estimate the annual value created by a firm. An automobile, truck, or tractor dealership, for instance, may well have a very high gross value of sales, but those autos, trucks, or tractors were not manufactured at that dealership. The only value created in that business is the preparation, marketing, and sales activity, a small fraction of the total market value of sales. The value created by a firm, the value of output minus the cost of purchased inputs, is called the *value added* in economic analysis.

The same can be true of a mine constructed and operated in a rural area. Almost all of the machinery, vehicles, and supplies have to be purchased elsewhere. Their value is not created at the mine.⁸ The Rosemont economic impact study calculated the value actually created within the study area, the sum of the incremental value added due to the operation of the mine, but IEI chose not to use it. If it had, the value would have been about 40 percent smaller.⁹

B. Treating Mining as a Costless Activity

The Rosemont Mine and Hermosa Project are controversial because significant parts of the population see that mining activity as incompatible with existing economic values associated with the landscapes that mining would fundamentally change. That is, mining may be incompatible with valuable current uses of that landscape. In that setting, pursuing one set of economic values comes at the expense of another set of economic values. That, of course, is not unusual. Economic activity almost always involves choices and tradeoffs. That is why economists are fond of reminding people that “there is no such thing as a free lunch.” With the same resources, you cannot usually pursue an indefinite number of economic activities.

Because the Rosemont Mine is located within a system of protected landscapes that local, state, and federal governments have sought to protect to a greater or lesser extent, those natural landscapes have become an important part of the larger environmental and recreational context that makes up a significant part of the quality of life in the Greater Tucson Area. That not only supports a vibrant visitor economy but also attracts new residents, businesses, and economic activities.

Because of considerations such as these, the Tohono O’Odham Nation, Pima County Board of Supervisors, Santa Cruz County Board of Supervisors, Tucson City Council, Sahuarita Town Council, Patagonia Town Council, Green Valley Council, and Sonoita

⁷ An Assessment of the Economic Impacts of the Rosemont Copper Project on the Economies of the Cochise/Pima/Santa Cruz Counties Study Area, the State of Arizona, and the United States Using the REMI Regional Economic Forecasting Model prepared for Augusta Resource Corporation by L. William Seidman Research Institute, Arizona State University, May 2012.

⁸ Because the Rosemont Mine would be located within the Tucson Metropolitan Area and the study area include Pima County (Tucson) as well as Santa Cruz and Cochise Counties, more of the supplies used by the mine may originate within the study area than would be the case for a mine located in a remote rural area.

⁹ Compare the value of output with the contribution to Gross Regional Product in the Seidman Research Institute Rosemont reports.

Crossroads Community Forum have all taken formal positions opposing the permitting of the proposed Rosemont mine. To them, the economic costs exceed the economic benefits.

This is pointed out not as an assertion that, in fact, the costs associated with the mine exceed the benefits, but simply to observe that there is controversy over the mines because there are widely recognized costs as well as benefits associated with the Rosemont and Hermosa Mines. In that context one cannot simply assume that the construction and operation of the mines would be a costless activity that would only have positive economic impacts. Yet that is what IEI implicitly does.

The size of the *net* economic benefit after the costs are subtracted from the benefits associated with the construction and operation of these mines is what might be put at risk by the designation of jaguar critical habitat. IEI does not attempt to measure what that *net* economic value of the Rosemont and/or Hermosa Mines are. In fact, IEI does not even hint that there are costs associated with the construction and operation of these mines. IEI assumes the mines generate only benefits. The one exception is that IEI recognizes that protecting Jaguar habitat *may* have economic value and, implicitly, the development and operation of the mines may damage that value, that is, impose a cost¹⁰.

Given that the question of whether there is net economic value associated with the proposed mine is currently being debated, it is surprising to find IEI presenting these mines as pure economic benefits.

C. What Economic Value Would Be Lost If the Mines Do Not Proceed

The “cost” associated with an event or action is supposed to be a measure of what has been lost or what we will have to go without as a result.¹¹ In the case of the copper and silver mines that may be affected by jaguar critical habitat, the loss would be the lost access to those particular copper or silver deposits. But in a competitive setting where many different sources of copper or silver are under consideration in Arizona or elsewhere in the United States or around the world, it is highly unlikely we would go without copper or silver if these two mines do not proceed. What would be lost is whatever *advantages* these particular mine sites had in the production of copper or silver. It is that advantage, if any, that would be lost as we turned to alternative sources and substitutes.¹² This is now the accepted practice in natural resources economics.

¹⁰ Note that as in IEI’s discussion of the benefits and costs of critical jaguar habitat designation, we are moving back and forth between *local economic impacts* and *economic value*. Economic impact analysis tends to ignore the creation and loss of economic value as is indicated by its facility in relabeling business costs as benefits.

¹¹ IEI provides this same definition of the relevant “cost”: “benefits foregone by society as a result of the regulations.” I.e the limitation on land use that may be associated with protecting critical jaguar habitat. Paragraph 48.

¹² John V. Krutilla made this point over 40 years ago in an important article in the *American Economic Review* 57(4):777-86, 1967, “Conservation Reconsidered.” He and colleagues applied this approach empirically in a series of case studies of the opportunity costs associated with protecting natural

Viewing the alternative sources or substitutes to the particular Arizona mines that might be affected by jaguar critical habitat designation is important. Designation of critical habitat seeks to protect a threatened or endangered species, which, by definition, has no close substitutes. Also, by definition, “critical habitat” refers to habitat that is crucial to the survival of the species.

As the Tucson FWS office said after the release of photographs of a jaguar roaming just west of the Rosemont Mine site for nine months said: “It’s the best (jaguar) habitat we have.” Environmental advocates went further. The Center for Biological Diversity in commenting on the sightings of the jaguar near the proposed Rosemont Mine said: “It’s hard to see how an area with possibly the only jaguar living in the wild in the United States...how that habitat would not be essential to recovery here.” Apparently, this is the only jaguar known to live in the United States for over the last fifteen years.¹³

Critical habitat seeks to identify habitat without which the survival and recovery of unique species would be threatened. Again, there are no close substitutes available. But there are close substitutes for copper and silver, namely other mines that would be developed instead if these particular mines do not go ahead or, possibly, other metals or materials or improvements in the efficiency with which the metals are used that could serve in place of the additional copper or silver.

In this context the economic loss or cost if one or both of these mines do not come into production is not the net economic value associated with the mines’ production but the cost advantage those mines have over the next best mine that would have been brought into production instead. This might be a tiny fraction of the value of the Rosemont or Hermosa mines or their output. In fact, the value could be close to zero.¹⁴

D. Treating Government Revenues as Net Improvements in Fiscal Balance

IEI repeatedly and erroneously treats tax revenues associated with potential mining activity as pure benefits to local, state, and federal governments. Thus, if critical jaguar habitat designation were to prevent the Rosemont mine from being built and brought into production IEI says there will an “annual loss of government revenue associated with the Rosemont Mine: \$25.7 million locally, \$46 million statewide, and \$235 million nationally. (Exhibit 5-1) The same estimate is provided in paragraphs 12, paragraph 132, and in the highlighted table following paragraph 156.)

landscape values in the face of commercial development proposals: *The Economics of Natural Environments: Studies in the Valuation of Commodity and Amenity Resources*, John V. Krutilla and Anthony C. Fisher, Resources for the Future. Baltimore: The Johns Hopkins University Press, 1985.

¹³ *Arizona Star*, June 28, 2013, Jaguar roves near Rosemont mine site.

http://azstarnet.com/news/science/environment/jaguar-roves-near-rosemont-mine-site/article_e8573513-b55b-553e-934c-e8951555f14e.html

¹⁴ Here we have switched to what IEI terms a national efficiency perspective: looking at economic value gained or lost, not looking at local economic impacts that shift from one geographic area to another.

Tax payments are not costless windfalls to either the people paying the taxes or the governments receiving the tax revenues. Taxes are the means by which the government funds the public services required to support economic activity and residential settlement. Tax payments to school districts, for instance, fund the education of the children of residents and employees of local businesses. Tax payments to road and highway departments, fire protection, and the criminal justice system fund expansions of the transportation system to serve expanded economic activity and larger populations as well as maintaining adequate levels of fire and police protection.

Any analysis of actual impacts of new economic activity on the fiscal balance faced by governments has to take into account not only the increase in tax revenues but the increase in the demand for public service associated with the new economic activity, the larger workforce, and the higher population. The actual impact on governments has to analyze both increased costs and increased tax revenues and fees. Larger economies do not have an easier time balancing the demands for services with the available tax revenues and fees than do smaller economies.

IEI provides no such fiscal analysis. It sticks to the “costless mining” approach promoted by the mining companies from which IEI received its economic impact information. IEI does not even mention the fact that the new mines would require increased spending by local, state, and federal governments. Such one-sided benefits-only analysis is not *economic analysis*. It is simply a re-presentation of the mining companies’ public relations releases and inappropriate for guiding public policy decision.

E. Taking Seriously the Limitations of Impact Analysis in Measuring Economic Costs

Early in IEI’s report, IEI warns that regional economic impact modeling actually is studying shifts in the geographic distribution of economic activity as new production draws capital, workers, and supplies from one location to another. This also impacts various groups of people differently, moving employment and income opportunities from one location to another. This often means the economic impacts measured are really measuring the redistribution of economic activity among geographic areas rather than actual net gains or losses within the economy. (Paragraph 53) In addition, IEI warns that such economic impact analysis “can overstate the long-term impacts of a regulatory change [such as jaguar critical habitat designation] because impact analyses “do not consider long-term adjustments that the economy will make in response to this change.” For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by impacted businesses.” (Paragraph 54)

IEI concludes, however, that: “Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts.” (Paragraph 55) IEI goes on to warn that these “distributional effects” should not be confused with economic costs and benefits.

Unfortunately, having provided this warning, IEI then proceeds to present quantified statements of mining economic impact costs that are in the range of hundreds of millions of dollars to billions of dollars and treats them the same as the IEI estimates of the costs of consulting with various parties over critical habitat protection. That is, IEI does not take its own warnings seriously as it presents the results of the Rosemont economic impact analysis.

F. Conclusion on IEI's Analysis of the Potential Mining Costs Associated with Designation of Jaguar Critical Habitat

IEI repeatedly suggests that the designation of jaguar critical habitat could have huge costs associated with it because that designation may block currently proposed and future mines. Those costs, IEI suggest, could be in the hundreds of million or billions of dollars a year.

In suggesting these huge costs, IEI ignores its own qualifications and warnings about the limitations associated with the very tools and numbers it then puts forward as a quantification of the potential costs associated with critical habitat designation.

The IEI estimation and interpretation of the potential mining costs of critical habitat designation are conceptually flawed in multiple ways and cannot be used to inform or guide decisions about the designation of jaguar critical habitat.

3. The Reliability of the Rosemont Mine Economic Impact Analyses on Which IEI Exclusively Relies for the Estimated Mining Costs of Critical Habitat Designation

A. Economic Impact Analyses as a Public Relations Effort

All of IEI's estimates of the potential economic costs on mining of the designation of jaguar critical habitat come from studies commissioned and paid for by the Augusta Resource, Inc., the owner of the proposed Rosemont Mine.

Large industrial projects such as the proposed Rosemont Mine almost always commission economic impact studies as part of their public relations efforts to boost public support for their proposals. This public relations use of economic impact studies is not limited to large industrial projects. State arts councils, state universities, regional tourism associations, agricultural and other industrial associations all regularly seek to boost public support for their private activities by commissioning economic impact studies to show how important they are to the economy. The point of the economic impact analyses is to suggest that a particular group's private interests are actually also public interests that deserve support, including relaxed public regulation and/or public subsidization.

Almost any group or industry of any size can count on economic impact analyses to serve as a public relations function because of the way such impact studies are carried

out. The typical impact study, including the Rosemont Mine economic impact study on which IEI uncritically relies, makes several assumptions that assure that the conclusions are always that there are substantial benefits associated with almost any economic activity. The more important assumptions made include:

- The project, industry, or activity being studied does not conflict with nor displace any existing economic activities.
- The project has no important non-market economic costs associated with it.
- The project will not increase the need for any public goods or services.
- Almost all commercial costs can and should be treated as public benefits.
- The capital, materials, and labor directly or indirectly used by the project would otherwise be permanently unemployed.

These assumptions assure that by design the impact analysis either dismisses or ignores actual costs associated with the project or by design turns the commercial costs into public benefits. Having purposely eliminated all costs associated with the project, it is not surprising that the impact analysis only finds substantial benefits. The impact analysis is *designed* to find only benefits. That is why it is such a useful public relations tool in promoting private interests as if they were public interests. *Any* project, no matter how economically irrational, can be shown to produce positive economic impacts.

Economic impact analysis is *not* a benefit-cost analysis. It is a *pure benefits* analysis by *design*. In that sense it violated economists' long standing objection to the fantasies of free lunches. Economic impact analysis is *free lunch economics* contrived for public relations purposes.

Economic impact analysis does not *have* to be such a distorted public relations exercise. Almost all of the assumptions listed above could be abandoned and actual economic analysis looking at both the positive and negative impacts of a proposed project could be studied. That, however, is not what was done for the Rosemont Mine economic impact studies on which IEI relies.

B. The "No Costs" Assumptions Typically Used in Economic Impact Studies

The economic impact analysis on which IEI relies imagines an "angelic" mine that has no costs or negative impacts associated with it. That is not the way to start *any* economic analysis.

- i. All economic activities are not necessarily compatible with each other.

Open pit mining and the storage of waste rock and tailing slurries obviously excludes the simultaneous use of that piece of landscape for other purposes, including, possibly, its use as critical habitat for the jaguar. That mining may also have impacts on recreation, rural open space, scenic vistas, water supply, dark skies, etc. Government agencies and private organization have recognized the value of maintaining natural

landscapes and have invested millions of dollars to maintain the view-scape, recreational opportunities, and wildlife habitat that contribute so much to the attractiveness of the Greater Tucson Area as a place to live, locate a business, or visit.

The controversy over the Rosemont Mine centers on exactly these conflicts over competing, valuable uses of public lands. Beginning one's analysis with the assumptions that no such conflicts among economic values and activities exist, fatally biases the analysis at the start.

ii. The absence of non-market costs associated with mining.

Metal mining is a landscape and environment intensive activity that in almost all operations has had significant environmental costs in the form of landscape, water, and air quality degradation. Many of our largest Superfund sites are abandoned mining operations. Some of them require perpetual treatment to prevent ongoing contamination of ground and surface water. Beginning an economic impact analysis by assuming that these costs are non-existent is counter-factual and misleading.

iii. Assuming new economic activity requires no public services.

As discussed above, tax revenues are not “free money falling from the skies.” Taxes are the way we pay for the public goods and services upon which all modern economies and communities depend. The economy cannot expand significantly without increasing the demand for and spending on public goods and services. In that sense taxes are the price paid for additional services to serve the expanding economy. If they are not spent on that, then the public will suffer the cost of degraded public goods and services. Fiscal analysis to determine the net impact on government budgets requires studying the increased demand for services as well as the increased tax revenues. Assuming the increased demand for services is zero biases the study at its very start.

iv. The assumed absence of commercial costs.

Impact analysis typically begins by converting business costs into benefits. The labor committed to the project and the wages they are paid, for instance, while costs to the firm, are treated as benefits to the community: more jobs and income. Similarly, the expenditures that a mine makes to purchase equipment and supplies, while clearly a cost to the firm, are treated as benefits to the community since money is being spent in other firms allowing them to make money and employ workers. Even money borrowed or raised on capital markets and the payments to investors in the form of interest or dividends are treated as benefits since, apparently, there would otherwise be no alternative uses of that capital, a highly unlikely outcome.

IEI's use of the total value of mine output reflects this conversion of all of the mines costs into benefits. Of course, no business could take this view of economic activity or it would be quickly out of business. Mining companies put major efforts into reducing their costs, especially labor costs, by investing in labor-saving technology. Mining companies

carefully weigh the value of the mineral concentrates produced by the mine against all of the costs associated with producing them. If the costs are projected to exceed to revenues from the sale of the metal concentrates, they do not proceed with the mine. When that happens, that does not represent an “economic loss,” as economic impact analysis would characterize it, but the opposite, the avoidance of a real economic loss. A mine’s costs are real economic costs.

Economic impact studies, however, encourage communities to see all of those costs as benefits. That, in certain circumstances can make sense. To the extent that resources that are currently unemployed, e.g. workers or land or capital, are put to productive uses they did not previously have, the cost to the economy is quite low and the payoff to workers and other resource owners could be quite high. But that is a factual question. To the extent that it is not unemployed local miners who are put to work but workers in other places attracted to the mine by the high pay or to the extent that the mine has to enter markets to bid for the capital investments needed or to the extent that machinery or supplies have to be imported from outside the economy, it is not clear how many of these costs are really public benefits. Only analysis, that has not been provided in these economic impact studies, can determine that. Labeling *all* of the value of output as a local benefit and *all* of the costs as benefits without any analysis turns economics on its head and invites us to enter a world full of free lunches where costs never need bother us.

C. IEI’s Uncritical Reliance on the Rosemont Mine Economic Impact Studies

IEI explains how it estimated the costs that jaguar critical habitat may impose on the local economy through regulation of mining in the following way:

If additional [jaguar habitat] conservation efforts are requested and the Rosemont mine does not reach production, the economic benefits of the mine would not be realized. The 2012 report **conducted by Arizona State University for the Rosemont Copper Company** provides estimates of these benefits at the local, State, and national level. **While we were unable to confirm the specific estimates presented in this report, it is clear that the economic impact of a decision not to open the mine would be large**, particularly at the regional and State level. (Paragraph 156; also Paragraph 12, emphasis added)

Note that IEI admits that the economic impact study it uses was prepared for the Rosemont Copper Company. IEI also admits that it cannot confirm the estimated losses that it reports and uses. Also note that IEI has apparently concluded that the “benefits” of the Rosemont Mine clearly dominate any potential costs associated with the mine, resulting in a “large” cost to the region and the state if the mine does not proceed. IEI does not document what analysis it carried out to come to that conclusion.

Apparently the Tohono O’Odham Nation, local government officials (City of Tucson, Pima County, Santa Cruz County), other government officials, business leaders, and

citizen groups who have concluded that the costs associated with the Rosemont Mine exceed the benefits are either confused or ignorant. Alternatively, those who are skeptical about the “benefits” of the Rosemont Mine may have rejected the pure benefits “free lunch” assumptions listed above and, unlike the Rosemont Mine impact studies and IEI’s use of them, taken actual costs associated with the mine into account.

IEI’s sole source for its estimates of the very large potential costs that designating critical habitat for the jaguar may cause within the mining sector is a study Rosemont Mine commissioned from the Seidman Research Institute. That study used the REMI economic model to carry out the analysis. The REMI model is a proprietary model owned by Regional Economic Models, Inc. that is leased to organizations at a cost of a hundred thousand dollars or more depending on the number of individuals and organization that will be allowed to make use of the model. For those who have not leased the model, this means that it is largely a “black box” whose particular application, assumptions, operation, and use cannot be analyzed and confirmed.

This is not a criticism of the REMI economic model itself but, rather, of its application and use where the modeling cannot be analyzed or replicated by those who have not incurred the expense of leasing the model. The reports produced from REMI modeling often contain very little detail that would allow an outside analyst to test even the reasonableness and consistency of the results.

During the public process associated with the Rosemont Mine Draft Environmental Impact Statement prepared by the Coronado National Forest, there was considerable discussion of how to estimate the economic costs and benefits associated with the proposed mine. Power Consulting, Inc. submitted a discussion of the previous Seidman Research Institute’s modeling of Rosemont’s expected economic impacts.¹⁵ In addition, the U.S. Forest Service drew on an economic study carried out by Applied Economics for the Tucson Regional Economic Opportunities (TREO) that the Rosemont Mine financed.¹⁶ A U.S. Forest Service economist provided a critique of that modeling as did Power Consulting, Inc.^{17 18} Thus a considerable diversity of material discussing the economic impacts associated with the proposed mine has been recently published. IEI does not mention any of those other studies nor respond to the critiques of the economic impact approach taken by the Seidman Research Institute and its reported results contained in them.

¹⁵ Analyses of Economic Costs of the Proposed Rosemont Copper Project, Scoping Comment Document, Power Consulting, Inc, submitted to the Coronado National Forest.

¹⁶ Economic Impacts of the Rosemont Copper Project on Pima County, Arizona, Applied Economics, June 2011.

¹⁷ Comparison of Economic Impact Results for the Proposed Rosemont Copper Mine, Krista Gebert, Regional Economist, Northern Region, USFS. December 20, 2011.

¹⁸ The Failure of the Rosemont Mine DEIS to Adequately Analyze the Socioeconomic Impacts of the Proposed Mine, Comments on the Draft Environmental Impact Statement for the Rosemont Copper Project, Power Consulting, Inc., January 2012

D. Conclusions on the Uncritical and Selective Use of the Seidman Research Institute's Rosemont Economic Impact Analyses to Inform the FWS's Decisions on Designation of Jaguar Critical Habitat

The economic impact studies that Rosemont Mine has paid for are the equivalent of “black boxes” that IEI could not have reviewed and did not review. That also means that the public and FWS cannot evaluate the reliability of the huge economic costs that IEI indicates may be associated with designation of jaguar critical habitat because such designation may block proposed mines in that critical habitat.

IEI could have reviewed a variety of alternative views of what the economic impacts associated with the Rosemont Mine might be. That material is available in the record associated with the development and publication of the Coronado National Forest's Draft Environmental Impact Statement on the Rosemont Mine. Instead IEI relied entirely on the study sponsored by the mining company itself. This certainly makes the IEI cost estimates incomplete and potentially biased and not of sufficient reliability to assist the FWS's decision making on designation of jaguar critical habitat.

4. The Economic Value of Protecting Jaguar Critical Habitat

A. IEI's Discussion of the Benefits Associated with Protecting Jaguar Critical Habitat

At the very end of IEI's analysis of the *costs* associated with jaguar critical habitat designation, there is a discussion of the potential *benefits* associated with that designation. It is unclear why in an “Economic Analysis of Critical Habitat Designation for the Jaguar” most (96 of 103 pages or 93 percent) of the study would focus on the costs rather than the benefits. As the Hermosa Project Preliminary Economic Assessment cited by IEI makes clear, a mining company's economic analysis would focus primarily on the costs associated with a potential mine rather than exclusively on the benefits. At the very least this IEI almost exclusive focus on the benefits of the proposed mine demonstrates a biased posture that assumes that the results of such critical habitat designation must be economically negative. IEI's presentation of quantified costs in the hundreds of million to billions of dollars certainly confirms that negative assumption.

IEI's introduction to the discussion of the “Potential Economic Benefits” of designating jaguar critical habitat begins by reminding readers that “the previous chapters of this report assess the economic impact of actions taken to protect the jaguar and its habitat. Specifically, the analysis forecasts impacts likely to occur...” Note that the costs are “likely to occur” but the chapter on benefits “contemplates potential economic benefits.” The costs are reasonably certain; the benefits may or may not exist.(Paragraph 242)

Later IEI *does* state that “the designation of critical habitat for jaguar has the potential to result in significant impacts to future surface mining activities. However, significant uncertainty exists regarding the specific potential impacts of critical habitat on the

mining operations.” (Paragraph 245) That is, despite the repeated quantification of these large costs, they, too, are only “potential” costs.

IEI’s benefits chapter concludes that it is not possible to monetize the benefits associated with protecting jaguar habitat because this is a species-specific question and no study has thus far dealt with those specific benefits. IEI, therefore, simply lists “potential benefits associated with the specific conservation efforts for the jaguar.” Those benefits are “the ancillary benefits” that could derive from conservation measures that may be implemented to avoid jeopardizing the species.” (Paragraph 261) The general benefits listed are “aesthetic,” “educational,” and “property value” benefits.

IEI’s chapter on the benefits of protecting jaguar critical habitat also points out that such landscape protection generates the same benefits as many other landscape conservation efforts. That is, jaguar critical habitat protection also preserves habitat for other species, maintains open space, enhances wildlife viewing, protects public lands for general recreation activities, and maintains view-scapes for people living throughout the Greater Tucson Area.

The value of these landscape protection measures is widely recognized by government agencies, non-profit organizations, and citizen in the Tucson area. Such landscape protection efforts have been an important part of public land use planning in the Tucson.

B. The Extent and Value of the Public Lands Encircling the Tucson Area

As briefly mentioned above, Tucson is nearly surrounded by protected lands that give that metropolitan area one of its unique qualities that is not only important to residents but is also the foundation of the Tucson area’s recreation and visitor economy. Major investments have been made at the federal, state, county, and city levels to provide for and protect vast natural open spaces around the Tucson urban area. This diverse set of public lands includes National Forest and National Park lands as well as state lands, wildlife refuges, county park lands, and ranch lands for which the voters of Tucson and Pima County have paid to protect from residential development. The acreage is huge, almost 2,000 square miles. Even priced at relatively low levels, the public investment value associated with these public lands is also huge, \$2.3 billion. The table below summarizes these public lands that are so important to Tucson’s unique and attractive quality of life.

According to the USFS Region Three National Visitor Monitoring Results (2008), there were an estimated 2.4 million visitors to the Coronado National Forest in 2007, almost 500,000 of whom visited the wilderness areas. Over 43 percent of the surveyed visitors listed eleven Pima County Zip Codes as their residences. Moreover, 48.8 percent of surveyed visitors traveled less than 25 miles to visit the National 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 residents of the Greater Tucson area.

Public Lands Surrounding Greater Tucson		
Jurisdiction	Area(sq mi)	Percent of Study Area
Coronado National Forest	835	27%
<i>CNF General Forest Areas</i>	667	21%
<i>CNF Wilderness Areas</i>	167	5%
Arizona State Trust Lands	595	19%
Pima County Parks & Protected Lands	162	5%
Saguaro National Park	142	5%
Santa Rita Experimental Range	79	3%
Las Cienegas National Conservation Area	77	2%
Other Federal	55	2%
Other Public	38	1%
Total Public	1,982	63%
Not Public	1,154	37%
Total Study Area	3,137	100%

Source: See Protected Lands Appenidx

Activities within the Coronado National Forest were also monitored in the 2008 study. The activities with the highest level of participation involved hiking or walking; viewing natural features, scenery and wildlife; and relaxing, all involving active engagement on these public lands and all dependent upon the high amenity value of the Coronado National Forest – scenic and accessible landscapes, peace and quiet; and the presence of native species.

Saguaro National Park is also contiguous to the City of Tucson. The Rincon Unit (east) of the National Park is less than 20 miles north of the Rosemont Valley where the proposed Rosemont Mine would be located. The backcountry and wilderness area of that Eastern Unit of the Saguaro National Park would have sweeping views over the site for the proposed Rosemont Mine and its huge open pit and expansive waste rock and tailings disposal areas.

Both the eastern and western units of the Saguaro National Park conserve outstanding tracts of the Sonoran Desert, including foothills grading into significant mountain ranges. The park is named for the Saguaro Cactus, perhaps the most striking and picturesque of the native cactus of the region, and the icon of the Southwest. The landscape consists of a rich mosaic of Sonoran Desert vegetation with striking changes in

vegetation composition as the topography gains elevation from the desert floor to the mountain peaks. The park also contains an abundance of native wildlife; one threatened species, the Mexican Spotted Owl, lives in the park, and an endangered species, the Lesser Long-nosed Bat, is in residence during its migration.

Saguaro National Park is the single most popular visitor destination in the greater Tucson area, with 2,738,772 visitors in 2008. This national park is one of the most unique units within the National Park System since the park has a major American city of nearly a million residents right in the middle of it. The estimated spending associated with Saguaro National Park in 2008 was \$24 million. The projected employment and payroll impacts were 335 jobs and \$6.7 million in labor income.¹⁹

Clearly these public lands, private lands protected by conservation easements, and other privately-owned open space are an important part of the lives of Tucson area residents as well as the economy of the region. Protecting the habitat of the jaguar complements these broad-ranging landscape protection efforts that have been under way for many decades. Residents of the Tucson area clearly recognize the economic, cultural, and social value of these efforts to maintain the natural areas surrounding Tucson. There can be no doubt of the value of these protected landscapes to residents of and visitors to the Greater Tucson Area.

¹⁹ National Park Visitor Spending and Payroll Impacts, 2008, Daniel J. Stynes, National Park Service, October 2009.