Comment Location (Chapter/Section/Page/ Line)	Special Expertise Citation	Comment / Rationale / Basis
Groundwater Quality	**Groundwater Quality**	**Groundwater Quality**
Chapter 3, Groundwater Quality, Pages 4 & 5, Table 51	Address full range of potential impacts from pumpage, including down-gradient impacts.	The table should be expanded to include in the Issue Category, any potential impacts from mine supply extractions in the Upper Santa Cruz Sub-Basin, as well as potential impacts to downstream habitats, environs, and populated communities in the Cienega-Davidson Basin. This comment remains unaddressed from the previous review.
Chapter 3, Ground Water Quality, Page 7, 2nd paragraph.	Aquifer Protection Permit	Although it is predicted to act as a groundwater sink due to its final depth, the pit lake does have an unknown potential to discharge contaminated water to the aquifer through rock fractures of unknown and unquantified depths and thus should be considered a discharging facility from a regulatory standpoint. It cannot be stated with any level of confidence that the pit will not discharge to the aquifer.
Chapter 3, Ground Water Quality, Page 14, 5thparagraph.	Aquifer Protection Permit/Potential groundwater contamination.	Because of the potential to discharge contaminated water to the aquifer through rock fractures of unknown and unquantified depths, and because the models all modeled the fractured rock environment as homogenous media, it cannot be stated with any level of confidence that the movement of any potential infiltration from heap leach seepage will be toward the mine pit lake. Although the Tetra Tech model predicts that. The cone of depression would take an uncertain amount of time to develop during the mine life, and there is a possibility that, if the containment system failed, contaminants could move laterally before reaching regional ground water or migrate offsite before the cone of depression expanded to reach the heap leach facility. The model does not eliminate that potential.
Chapter 3, Ground Water Quality, Page 14, 5th paragraph	Potential for groundwater contamination cannot be eliminated.	Although the geochemistry of the mine pit lake that is predicted to develop after closure of the mine, the potential to present a threat to ground water regionally cannot be eliminated because the models all modeled the fractured rock environment as homogenous media, and cannot predict rapid flow through rock fractures.
Chapter 3, Ground Water Quality, Page 15, 2nd paragraph.	Pit lake geochemistry	Using a precipitation chemistry record collected from 200 miles away from the project site and at a significantly lower elevation does not give much confidence to the estimated contribution of atmospheric inputs, and would logically be expected to significantly underestimate precipitation inputs to site chemistry.
Chapter 3, Ground Water	Sierrita Mine Sulfate Plume	Since this was not modeled because "*the exact location and amount of mitigation*

Quality, Page 17, last paragraph.		*pumping is not yet known*", and because the range of significant drawdown from the Rosemont water supply wells has been considered/presented only for the -10 foot interval, it cannot be stated with any degree of confidence that the location of the sulfate plume is beyond the expected range of significant drawdown from the Rosemont water supply wells. This exemplifies the problem with not presenting the model results with the full range of possibilities based on the model's margin of error (+ or –10' drawdowns). See related comments on this issue under *Groundwater Quantity*.
Chapter 3, Groundwater Quality, Page 18, 3rd sentence.	Uncertainty of model results cannot eliminate potential impacts.	It is incorrect to assume that "None of the seepage expected from the tailings, or potentially occurring from the waste rock, is expected to impact a navigable water, as these discharges are most likely to be captured by the mine pit lake." Surface flows and "pass through drain flows" in the waste rock deposits have the potential to contaminate downstream surface and groundwater, and so does the heap leaching operation. This comment remains unaddressed.
Groundwater Quantity	**Groundwater Quantity**	**Groundwater Quantity**
Chapter 3, Groundwater Quantity, Page 9, first & only paragraph.	"Industry standards" inadequate when only the "favorable" end of the margin of error is presented.	The 10-foot drawdown threshold of concern is fine to use, but do not forget that the model's level of accuracy can err in both directions. The model could underestimate effects just as easily as it could overestimate them. Therefore the 0' (zero) line is more appropriate for any graphic displays of the extent of the cone of depression, since it represents the he midrange of any possible error. Showing only the minus 10-foot line only shows the underestimated extent, and is another way of arbitrarily "biasing or under-reporting" the actual results of analysis. This comment remains unaddressed from the previous review.
Chapter 3, Groundwater Quantity, Page 11, fourth and fifth paragraphs.	Calibration residual standard deviation exceeds typical cutoff for acceptability of 10 percent of observed values range.	With a residual standard deviation of 25.26 feet, equating to 10.6 percent of the range of observed values, the model would be generally considered to be unacceptably calibrated. Seasonal fluctuations and trend calibration of a locally modified regional model result in this high residual which gives very low confidence/certainty to any predictions. MHW's final conclusion of the model's acceptability is based solely on the calibration difficulties encountered, which serves only as an explanation as to why the residual was exceedingly high, but certainly does not provide any justification for acceptability.
Chapter 3, Groundwater Quantity, Page 11, seventh paragraph.	No explanation given for "conservative" direction of calibration "bias".	No explanation is given as to why an exceedingly high calibration residual is considered (according to M&A), to result in a small bias to over predict regional groundwater level declines. It could just as well underestimate results, depending on the predominant direction (+/-) of the deviation of modeled results from observed data, which should be fully disclosed.

Chapter 3, Groundwater Quantity, Page 12, 7th paragraph.	Inadequacies and uncertainties of modeling fractured rock aquifer as homogenous porous media should be fully disclosed.	Modeling this fractured rock aquifer with known significant geologic faults as a homogenous porous media with a finite difference model may not be the most appropriate approach. Model results may be highly questionable for many reasons, as specifically addressed in the groundwater model review. DEIS should also present the inadequacies and degree of uncertainty. Pump testing only five (5) wells may not be enough to accurately calibrate the finite difference transient model, especially when using a homogenous porous media structure in this fractured rock geology. Caution in use of model predictions near the pit, is especially warranted for evaluating impacts to springs on the west side of the pit and topographic divide. The EPM (equivalent porous media) approach incorporates highly variable hydraulic conductivities in the bedrock flow system which are representative of varying degrees of faulting and fracturing in the bedrock that can be off by as much as a an order of magnitude result in uncertain predictions of travel times (Doughty C. and K. Karasaki. 2010). This modeling inadequacy adds further uncertainty to predictions of impacts to distant water resources. The EPM approach incorrectly assumes relatively isotropic conditions for an anisotropic geologic setting. Citation: Doughty C. and K. Karasaki. 2010. Modeling flow and transport in saturated fractured rock to evaluate site characterization needs in, Special Issue: Groundwater: 'Bridging the gap between measurements and modeling.' Journal of Hydraulic Research 33-44. This comment remains unaddressed from the previous review, but BLM is not asking for any re-modeling. Language describing the inadequacies and uncertainties of this modeling assumption needs to be added.
Chapter 3, Groundwater Quantity, Page 14, fifth paragraph (bullet).	457 square miles / 5 wells = 91.4 sq. mi./well	Pump testing of only five wells for calibration of the transient model of 457 square miles, equates to 91.4 square miles per pump tested well. Any predictions made by a model with such a low level of calibration resolution cannot have a high degree of certainty. "The large aerial extent of the regional flow model domain limited the size of the finite difference model grid cells which comprise the numerical model. Hydrogeologic features that were smaller than the grid resolution were typically not explicitly simulated, i.e., their geometries and distributions were approximated. Due to the uncertain role these smaller hydrogeologic features have on the localized groundwater flow system, the prediction of small magnitude changes in spring and stream flows, including small water-level changes, become more uncertain at distant locations from the Open Pit."

		This limitation must be clearly disclosed. This comment remains unaddressed from the previous review, but BLM is not asking for any re-modeling. Language describing the inadequacies and uncertainties of this modeling assumption needs to be added.
Chapter 3, Groundwater Quantity, Page 14, seventh paragraph (bullet).	Emphasis needed on the uncertainty of predictions resulting from calibration difficulties, especially for distant individual water wells, springs and streams.	Difficulties identified in calibrating water levels on the west side of the model, nearest the mine pit also indicate that predicted ground water levels farther away from the immediate vicinity of the mine pit should also be used with caution. Because the expected changes in water levels in the immediate vicinity of the mine pit are very large and not accurately predictable, the degree of impacts to more distant springs, perennial and intermittent streams, and wells in this area are not highly reliable. Overall, the difficulties in calibrating the model in this 457 square mile area result from the use of a porous media model to model fracture flow conditions. On a regional scale the porous media model may be reliable for predicting water level impacts, but on the scale of individual wells, springs and streams the model is not reliable. Because of the quantity and type of limitations to computer simulation of ground water impacts to aquatic and riparian resources, it is unlikely that modeling will have sufficient resolution for reliable estimates of flow direction and volumes required for an adequate analysis of the effects to Cienega Creek. However, general impacts from reduced aquifer recharge from capture by the proposed mine pit can be stated qualitatively with reasonable certainty. This comment remains unaddressed from the previous review, but BLM is not asking for any re-modeling. Language describing the inadequacies and uncertainties of this modeling assumption needs to be added.
Chapter 3, Groundwater Quantity, Page 14, eighth paragraph (bullet).	Using constant head boundaries artificially provides unlimited external groundwater inflow from the Whetstone Mountains.	The use of constant head boundaries artificially provides unlimited external groundwater inflow from the Whetstone Mountains which should have been constrained with a recharge estimate for the area between the model boundary and the Cienega basin boundary. The high inflow from the boundaries may also control the ET and stream flow discharges. Since balance of the model relied on adjustments of groundwater flux at its boundary conditions, what are the implications to the model's predictive accuracy? This comment remains unaddressed from the previous review, but BLM is not asking for any re-modeling. Language describing the inadequacies of this model's boundary conditions needs to be added to the DEIS.

Chapter 3, Groundwater Quantity, Page 15, sixth paragraph (bullet).	Uncertainty of impact predictions for distant individual water wells, springs and streams is increased due to detailed geological data being limited to the immediate project area.	Uncertainty of impact predictions for distant individual water wells, springs and streams is increased due to with recognition that the record of historic water level data used as a basis for the model is largely limited to the period since 2008 and because the spatial distribution of detailed geological data is limited to the immediate project area.
Chapter 3, Groundwater Quantity, Page 15, ninth paragraph (bullet).	Emphasis needed on why model may not be appropriate for analyzing "distant" impacts.	Much more emphasis is needed to convey that while much of the Cienega Basin was included in the model domain, the purpose of this model was to analyze impacts in the vicinity of the mine, and therefore the model may not be appropriate for use elsewhere in the basin without additional revision. Emphasis is needed to directly relate the limited spatial distribution of detailed geological data, to the uncertainty of impact predictions for distant individual water wells, springs and streams.
Chapter 3, Groundwater Quantity, Page 16, seventh paragraph.	No estimate of pumpage in the area was made. Groundwater pumpage within the basin is not "negligible" and legally has to be considered as a cumulative impact. It cannot just be dismissed by an "assumption".	Groundwater pumpage within the model area is not negligible and is expected to increase with increasing population growth, especially in response to mine workers who likely would choose to reside in the same area. This is a cumulative impact that has to be addressed as required by NEPA. With a growing number of wells, groundwater pumpage in the Sonoita area has been an issue of much public discussion. It should NOT be assumed that pumpage is "negligible". How was the 400 – 500 AFA estimated? This estimate is not negligible when compared to small and sensitive stream flows within the Las Cienegas National Conservation Area (LCNCA). The cumulative effects of pumping 350 – 400 wells and the estimated reductions of stream flow are foreseeable and significant in the Cienega creek Basin that will eventually also have to extend affects to Davidson Canyon to some degree. Our preliminary research shows that as of 2009 there are a total of 1,886 exempt wells in the basin. This represents an increase of about 49% since 1990 when there were 1,263, and a 29% increase between 1990 and 2000 with 366 new wells registered in that period. Furthermore, there is much State land available in the Sonoita area for continued expansion of developments and new wells. Residents in the area are already experiencing drawdown in wells. The cumulative amount of "exempt" wells pumpage is not "likely small and dispersed and certainly not "inconsequential" for residents or for Cienega Creek's baseflows. These are additive effects that deserve analysis. An inventory of all wells with the necessary information to more accurately analyze impacts to local wells is not "*prohibitively costly and time consuming*"; and it should be

		conducted to provide a much higher level of confidence in the model predictions. Much/most of the necessary information is available with the ADWR records. The upper Cienega Creek watershed has been estimated to provide 10% (6,200 acre-feet) of the recharge to the Tucson Active Management Area (AMA). In addition, the maintenance of this undeveloped watershed in good condition protects Tucson from floods that might surpass flood control channel design in town. If the basin were fully developed, flood peaks could increase by an estimated 25-50% (Knight 1996). The open pit mine will likely have and additive impact to the existing water exploitation in the valley with impacts to the LCNCA and its aquatic/riparian areas, but also to the AMA located downstream. See attached map of wells in the Cienega Creek HUC. The total number of wells in 1990 was 1,263 and by 2009 it had grown to 1,886. This is a 49% increase over 20 years (see attachment provided below). Given the ongoing development in the area and location near Tucson it will continue to grow (seems reasonable and very likely given the census data for the area). If another 3,000 wells (projection based on the past installation rate) during the life of the mine are added, then the regional aquifer and associated riparian/wetlands will very likely be greatly degraded and some lost. In the 1970s, the Gulf America Corporation (for a large anticipated future subdivision) and Anamax Copper (for anticipated use in future mining in the Santa Rita Mountains) installed over 50 wells on the LCNCA. Likewise, water extraction for new subdivisions in the area is extremely likely in the future. AZ water law does not limit wells for the protection of surface water even though they are intertwined. As a result, GW in AZ is treated like a common property resource much like air. This comment remains unaddressed from the previous reviews.
Chapter 3, Groundwater Quantity, Page 16, eighth paragraph.	The HFB should be eliminated from the model. The Davidson Canyon Fault and Flat Fault should be incorporated into the Tetra Tech model.	The horizontal flow barrier (HFB) simulating an intrusive quartz-porphyry dike damming off groundwater flows from upper Davidson Canyon to lower Davidson Canyon is not supported by any data nor by any on-the-ground observations such as changes in vegetation, or higher groundwater levels on the upstream face of subject geologic feature. Without any supporting evidence of its hydrogeologic effects or its existence, the HFB should be eliminated from the model. This comment remains unaddressed from the previous reviews. Not modeling the Davidson Canyon Fault and Flat Fault in the Tetra Tech model further deviates from true representation of the existing fractured rock geologic environment.

Chapter 3, Groundwater Quantity, Page 17, last three paragraphs, and page 18, first two paragraphs.	Uncertainties associated with sensitivity analysis.	Sensitivity analysis results and the use of constant head boundaries indicate that higher stream flow losses are possible given the uncertainty associated with various model parameters.
Chapter 3, Groundwater Quantity, page 20, Table 46.	Provide the expected maximum drawdown near the pit.	The expected maximum drawdown (in feet) near the pit should be clearly presented. Not just shown as "*greater than 100 feet*". (We know it will be at least several hundred feet). The depth of the pit reaches an elevation a few hundred feet below the elevation of Cienega Creek and Empire Gulch. It would be helpful to have an illustration(s) that show gradient reversal towards the pit and flow direction; this is important for the reader to conceptualize the hydrologic process and scope of GW impacts to surface waters and dependant biological resources.
Chapter 3, Groundwater Quantity, pages 20 - 22, Table 46.	Table 46 is incomplete.	Table 4.6 is incomplete. Please include all issues. Issue 4: impact on riparian and wetland habitat. Determine the extent of surface water for Cienega Creek, Cold Spring, lower Empire Gulch, Empire Gulch Spring and Mattie Canyon (miles) and Cieneguita Wetlands (acres). All of these streams, springs and wetlands are at risk of moderate to severe impacts of lowered GW elevations in the regional aquifer. This comment remains unaddressed from the previous review.
Chapter 3, Groundwater Quantity, page 20, Table 46.	Show calculation of 1% impairment of mountain-front ground water recharge function.	Show how the relative impairment of mountain-front ground water recharge function was calculated at 1%. The area of impacted mountain-front is much greater than 1%. The reduction of mountain-front recharge area should also be presented.
Chapter 3, Groundwater Quantity, page 21, Table 46.	Reduction in flow along Cienega Creek.	The earlier part of July is often the driest time of year, as the monsoon is more and more delayed due to climate change. Low-flows in July should be included in the low-flow analysis, which currently only evaluates the Months of May through June. Furthermore lowering of the water table/reduced groundwater flow to Cienega Creek would also result in permanent impacts to numerous wetlands supporting T & E species within the LCNCA.
Chapter 3, Groundwater Quantity, page 21, Table 46.	Comparison of mine pit water loss with overall basin water balance.	Present the percentage of water loss during active mine dewatering. This percentage would be greater, experienced beginning almost immediately, and would last for at least one generation, before diminishing to the stated equilibrium levels.

Chapter 3, Groundwater Quantity, pages 20 - 22, Table 46.	Table 46 is incomplete.	Table 4.6 should also show the total number of any xeric-, meso- and hydro-riparian streams (ephemeral, intermittent and perennial) that would be physically and hydrologically impacted.
Chapter 3, Groundwater Quantity, page 22, Table 46.	Annual rate of drawdown attributed to pumping (feet per year).	Annual rate of drawdown in the supply model attributed to pumping (feet per year) was presented as 5–8 feet in previous versions. No explanation is given for this difference. At the previously presented higher annual drawdown rate, the total drawdown could be as much as an additional 160 feet attributed solely to mine supply pumping.
Chapter 3, Groundwater Quantity, page 22, Table 46.	Approximate number of wells within geographic extent of impact.	The approximate number of wells within geographic extent of impact is affected by the geographic extent of cone of depression created, as simulated by the model, which should be taken at the outer limits of the margin of error; not just the -10 foot line. The model could underestimate effects just as easily as it could overestimate them. Therefore the 0' (zero) line is more appropriate for any graphic displays of the extent of the cone of depression, since it represents the he midrange of any possible error. Showing only the minus 10-foot line only shows the underestimated extent, and is another way of arbitrarily "biasing or under-reporting" the actual results of analysis, and consequently underestimates the number of impacted wells in the area. This comment remains unaddressed from the previous reviews.
Chapter 3, Groundwater Quantity, page 23, Table 47.	BLM's Federal Reserve Water Rights for Cienega Creek need to be included.	BLM's Federal Reserve Water Rights and management mandates for Cienega Creek need to be included in Table 47, as these are expected to be impacted according to all pertinent groundwater models.
Chapter 3, Groundwater Quantity, page 42, eighth paragraph.	Unclear how number of impacted wells was established.	It is unclear whether the "approximate area" or the "maximum extent" of drawdown greater than 10 feet (as shown in figure 36), was used to calculate the number of well that could be impacted within the area.
Chapter 3, Groundwater Quantity, page 52, first sentence.	Verbiage relates to pit model; not supply model.	The specific factors listed to be considered to assess impacts relate to pit model; not to the mine supply model. This is apparently a typographic error in need of correction.
Chapter 3, Groundwater Quantity, page 52, bulleted list.	Specific factors should also include the total number of streams impacted.	The bulleted list of specific factors to be considered to assess impacts should also show the total number of any xeric-, meso- and hydro-riparian streams (ephemeral, intermittent and perennial) that would be physically and hydrologically impacted.
Chapter 3, Groundwater Quantity, page 51, first	Median streamflow is not the same as "baseflow".	The accuracy of all percent reductions in baseflow (not streamflow) presented as predicted by the ground waterflow models highly questionable because they are all based

paragraph.		on estimates of median streamflow, and should be recalculated. Median streamflow includes runoff flooding peak flows. Three methods (straight line, fixed base, and variable slope), of hydrograph separation are available to separate baseflows from peak flows. Exclusion of peak flows in an accurate analysis would certainly result in greater percent **baseflow** reductions. The natural variation in streamflows will result in greater percent **baseflow** impacts. Certain times of the year have significantly less flow and therefore could be impacted more by decreases in ground water levels. Low flows as a result of drought and/or climate change would also result in greater **baseflow** impacts from decreases in ground water levels. A seven-day low-flow analysis would also be worthwhile and likely would provide a more accurate estimate than the estimated median streamflows. The minimum flow analysis described in the second paragraph of page 52 clearly shows the potential impacts to dry-up baseflows from some portions of the stream during low flow periods. This type of impact is of major concern to BLM because aquatic species cannot survive or return; which should be fully disclosed and emphasized in the DEIS. Additionally, the minimum flow analysis does not include the Month of July, the earlier part of which is often the driest time of year, as the monsoon is more and more delayed due to climate change. Low-flows in July should be included in the low-flow analysis. Furthermore lowering of the water table/reduced groundwater flow to Cienega Creek would also result in permanent impacts to numerous wetlands supporting T & E species within the LCNCA. The baseflow calibration target was incorrectly estimated because the median flow value for the USGS gages used as the calibration target instead of the baseflow. The correct baseflow is I cfs not 2 cfs. The greatest impacts to aquatic species occurs during the late spring/early summer when average base flows fall below 0.25cfs. Modeling these flows provides the most relevant data for deriving impacts to aquatic habitats and species. These low flows were not modeled. Instead average flows were modeled. This comment remains unaddressed from the previous review.
Chapter 3, Groundwater Quantity, page 63, first full paragraph, first bullet).	Impacts to baseflows are greater than 1 – 3%!	Impacts would be greater when consideration is given to baseflows, as well as seasonal lows or drought cycles. Climate change is expected to produce less flow, furthering BLM's concern for lass of baseflows and dependent aquatic and riparian obligate species.

Chapter 3, Groundwater Quantity, page 63, fourth paragraph, first sentence.	Even seasonal losses of Cienega Creek baseflows are not "minor" impacts.	The effect of these flow reductions on the current uses of Cienega Creek and its designation as an Outstanding Arizona Waters are of concern to the BLM because reductions to stream flows are predicted to potentially dry-up baseflows from some portions of the stream during low flow periods, and are predicted to result a reduction in perennial stream. This would permanently impact native aquatic species, and infringe on Federal Reserve Water Rights. BLM cannot consider such potential impacts as "minor". They would affect existing uses and the Outstanding Arizona Water designation. Neither the Errol L. Montgomery nor the Tetra Tech groundwater models simulate seasonal variations in flow in Davidson Canyon or Cienega Creek, or how the simulated impacts on average baseflows would impact seasonal flows. It is not clear how streamflow might vary over the course of the year, e.g., would flows in the perennial reaches of lower Davidson Canyon disappear entirely over several months during dry seasons or drought conditions? Effects of groundwater drawdown may be greater in drier months with significant, irreversible impacts to riparian resources. There should be sufficient data (stream flow gauging, rainfall) to simulate seasonal trends. AGFD requires a seasonality analysis in order to analyze both short-term and long-term effects on riparian resources. Furthermore lowering of the water table/reduced groundwater flow to Cienega Creek would also result in permanent impacts to numerous wetlands supporting T & E species within the LCNCA.
Chapter 3, Groundwater Quantity, page 63, fifth paragraph.	Calibration difficulties, limited geologic data, large area of model, and fractured rock modeled as homogenous media, also add to the significant prediction uncertainty.	The significant uncertainty associated with the modeled impacts to Cienega Creek is also associated with calibration difficulties encountered, limited geologic data, large area of model, and fractured rock modeled as homogenous media, in addition to the conceptual hydrologic framework, the time frame involved, and the magnitude of the modeled impacts.
Chapter 3, Groundwater Quantity, page 65, first full paragraph.	Pit evaporation estimated to be greater than the mean monthly June flow in Cienega Creek	Loss of water from the aquifer as a result of the pit is estimated to vary anywhere from 104 gallons per minute (0.23 CFS), to 550 gallons per minute (1.23 CFS). The mean monthly June Cienega Creek streamflow average is only 0.28 cubic feet per second (U.S. Geological Survey 2011).
Chapter 3, Groundwater Quantity, page 65, last paragraph.	Apparent contradiction/confusion in the prediction of groundwater recharge reduction and pit losses.	During mining the amount of water lost from the ground water basin as a result of the mine pit would represent a loss equivalent to 5 to 14 percent of the current basin recharge and would represent an increase in water loss from the aquifer of 9 to 75 percent. After closure, when the aquifer reaches equilibrium, this amount would

		represent a loss equivalent to 2 to 5 percent of the current basin recharge and would represent an increase in evaporative water loss from the aquifer of 3 to 31 percent, as shown in table 49. This appears to be in direct contradiction to the statement that the relative impairment of mountain-front ground water recharge function was calculated at 1%. It is not clear if/how a distinction is made between mountain front recharge (1,102 AFA) and basin recharge (6,900 - 25,500 AFA estimates by various authors) for this calculation of percent reduction. The initial M&A groundwater study (page 113) reported a 215 AFA pit inflow, representing an approximate 4.5 percent loss of groundwater from the 4,798 AFA simulated groundwater recharge to the Cienega Creek system after 1,022 years. The November 2010 DEIS (page 39) reported 500 AFA loss of mountain front recharge, representing approximately 5% - 7% of the basin total. The 500 AFA equates to about 45.37% of the 1,102 AFA now reported as mountain-front recharge. (See related following comment).
Chapter 3, Groundwater Quantity, page 67, second paragraph.	73 is not 1% of 1,102. (73/1,102 = 0.0662; or 6.6%). The reduction of mountain-front recharge area should also be presented.	The reduction in mountain-front recharge owing to capture by the mine pit lake, as well as falling on the tailings and waste rock piles, which will have stormwater controls, was estimated to be approximately 73 acre-feet per year at the end of active mining; this represents an approximate **6.6** percent reduction (not 1%) in the estimated 1,102 acre-feet of mountain-front recharge. The reduction of mountain-front recharge area should also be presented.
Chapter 3, Groundwater Quantity, page 75, first paragraph and subsequent bulleted list.	Groundwater pumpage within the Cienega Creek basin is a cumulative impact that legally has to be considered.	The Council on Environmental Quality defines a cumulative impact as —the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (federal or nonfederal) or person undertakes such other actions (40 Code of Federal Regulations 1508.7). Groundwater pumpage within the Cienega Creek basin meets all of these criteria. It must be considered, just as present and future pumpage in the Santa Cruz basin was considered for the mine supply model.
Chapter 3, Groundwater Quantity, page 77, first paragraph, (bullet), and sixth paragraph.	Recharge will not provide any mitigation in the impacted area.	The proposed locations for recharge are too far down-gradient to provide <u>any</u> actual offset to the drawdown from the proposed mine supply pumpage. The “off-set” would only be theoretical to the over-all water budget of the Tucson AMA as a whole, but of no benefit to the impacted area since recharge would be far down-gradient. This comment remains unaddressed from the previous review. The fact that recharge will

		not provide any mitigation in the impacted area needs to be clearly and succinctly stated.
Chapter 3, Groundwater Quantity, page 77, seventh paragraph, second sentence.	What about a protection plan for Cienega Creek water resources?	The water resources in Davidson Canyon/Cienega Creek basin are just as important to local residents as those in the Santa Cruz basin. A protection plan to mitigate impacts to wells, springs, seeps, and streams is needed.
Surface Water Quality	**Surface Water Quality**	**Surface Water Quality**
Chapter 3, Surface Water Quality, page 1, second paragraph, and figure 49 on page 2.	Analysis area should include watersheds on west side of divide.	Analysis area should include watersheds on west side of divide. Access road and utility corridor activities do have the potential of affecting surface water quality. Off-site construction of above-ground power lines, water supply lines, and access roads should be analyzed, as these activities most certainly can affect surface water quality. At a minimum, Pima County drainage standards should apply. Stream course or drainage pattern alterations should not occur. All streams should continue to flow into their natural courses. No "gathering" or "consolidating" of several small streams into larger crossings and larger drainage structures should occur. Culvert designs need to consider sediment transport. Additionally, all disturbed areas should be hydroseeded with native grasses and completely stabilized with appropriate stormwater BMP's, as part of a complete Storm Water Pollution Prevention Plan (SWPPP) that should be prepared. Effective detention upstream of culverts can be designed to have positive effects of reducing peak flows and extending flow durations, which can promote better flow regimes, increase recharge, and generally improve habitats. Proper erosion control/energy dissipation measures should be designed at all culvert watercourse crossings. This comment remains unaddressed from the previous reviews.
Chapter 3, Surface Water Quality, page 3, last paragraph; and first paragraph on page 4.	Sediment yield impacts on the Santa Cruz side also need to be analyzed.	Sediment yield and other potential surface water quality impacts on the Santa Cruz side also need to be analyzed. Off-site construction of above-ground power lines, water supply lines and access roads should be analyzed, as these activities most certainly can affect surface water quality. Extremely small surface disturbances, especially in headwaters, do have the potential to cause significant and long-lasting downstream impacts to surface water quality; especially when impacts to many washes not just a single wash are expected. The stated widths (225 feet total), for water and power lines, and the access road, and their respective

		mapped lengths clearly indicate that their footprints are NOT "extremely small". Although the proper use of BMPs can mitigate and even prevent impacts, their potential still needs to be analyzed and fully and succinctly disclosed. After construction, stabilization measures as required under a SWPPP can prevent continued potential for erosion, but the potential impacts still need to be analyzed and fully and succinctly disclosed. Culvert designs need to consider sediment transport. Proposed mitigation is not a justifiable reason for not analyzing and not disclosing potential impacts. Potential impacts to surface waters on the Santa Cruz side should be fully analyzed and their proposed mitigation methods should be completely and clearly described in detail. Impacts to surface water quality from linear features such as power lines, water supply pipelines, and access roads should be analyzed even if they would only have a small footprint in washes and are temporary in nature. They need to be analyzed and fully disclosed even if they occur only during construction and are then reclaimed following construction. The post-construction reclamation process and methods should be completely and clearly described in detail, as proposed mitigation. Impacts from unpaved associated maintenance roads and would be expected to surface water impacts even though no transmission poles would be constructed in washes, because stormwater runoff from the unpaved roads can enter into adjacent downstream washes. Temporary impacts are not exempt from the need to be analyzed and disclosed. BMP's, no matter how well designed, can and often do fail. It cannot be assumed that just because BMP's will be implemented in a SWPPP, that they will all prevent all potential surface water quality impacts. They each need to be fully described and analyzed as to their appropriateness, functionality, and durability; as only partially, conceptually and generally described in subject paragraph on page 4. This comment remains partially unaddressed from the previous reviews.
Chapter 3, Surface Water Quality, page 4, sixth paragraph, second	A more rigorous sediment yield analysis is warranted.	The Pacific Southwest Inter-Agency Committee (PSAIC; 1968) method is outdated. There are many newer and better models available. This empirical model is too generalized for site specific analysis. It is more subjective and probably less accurate than other models.

sentence.		PSIAC predicts average annual sediment yield, and is not intended for event modeling, which should be analyzed. PSIAC is a qualitative model; a quantitative event model would be more appropriate. A comparison of several models would be most appropriate. A more rigorous analysis of sediment yields and downstream impacts is warranted.
Chapter 3, Surface Water Quality, page 5, table 76.	Potential for acid rock drainage.	Early detection of acid rock drainage would occur in early testing of sediment ponds down gradient of waste rock storage areas, if the acid drainage were to seep and permeate into the fractured rock aquifer and contaminate the groundwater instead of traveling as runoff to downstream sediment ponds. Either or both could occur, but if only the groundwater path was taken, testing in the sediment ponds would not be expected to detect that acidic drainage. Additionally, there could be a significant time lag even with surface runoffs.
Chapter 3, Surface Water Quality, page 5, table 76.	Potential for other contaminants.	There is always a potential for heap leachate to reach surface waters. Even with BADCTs, the potential for mishaps, material failures, human error, and catastrophic events can cause unforeseen leaks from heap leach facilities which then could reach surface waters. The potential can be reasonably and possibly even completely mitigated, but not eliminated. It is incorrect to assume that "Down-gradient water-quality impacts due to the Project are not expected to occur due to the anticipated terminal hydraulic sink." Surface flows and "passthrough drain flows" in the waste rock deposits have the potential to contaminate downstream surface and groundwater, and so does the heap leaching operation. A more accurate choice of wording is warranted.
Chapter 3, Surface Water Quality, page 6, and table 77.	BLM's Federal Reserve Water Rights for Cienega Creek need to be included.	BLM's Federal Reserve Water Rights and management mandates for Cienega Creek need to be included in this section and in Table 77, as these are expected to be impacted according to all pertinent groundwater models showing flow reductions, which will also result in water quality impacts as less flows will have higher concentrations of potential pollutants and less frequent flows can dramatically change ecosystem parameters which in turn have the potential to cause further water quality degradations. Furthermore, BLM has a Congressional mandate to protect, maintain and enhance the natural resources of the Las Cienegas National Conservation Area in perpetuity.

		Furthermore lowering of the water table/reduced groundwater flow to Cienega Creek would also result in permanent impacts to numerous wetlands supporting T & E species within the LCNCA.
Chapter 3, Surface Water Quality, page 17, first paragraph, third sentence.	Baseline of total suspended sediments.	A sampling of or measurement of total suspended sediment under baseline conditions should be conducted in the project area; these types of samples are not difficult to properly collect during runoff events and ARE commonly included in water quality analyses. While it is true that the lack of samples of sediment load in stormwater in the project area does not affect the analysis, the baseline information would be extremely valuable to assess the reliability future sediment load predictions under each alternative by standard erosion modeling techniques.
Chapter 3, Surface Water Quality, page 20, last first paragraph, first sentence.	Define term of Aquifer Protection Permit.	What is the term of the Arizona Department of Environmental Quality Aquifer Protection Permit through which routine inspections of the waste rock storage area shall continue to be performed quarterly and after every major storm or surface flow event?
Chapter 3, Surface Water Quality, page 20, last paragraph, last full sentence.	Complete early detection of acid rock drainage.	Clearly state here and in the groundwater quality section if monitoring wells would be located upstream of the sediment ponds, immediately down gradient of the waste rock storage areas to detect as early as possible any acid drainage that might seep and permeate vertically into the fractured rock aquifer. This comment remains unaddressed from the previous reviews.
Chapter 3, Surface Water Quality, page 21, fourth paragraph, third sentence.	Will seepage from the heap leach facility be treated?	Will seepage from the heap leach facility be treated with an engineered biological system to meet numeric Arizona Aquifer Water Quality Standards? (No decision is expressed).
Chapter 3, Surface Water Quality, page 27, twelfth paragraph, (bulleted line).	Revegetation of tailings buttress walls is questionable.	Revegetation of tailings buttress walls to prevent erosion of sediment during mine operation is highly doubtful, based on the lack of success to revegetate spoils slopes in any other mines. Revegetation of mining waste buttresses has been problematic at best in all cases, and has never been fully successful. Perhaps higher probabilities of success could be expected with landforming of the tailings instead of using buttresses.
Chapter 3, Surface Water Quality, page 28, second paragraph.	For how long will these requirements hold?	For how long will Rosemont Copper be held to all these surface permit monitoring, reporting, and contingency conditions requirements?

		(Don't want to assume any time, but it should be well past closure).
Chapter 3, Surface Water Quality, page 29, fifth paragraph.	Sediment deprived water can cause erosion.	Reduction of sediment yield from the project area is not necessarily a "benefit". Sediment deprived (hungry) water can cause downstream erosion. Monitoring of downstream channels for excessive erosion caused by reductions of sediment should be part of the long-term requirements of the surface water quality mitigation measures. This possibility should also be addressed.
Chapter 3, Surface Water Quality, (issue not addressed within DEIS).	Caution warranted to prevent spills to the eastern watersheds. Relocate stormwater basins.	Although no project facilities or features are proposed to be located in the eastern watersheds, stormwater basins and diversions near the pit are proposed right up against the eastern divide, protected only by earthen berms. Extreme caution is warranted to prevent spills to the eastern watersheds. Preferably, these facilities (stormwater basins) should be relocated further away from the eastern divide. This comment remains unaddressed from the previous reviews.
Surface Water Quantity	**Surface Water Quantity**	**Surface Water Quantity**
Chapter 3, Surface Water Quantity, page 1, second paragraph, third and fourth sentences, and figure 47.	Cienega Creek must be included within the analysis area for surface water quantity.	Cienega Creek has not been included within the analysis area for surface water quantity. The drainages affected by the proposed project represent a small proportion of the Cienega Creek watershed (roughly 2 percent), but the perennial headwater reaches of Cienega Creek are within BLM's Las Cienegas National Conservation Area, (LCNCA). Other differentiating watershed factors, such as location relative to higher elevations, wind and storm track directions, land use, vegetative type and cover density, soils and topography must to be evaluated. Surface flows in Cienega Creek are expected to be reduced by decreased groundwater inputs as a result of permanent pit evaporation. The impacts of these reductions to the seasonal low-flow conditions in Cienega Creek within the LCNCA are of major concern to the BLM because they have the potential to totally extirpate native aquatic and riparian obligate threatened and endangered (T & E) species. Expected reductions in flows to Cienega Creek should not be considered "negligible", just because they would be less impacted than flows to Davidson Canyon. The relative differences between the portions of drainages affected in each watershed are irrelevant when it comes to addressing the significance of impacts within each watershed. The effect of these flow reductions on the current uses of Cienega Creek and its designation as an Outstanding Arizona Waters are of major concern to the BLM because reductions to

		stream flows are predicted to potentially dry-up baseflows from some portions of the stream during low flow periods, and are predicted to result a reduction in perennial stream. This would permanently impact native aquatic species, and infringe on Federal Reserve Water Rights. BLM cannot consider such potential impacts as "minor". They would affect existing uses and the Outstanding Arizona Water designation. Using a regression equation of the average-annual runoff for Cienega Creek many miles downstream at its confluence with Pantano Wash is meaningless in assessing impacts to baseflow conditions and affects to Outstanding Arizona Water designations and current designated uses in the LCNCA. Average-annual runoff is not the same as "baseflow". Average annual runoff includes flooding peak flows. Three methods (straight line, fixed base, and variable slope), of hydrograph separation are available to separate baseflows from peak flows. Exclusion of peak flows in an accurate analysis would certainly result in greater percent **baseflow** reductions. Furthermore lowering of the water table/reduced groundwater flow to Cienega Creek would also result in permanent impacts to numerous wetlands supporting T & E species within the LCNCA.
Chapter 3, Surface Water Quantity, page 1, third bullet.	Implies that Cienega Creek is included within the analysis area for surface water quantity.	"*Quantitative assessment of potential lowering of the water table/reduced groundwater flow to Cienega Creek that results in permanent changes in flow patterns and that may affect their Outstanding Arizona Water designations and current designated uses*" implies that Cienega Creek is included within the analysis area for surface water quantity, which appears to contradict the information addressed in the above comment.
Chapter 3, Surface Water Quantity, page 5, and table 59.	BLM's Federal Reserve Water Rights for Cienega Creek need to be included.	BLM's Federal Reserve Water Rights and management mandates for Cienega Creek need to be included in this section and in Table 59, as these are expected to be impacted according to all pertinent groundwater models showing flow reductions. Furthermore, BLM has a Congressional mandate to protect, maintain and enhance the natural resources of the Las Cienegas National Conservation Area in perpetuity, including numerous wetlands supporting T & E species within the LCNCA.
Chapter 3, Surface Water Quantity, page 16, bulleted list.	Include reductions of surface flows caused by reductions of groundwater inflows.	The bulleted list of elements common to all action alternatives should include reductions of surface flows caused by reductions of groundwater inflows.

Chapter 3, Surface Water Quantity, page 26, first paragraph.	Mitigation Plan should include streams and wetlands.	Rosemont Water Source Enhancement and Mitigation Plan should also include mitigation of impacts to streams. Live stream reaches and wetlands within the LCNCA support wildlife, riparian habitat, and recreational uses; and are expected to be indirectly impacted through project related groundwater inflow reductions. Grazing is not the only existing activity to be impacted, but it seems to be the primary, if not sole, focus of the proposed mitigation plan. Seeps and springs are not the only sources of water for wildlife. Water from streams and wetlands is also used by wildlife; and it supports riparian habitats and recreational uses.
Ch 3 Biological Resources – General Comment		The BLM has been conducting surveys on Cienega Creek, Mattie Canyon Creek, and Empire Spring since 1989. The distribution, trend and abundance of Gila topminnow, Gila chub, Chiricahua leopard frog, and Huachuca water umbel are well documented and known. Information presented concerning these species has many omissions and inaccuracies (too many to address individually). This data can be provided to assist in the analysis. Of primary importance is that the Gila topminnow, Gila chub and Huachuca Water Umbel populations are the largest in the US. The Chiricahua leopard frog population in Empire Gulch Spring is the largest natural population and only natural spring habitat supporting CLF left in the basin
Impacts to Lands with Special Designations		Wild and Scenic River The BLM has determined that 10.5 river miles (3,200 acres) of Cienega Creek and tributaries Mattie Canyon and Empire Gulch are suitable to recommend to congress as "scenic" for inclusion in the National Wild and Scenic Rivers System. These are designated as WSR study areas. Should these waterways become degraded by GW depletion, they would no longer be eligible for inclusion as a WSR.
Impacts to Lands with Special Designations		ACEC The entire LCNCA was designated an area of critical environmental concern(BLM approved Las Cienegas Resource Management Plan 2003).Appendix 6 of the plan states that the goal is to "protect and enhance watershed, grassland, and threatened/endangered wildlife resources, emphasizing total ecosystem management..". A partial list of objectives include the following: Resolve non-federal land use conflicts, maintain adequate instream flow to support aquatic and riparian resources, maintain water quality to support aquatic, riparian and fish and wildlife values. Maintain or

		improve riparian conditions to meet objectives for riparian proper functioning condition (PFC) and Threatened and Endangered fish and wildlife habitat, including but not limited to a combination of maintenance of adequate woody species regeneration, promotion of mixed age stands of woody species, promotion of mature cottonwood overstory, and maintenance of cienega habitat, promote recovery of Gila topminnow. A partial list of management prescriptions include the following: Acquire non–federal land from willing sellers within the ACEC boundaries and incorporate these acquired lands as part of the ACEC, introduce Gila topminnow from Cienega Creek into available habitats (as fully protected) to provide refugia for the Cienega Creek population. If GW resources become depleted in the ACEC, then the ACED would be degraded to the point that the purposes for which it was designated could not be met.
Ch 3 Biological Resources – General Comment		The DEIS often down-plays the effect of the dewatering of the CC because it may not happen for 50 to 150 years after the mine closes. Because the modeling has so many avenues for errors in simulated outcomes, the numbers may well underestimate the rate and severity of GW drawdown (see comments in GW Resources Section and Myers 2011. Nonetheless, the loss of GW to the springs, wetlands and creeks is rather certain, it is just a matter of time. Only the final degree and timing are in question. Many of the statement made are not supported by a citation. In some cases, they appear speculative, but may not be if they are tied to studies or data. Perhaps, the analysis needs to have a range of values likely to occur as the models estimates have an unknown level of reliability. In statistical terms, the models used cannot be evaluated for precision or accuracy. In order to analyze the impacts to biological resources, it may be prudent to make and educated determination of best-case and worst-case scenarios for comparison. For instance, the range could be one-half the simulated value and twice the simulated values. This may be a way to resolve the disagreements about potential modeling errors.
Ch 3 Biological Resources – General Comment		The DEIS did not have data from the AGFD Heritage Data Management System for determining species occurrences and distributions, but instead reported what they surveyed and added information from a few miscellaneous reports.
Ch 3 Biological Resources – General Comment		DEIS refers to Cienega Creek often, but it is sometimes unclear to the reader as to which portion of the creek it is referring to: upper on BLM or lower on Pima County.
Ch 3 Biological Resources – General Comment		The impact of GW depletion predicted in the GW Resource section appears likely to cause the collapse of the aquatic and riparian ecosystems on BLM and Pima County over decades to centuries. Please, clarify analysis in this section to remove the ambiguity

		throughout this section about severity of impacts.
Ch 3 Ground Water – General Comment		The depth of the pit reaches an elevation a few hundred feet below the elevation of Cienega Creek and Empire Gulch. It would be helpful to have an illustration(s) that show gradient reversal towards the pit and flow direction; this is important for the reader to conceptualize the hydrologic process and scope of GW impacts to biological resources.
Ch 3 Ground Water – General Comment		This Section does not compare the outputs of the 3 GW model outputs for the reader. This variability in outputs should be disclosed and considered when discussing simulation outputs.
Ch 3 Biological Resources – Comment pg349/pp2		The draft analysis area also includes Cienega Creek, Empire Gulch, Gardner Canyon, Cieneguita wetlands, Spring Water Wetlands, Mattie Canyon, Cinco Pond wetlands. The area supports a number of unnamed perennial and seasonal wetlands.
Ch 3 Biological Resources – Fig. 51		Legend has error. Should be Las Cienegas National Conservation Area.
Ch 3 Biological Resources – Comment pg351		Suggest that riparian should be discussed in the Biological Resources section since this plant community is part of the biota of the analysis area and is habitat for a wide range of species. The EIS does not have a discussion of the importance of riparian habitat to fish and wildlife. In the arid south west, about 60% of all vertebrate species and 70% of all threatened and endangered species are riparian obligates (cited in Poff et. al. 2011).
Ch 3 Biological Resources – Comment pg351		This list of issues does not include additional issues presented in previous comments provided by BLM and others.
Ch 3 Biological Resources – Comment pg352 last pp		The most comprehensive data repository resides with the AGFD. They maintain the Heritage Data Management System (HMDS). The species accounts for the area do not include occurrences or distributions in the data base. These data should be gathered and presented in tables and/or maps for each species.
Ch 3 Biological Resources – Comment pg355 Table 97		For consistency the table should reflect those species petitioned for listing. The USFWS has determined those that will be reviewed for listing as proposed in the near future as a lawsuit settlement. Also, note which federally listed species have designated critical habitat in the analysis area and those with proposed CH.
Ch 3 Biological Resources – Comment pg358 Table		5B habitat loss aquatic. Cienega Creek has 30 plus perennial and seasonal wetlands that cover tens of acres.

98		Inventory of wetlands has yet to be completed. A list of seeps and springs on the LCNCA can be provided as it is not clear whether or not the numbers cited later in the document include all BLM springs.
Ch 3 Biological Resources – Comment pg359		Endangered Species Act. The BLM and other agencies are responsible for assisting the U.S. Fish and Wildlife Service (USFWS) with actions that support the recovery of threatened and endangered species [Section 7(a)1]. Agency responsibility extends beyond section 7(a)2.
Ch 3 Biological Resources – Comment pg362/pp1		States 101 springs but only 63 in surface water section and table 98. Which is it? A list of seeps and springs on the LCNCA can be provided as it is not clear whether or not the numbers cited include all known BLM springs. The Cienega Basin within the LCNCA has over 30 wetlands, both perennial and seasonal. Most of these wetlands occur on the Cienega creek floodplain between Cinco Canyon and Oak Tree Canyon. Named wetland complexes include Cieneguita Wetland, Spring Water Wetland, Cinco Ponds Wetland. Another set occurs upstream of the Mattie Canyon confluence on Cienega Creek (Cold Spring Wetland). These wetlands cover tens of acres. A complete inventory of wetlands has not been completed and is slated for this year.
Ch 3 Biological Resources – Comment pg368		The DEIS does not mention the presence of interior marshland (= Cienega) (Minckley and Brown 1982, Hendrickson and Minckley 1984). See comment above. LCNCA has extensive network of wetlands. The plant list for wetlands and Interior Deciduous Woodland on the LCNCA is available upon request. Riparian areas in the western US provide habitat for and an estimated one-third of the plant species (cited in Poff et. al. 2011).
		It is customary to begin species descriptions with federal listing or other status and existence of any critical habitat in the area. The table is useful for looking at the overall species list and numbers of with some kind of recognized status, but a short statement is helpful to the reader.
Ch 3 Biological Resources – Comment pg372/pp3		Giant Sedge has been observed along the Cienega Creek upstream of Gardner Canyon for approx. 1 mile, Downstream of Mattie Canyon Confluence downstream to Fresno Canyon about 2.3miles, along Mattie Canyon for about 1 mile. This species population is still expanding throughout the wetland/riparian system, but has not been fully surveyed. This was not disclosed in the DEIS.
Ch 3 Biological Resources – Comment pg374		Huachuca water umbel Results of a 2011 survey for HWU found that Cienega Creek, Empire Gulch, and Mattie

		Canyon have a combined total of 100 patches. Data was sent with comments on the Sec 7 draft Biological Assessment. The LCNCA population of HWU likely exceeds that of any other location in the US (waiting for USFWS to verify). This information is relatively new (July 2011) and was not disclosed in the DEIS. Nonetheless, population data has been collected for several years as an adjunct to the wet-dry surface water monitoring done annually on the LCNCA.
Ch 3 Biological Resources – Comment pg376		Chiricahua Leopard Frog AGFD has data for this species in its HDMS data base. It is customary to include a distribution map of each species. AGFD has data for this species in its HDMS data base. CLF also occurs in interior marshland (Cienega) near confluence of Cinco Canyon and Cienega Creek. Empire Gulch Spring supports the largest stable breeding population left in the basin. Its unique feature of having a supply of ground water that holds the temperature fairly constant at between 14 and 19oC, which prevents mortality from the fungal disease chytridiomycosis (Dr. Phillip Rosen, personal communication). This information was not disclosed in the DEIS.
Ch 3 Biological Resources – Comment pg377		Giant Spotted Whiptail It is customary to include a distribution map of each species. AGFD has data for this species in its HDMS data base. Also see Rosen and Caldwell 2004 for distribution in the analysis area. This information was not disclosed in the DEIS.
Ch 3 Biological Resources – Comment pg377		Gila Chub It is customary to include a distribution map of each species. AGFD has data for this species in its HDMS data base Gila chub occupy Cienega Creek and Mattie Canyon but **not** Empire Gulch. Any record for Empire Gulch is likely in error. Of primary importance is that the Gila chub population in Cienega Creek is the only large stable and secure populations in the U.S. (Weedman 1996). This species is being released in cooperation with the USFWS and AGFD to other waters in the LCNCA for species recovery.
Ch 3 Biological Resources – Comment pg378		Gila Topminnow It is customary to include a distribution map of each species. AGFD has data for this species in its HDMS data base Also a distribution map of species is usually provided. This species has been monitored by BLM from 1989 to 2011. Information on this monitoring was provided with comments on the Sec 7 draft Biological Assessment. This data was not disclosed in the DEIS. Of primary importance to the analysis is that the Gila topminnow in Cienega Creek relatively secure and Cienega Creek represents the largest remaining

		habitat in the U.S. (USFWS 2004, Gila topminnow draft revised recovery plan). Gila topminnow were released into Empire Gulch in 2001 and have been collected from Mattie Canyon. This data was not disclosed in the DEIS.
Ch 3 Biological Resources – Comment pg379		Lesser long-nosed bat It is customary to include a distribution map of each species. AGFD has data for this species in its HDMS data base. A query of this data base for this species at Empire Gulch resulted in a record for 2 individuals captured in 1989 and a record for 1997, which revealed that 22 LLNB were collected at the canal by the Cienega Ranch (AGFD memo from Sabre Stonn HDMS division).
Ch 3 Biological Resources – Comment pg360		Longfin dace It is customary to include a distribution map of each species. AGFD has data for this species in its HDMS data base. Distribution and other data collected for this species by the BLM was not disclosed in the DEIS.
Ch 3 Biological Resources – Comment pg361		N Mexican Gartersnake It is customary to include a distribution map of each species. AGFD has data for this species in its HDMS data base. This data was not disclosed in the DEIS.
Ch 3 Biological Resources – Comment pg362/pp2		SW willow Flycatcher It is customary to include a distribution map of each species. AGFD has data for this species in its First sentence is long and confusing. What does Empire/Cienega/Cienega Creek pertain to geographically? It is customary to include a distribution map of each species. AGFD has data for this species in its HDMS data base. Assessment. This data was not disclosed in the DEIS.
Ch 3 Biological Resources – Comment pg386		Impacts common to all alternatives The discussion of the GW modeling and its risks concerning estimate error were not stated in the Environmental Consequences section for the reader to put the analysis into the proper context. This is all important for the analysis of impacts to the flora and fauna on the LCNCA. Myers (2011) compared the three models used to predict future GW conditions. All three models show that the pit would cause a profound lowering of the regional aquifer with a reversal of and creation of a steep gradient moving water towards the pit. The cone of depression created by dewatering the pit would move out from the pit and capture water to the south east that feeds surface flow to Cienega Creek, Empire Gulch, and over 30 perennial and seasonal wetlands. Accuracy and precision of all three models are limited

		by broad level of site characterization of geology, assumptions made where data is not available, and gross and varied estimates of inflow (recharge) into the modeled hydrologic system, gross estimates of conductivity values generalized for large heterogeneous geologic units, assumptions made concerning hydrologic connection without supporting satisfactory hydraulic data or surveys of fracturing. Known faults and fracturing were discussed in modeling reports, but site investigations for faults and fractures were rather limited and likely inadequate. Doughty and Karasaki (2010) noted that a wide range in travel times modeled for fractured bedrock by the different research groups for the same site can be largely attributed to orders of magnitude differences in the effective porosity used for the fracture network. This underscores the importance of accurate estimates as a key component of site characterization. In general, it is widely recognized that ground water modeling does not provide more than a modest level of quantitative certainty in complex geologic settings (EPA 1989, EPA 2001, EPA 2003, GW modeling see comments submitted June 2011) and previous comments to the FS). This puts the analysis of impacts to listed aquatic species at risk of error with dire consequences if the estimate is low by even a small margin. The geologic setting of the proposed mine site is likely to have these "conduits" of GW flow that violate modeling assumptions using simplified inputs. What is certain is that the pit would cause a profound lowering of the regional aquifer around the pit with a reversal of the natural gradient and creation of a steep gradient moving water towards the pit. The cone of depression created by the pit would radiate out from the pit and capture water. This effect would extend to the south east that feeds surface flow to Cienega Creek, Mattie Canyon, Empire Gulch, and over 30 perennial and seasonal wetlands. The rate of GW declines around the pit is debatable and is not as important as the final outcome. The impacts to GW are likely to cause the slow but eventual collapse of the aquatic ecosystem on the LCNCA and Pima County lands. These kinds of impacts are irreversible, cannot be mitigated and will last for centuries.
GW Resources Section - General		Simulated dewatering by the excavation of the pit is estimated to be 300 to 500 gpm. For the reader these numbers needed to be converted to acre-ft/year (484 to 806 acre-ft/year) to provide the volume of water captured by the pit.
Ch 3 Biological Resources – Comment pg387/bullet 4		The estimated change of <0.01 cfs after 50 years is not feasible given the level of model calibration and rough estimates for input variables. The next statements concerning the 150 and 1000 year changes in flow rates are unrealistically fine grained as well. At this

		level of detail, such statements are speculative as the model accuracy is rather coarse even though output figures appear precise. The model cannot be tested for actual accuracy of results so much is left to "faith" in the model, assumptions and inputs.
Ch 3 Biological Resources – Comment pg388/bullet 1		Clearly a 10ft drawdown in Empire Gulch would eliminate perennial surface water and herbaceous plants that rely on wetted bank soil. Regeneration of riparian trees would likely no longer occur do to poor seedling establishment on sites that have become too dry for survival in June and July prior to the onset of monsoons. The literature is quite clear on this (see Leenhouts, et al 2005)
Ch 3 Biological Resources – Comment pg388/bullet 2		Gardner Canyon is the largest contributor of GW to Cienega Creek (Huth 1996). Such a large impact has implications to Cienega Creek in the area of its confluence which supports several large wetland complexes and other smaller wetlands.
Ch 3 Biological Resources – Comment pg388/bullet 4		Wells that supply stock tanks on the LCNCA would experience a drop in water levels, making some of the marginal wells unusable while others would need to be deepened. This was not disclosed in the EIS.
Ch 3 Biological Resources – Comment pg390		Vegetation Communities Interior marshland (cienega) needs to be added to the list of plant communities. Ground water drawdown would be expected to cause a reduction in health and extent or riparian vegetation. In addition it can be expected that a *loss of all or most aquatic and semi aquatic herbaceous species will likely occur.* See comments above concerning Empire Gulch.
Ch 3 Biological Resources – Comment pg391		Animal Movement Corridors Fragmentation of aquatic habitat is likely to occur with GW drawdown. Perennial reaches will become fragmented by intermittent reaches and intermittent reaches will be fragmented by conversion to ephemeral reaches. Intermittent and ephemeral reaches will likely become biological sinks for fish and frog tadpoles where suitable habitat once occurred.
Ch 3 Biological Resources – Comment pg393		Huachuca Water Umbel The indirect impact associated with the decline of GW levels is increased desiccation of channel and banks in Cienega Creek, Mattie Canyon, Empire Gulch and various wetlands. Overall habitat suitability is likely to decrease or become lost for this species on the LCNCA (see discussion above for Empire Gulch). The population can be anticipated to decline or extirpated from natural habitats on the LCNCA. The 50 year estimate before impacts occur is irrelevant as the impacts are very likely (reasonably certain) to occur and

		are irreversible. This will severely limit the ability of the BLM to move this species towards recovery on the LCNCA. A discussion of impacts to this species may be premature as sec. 7 consultation with the USFWS has not occurred yet. The effects of the proposed action to this species will be much more complete following consultation. The Giant sedge (BLM sensitive) is likely to have similar impacts as that of HWU. Gains in the number and distribution of the is species will be reduced or lost.
Ch 3 Biological Resources – Comment pg396		Chiricahua Leopard Frog The indirect impact associated with the decline of GW levels is likely to be the slow reduction or complete loss of habitat suitability and population extent, and possibly, viability in Cienega Creek, Mattie Canyon, Empire Gulch and populations released into various wetlands on the LCNCA. Cinco Ponds Wetland received frogs and tadpoles in October 2011 for recovery purposes. The population can be anticipated to decline or extirpated from natural habitats on the LCNCA. The 50 year estimate before impacts occur is irrelevant as the impacts are very likely (reasonably certain) to occur and are irreversible. This will disrupt progress made towards recovery of this species on the LCNCA. A discussion of impacts to this species may be premature as sec. 7 consultation with the USFWS has not occurred yet. The effects of the proposed action to this species will be much more complete following consultation.
Ch 3 Biological Resources – Comment pg396		The impacts to GS whiptail lizard throughout the analysis area were not disclosed in the EIS.
Ch 3 Biological Resources – Comment pg396		The indirect impact associated with the decline of GW levels is likely to be the slow reduction or complete loss of habitat suitability and population extent, and possibility, viability in Cienega Creek and Mattie Canyon. The population can be anticipated to decline or extirpated from natural habitats on the LCNCA. The 50 year estimate before impacts occur is irrelevant as they are very likely (reasonably certain) to occur and are irreversible. This will disrupt progress made towards recovery of this species on the LCNCA. A discussion of impacts to this species may be premature as sec. 7 consultation with the USFWS has not occurred yet. The effects of the proposed action to this species will be much more complete following consultation.
Ch 3 Biological Resources – Comment pg396		Impacts similar to those for Gila Chub but also include populations in Cinco Ponds Wetland and Empire Gulch.

Ch 3 Biological Resources – Comment pg399		Impacts similar to those for Ch leopard frog, which is a primary prey item.
Ch 3 Biological Resources – Comment pg413		Cumulative Impacts The cumulative impacts section did not disclose significant impacts to species, habitats and ecosystems. GW loss from existing wells in the basin and future development that is sure to accompany new housing in the area for miners and supervisors. The area has become gentrified with new houses gardens and ponds with exotic fish. Non-native species are a great threat to aquatic animal communities, especially federally listed species. Sonoita is growing rapidly. Current zoning is one residence for every 4.13 acres, which would result in a population of about 8,200 when the area is fully built out. The resulting water consumption is estimated at 8,092 acre-feet/year, well above the safe yield. In addition there is an abundance of AZ State Trust Land in the basin that can be purchased for development allowing for additional expansion (see previous map of well distribution in past comment from BLM. Global climate change models indicate that the area will become more arid, thus lowering recharge inputs to the already stressed GW system (USGCRP 2012). The U.S. Global Change Research Program (USGCRP) coordinates and integrates federal research on changes in the global environment and their implications for society. Thirteen departments and agencies participate in the USGCRP, which was known as the U.S. Climate Change Science Program from 2002 through 2008. The program is steered by the Subcommittee on Global Change Research under the Committee on Environment and Natural Resources, overseen by the Executive Office of the President, and facilitated by the National Coordination Office. During the past two decades, the United States, through the USGCRP, has made the world's largest scientific investment in the areas of climate change and global change research. Since its inception, the USGCRP has supported research and observational activities in collaboration with several other national and international science programs. Some findings of this program are, 1) water supplies will become increasingly scarce, calling for trade-offs among competing uses, and potentially leading to conflict, 2) increasing temperature, drought, wildfire, and invasive species will accelerate transformation of the landscape, 3) increased frequency and altered timing of flooding

		will increase risks to people, ecosystems, and infrastructure, 4) unique tourism and recreation opportunities are likely to suffer, 5) cities and agriculture face increasing risks from a changing climate (USGCRP 2012). While climate models, like GW models lack precision and accuracy to make highly specific predictions, they do provide a useful function in that they do simulate future conditions, as best as, the current science and technology allow. Effects of global warming reasonably certain to occur to the San Pedro River have been published and are germane to the Cienega Creek system (Dixen et al. 2009). The DEIS does not bring to light the role the additional aquatic habitat degradation in the area to the status of aquatic habitat in the larger Gila River basin and the repercussions to aquatic species federally listed or otherwise biologically imperiled. Loss and alteration of surface water is extensive and has become a critical factor in the need to list aquatic species (Minckley 1985, Minckley and Marsh 2009). Federally listed species in the basin are largely imperiled because of cumulative impacts (see Federal Register listing notices these listing these species). The DEIS does not address that the BLM is actively working with the AGFD and USFWS to create a metapopulation of Chiricahua leopard frogs, release pupfish, topminnow, Gila chub, Mexican gartersnake and plant Huachuca water umbel on the LCNCA to meet obligations in Sec 7(a)1 of the ESA. By dewatering aquatic habitat, the mine is in conflict with both Sec 7(a)1 and 7(a)2. This weakens the security of the species and limits recovery options. The data we have indicates that the direct, indirect and cumulative impacts are likely to result in the collapse of aquatic/riparian/wetland ecosystems at lower elevations of the basin (3000 to 5000ft). At higher elevations topography, limited mineral potential and federal ownership will likely limit these impacts.
		Literature Cited Dixen, M, J.C. Stromberg, J.T. Proice, H. Galbraith, A.K Friemer, and E.W. Larsen. 2009. *Potential Effects of Climate Change on the Upper San Pedro Riparian Ecosystem*, in, *Ecology and Conservation of the San Pedro River*, J.C. Stomberg and B. Tellman, editors. Huth, H. 1996. Hydrogeochemical modeling of western mountain front recharge, upper

		Cienega Creek sub-basin, Pima County, Arizona. M.S. Thesis. Tucson: Univ. of Arizona. Knight, E.L. 1996. A water budget and land management recommendations for upper Cienega Creek basin. Unpublished Master's Thesis, University of Arizona: Tucson. Leenhouts, J.M., J.C.Stromberg, and R.L. Scott. 2005. Hydrologic requirements of the consumptive ground-water use by riparian vegetation along the San Pedro River, Arizona. U.S. Geologic Survey, Scientific Investigation 2005-5163 Minckley, W.L. 1985. Native fishes and natural aquatic habitats in U.S. Fish and Wildlife Service Region II west of the continental divide. Report to the USFWS, Albuquerque, NM. Minckley, W.L. and P.C.Marsh. 2009. Inland fishes of the greater southwest: chronicles of a vanishing biota. Univ AZ Press, Tucson. Myers, T. 2011. Technical memorandum: review of proposed Rosemont Ranch Mine ground water models. Prepared for the Pima County and Pima County Flood Control District. United States Environmental Protection Agency. 1989. Stephen G. Schmelling and Randall R. Ros, Contaminant Transport in Fractured Media: Models for Decision Makers. United States Environmental Protection Agency, EPA/540/4-89/004 United States Environmental Protection Agency. 2001. *The State-of-the-Practice of Characterization and Remediation of Contaminated Ground Water at Fractured Rock Sites*. EPA542-R-01-010. U.S. Global Change Research Program web site 01-13-2012. http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/regional-climate-change-impacts/southwest.
DEIS/Chapter 3/Table 47/Summary of Effects/Proposed Action/225	3A: Direction and degree of change in water table level (feet) 3A: Locations in which water resources may be impacted	Impacts to Empire Gulch and Cienega Creek, as stated in the DEIS, may conflict with the approved Las Cienegas Resource Management Plan and Record of Decision (LCNCA RMP and ROD; 2003). From the LCNCA RMP and ROD, page 8-9, refer to the riparian vegetation objectives a-d, and Fish and Wildlife Management Objective 1. From the

Table 47/Summary of Effects, Proposed Action/3D: Potential lowering of the water table/reduced groundwater flow to Davidson Canyon and Cienega Creek that results in permanent changes in flow patterns may affect their designations as Outstanding Arizona Waters and current designated uses/226	(geographic extent) No drawdown above threshold of 5 feet at Corona del Tucson residences, along Cienega Creek, or at Davidson Canyon/Cienega confluence; 1-to10-foot drawdown at Upper Empire Gulch with impacts beginning approximately 50 years after end of active mining 3A: Duration of effect, Perpetuity 3A: Relative impairment of mountain-front groundwater recharge function, 1% Subcomponent 1: Reduction in flow along Cienega Creek (percentage), 1 to 3% of average annual flow; critical low-flow periods (may through June) would see greater impacts; impacts modeled to potentially start 50 years after end of active mine lifeSubcomponent 2: Miles of perennial stream length lost along Cienega Creek, 0.16 (based on average flow) Subcomponent 3: Reduction in flow along Davidson Canyon (percentage), 10%; impacts expected to start immediately after construction of mine	LCNCA RMP and ROD, page 33-38, refer to the Fish and Wildlife Management Actions (including those for listed species). From the LCNCA RMP and ROD, page 72, refer to the Riparian and Aquatic Habitat Objectives. Conflicts with land use plans have been identified in past agency comments regarding the inclusion of Cienega Creek and Empire Gulch into the "analysis area." See also: http://www.blm.gov/wo/st/en/prog/planning/nepa/webguide/40_most_asked_questions/questions_20-29.html 23a. **Conflicts of Federal Proposal With Land Use Plans, Policies or Controls.** How should an agency handle potential **conflicts** between a proposal and the objectives of Federal, state or local land use plans, policies and controls for the area concerned? See Sec. 1502.16(c). A. The agency should first inquire of other agencies whether there are any potential conflicts. If there would be immediate conflicts, or if conflicts could arise in the future when the plans are finished (see Question 23(b) below), the EIS must acknowledge and describe the extent of those conflicts. If there are any possibilities of resolving the conflicts, these should be explained as well. The EIS should also evaluate the seriousness of the impact of the proposal on the land use plans and policies, and whether, or how much, the proposal will impair the effectiveness of land use control mechanisms for the area. Comments from officials of the affected area should be solicited early and should be carefully acknowledged and answered in the EIS.
DEIS/Chapter 2/Alternatives, Including the Proposed Action/ Utility Lines (Electrical and Water Supply) Alignment	West of the Santa Rita Mountains ridgeline, the preferred route generally parallels the existing South Santa Rita Road before entering private property held by Rosemont Copper. The alignment then enters the	Water and electric lines should be buried under the existing South Santa Rita Road in order to limit disturbance to Pima pineapple cactus and occupied habitat on BLM land.

Alternatives/TEP Preferred Route/38	Rosemont claim block and crosses the ridgeline at Lopez Pass.	
DEIS/Chapter 2/Alternatives Impact Summary/ Table 8/Biological Resources/100	4.Riparian habitat disturbed (acres) Cienega Creek: 490.4 hydroriparian/mesoriparian; Davidson Canyon: 471.2 xeroriparian, 17.2 to 204.7 mesoriparian; Empire Gulch: 58.3 hydroriparian/mesoriparian; Gardner Canyon: 139.6 hydroriparian/mesoriparian 4. Qualitative assessment of ability to meet legal and regulatory requirements Biological, hydrologic, and geomorphic impacts to Davidson Canyon; Biological and hydrologic impacts to Cienega Creek, Empire Gulch, and Gardner Canyon 5E: Species of Concern – Effects on Population Viability Could be reduced for at least 3 sensitive species	Does 5E refer to "sensitive species" or special status species? Sensitive species would only include those specifically designated as such by USFS and BLM. If special status species, this would include all sensitive species and listed species. See BLM comments on draft BA and effect determinations. Based on acres of riparian habitat disturbed, biological, hydrologic, and geomorphic impacts in Cienega Creek and Empire Gulch alone, species of concern-effects on population viability could be reduced for more than three species. Include in this list: Chiricahua leopard frog, Huachuca water umbel, Gila chub, Gila topminnow, southwestern willow flycatcher, and lesser long-nosed bat at Cienega Creek and Empire Gulch, and Pima pineapple cactus within the proposed TEP alignment; this would be at least seven species.
DEIS/Chapter 3,/Affected Environment and Environmental Consequences/Groundwater	Pumping of mine supply water in the Upper Santa Cruz Sub-Basin would remove water from the regional aquifer and would lower groundwater levels, which could cause reduced groundwater availability to existing wells and water users. In the Davidson	

Quantity/Introduction/206 DEIS/Chapter 3,/Affected Environment and Environmental Consequences **/**Summary of Effects by Issue/ Measures by Alternative/ Table 98/356	Canyon/Cienega Basin, development of the mine pit would intercept groundwater from fractures in the rock formations in the immediate vicinity of the mine, as well as the adjacent basin fill. Together, the fractured rock and basin fill form the regional aquifer of that groundwater basin (see figure 29). During mine operation, water from the mine pit would be actively pumped, which would cause drawdown in the regional aquifer. After closure, a mine pit lake would form that would lose water through evaporation, which would perpetuate the drawdown in the regional aquifer. This drawdown will cause impacts to wells, springs, streams, and riparian areas. 5E: Species of Concern – Effects on Population Viability Could be reduced for at least 3 sensitive species	
DEIS/Chapter 3/Affected Environment and Environmental	In order to determine which future activities are likely to occur, the Coronado National Forest (the	BLM Manual 6840.1F2e(2)(b) (Special Status Species Management) states this as "Reasonably Certain to Occur." For a particular effect to be an effect subject to consultation, it must be reasonably certain to occur. This determination cannot be based

Consequences/Introduction/108	Coronado) interdisciplinary team (ID team) convened to create a list of reasonably foreseeable actions with input from all resource specialists. The list includes these actions: • Beaver reintroductions at Cienega Creek by the Arizona Game and Fish Department and the Bureau of Land Management • Delivery and recharge of groundwater with water from the Central Arizona Project in the Green Valley area by the Community Company of Green Valley • Pima County Conservation Plan activities may include acquisition of archaeological and historical sites and traditional use sites for conservation and heritage education purposes, tours, monitoring, and other uses of sites by County staff and others • Designation of the Santa Rita Mountains as a traditional cultural place • Continued maintenance of forest roads and private roads in support of permitted Rosemont Copper Company (Rosemont Copper) grazing operations • Pavement preservation activities on State Route 83 between Sonoita and milepost 43 by the Arizona Department of Transportation • Sahuarita Road Phase II from La Villita Road to Country Club Road (roadway widening and drainage improvement project)	on speculation or the mere possibility of an effect on a listed species or critical habitat. In the context of indirect effects, "reasonably certain to occur" may be evidenced by appropriations, work plans, permits issued, or budgeting; they follow a pattern of activity undertaken in the action area; or they are the logical extensions of the proposed action." Therefore, BLM does not limit reasonably foreseeable to only those proposed activities with a permit application. Are any of the possible listed non-federal activities in the DEIS evidenced by appropriations, work plans, or budgeting; do they follow a pattern of activity undertaken in the action area; or are they a logical extension of the proposed action? If so, they must be included under cumulative effects in the resource section and the BA. The BA does not adequately address cumulative, synergistic, or interacting effects (see BLM agency comments). See also section 6840.1F2e(3): "When making the "reasonably certain to occur" determination in the context of cumulative effects, the BLM must examine the effects of these actions that are likely to occur, bearing in mind the economic, administrative, or legal hurdles that remain to be cleared. Indications of this likelihood include approval of the action by the appropriate government unit(s), evidence of funding having been obtained by project sponsors, or the initiation of contracts. These future non-Federal actions are reasonably certain to occur if approval by all non-Federal agencies or governments granting authority for the action is reasonably certain and economically viable." For any of the possible listed non-federal activities, has approval of the action by an appropriate government unit been given; has evidence of funding been obtained by project sponsors; OR has initiation of contracts occurred? If so, they must be included under cumulative impacts in the BA. See also section 6840.1F2e(4): "Distinguishing between National Environmental Policy Act (NEPA) effects and ESA effects. NEPA and the ESA have different purposes and impose different analytical standards. While the NEPA and ESA standards for direct effects are very similar, there is an important difference between the acts regarding the standards for indirect and cumulative effects. Under NEPA, indirect or cumulative effects must be reasonably foreseeable. In contrast, the ESA and its regulations require that such effects be reasonably certain to occur. Thus, effects that may be required to be considered under the NEPA analysis standard may not necessarily require consideration under the ESA. In addition, under NEPA, cumulative effects include the effects of both Federal and non-Federal actions, whereas under ESA, cumulative effects do not include Federal actions." Therefore, the cumulative effects for each listed species in the BA (i.e. Chiricahua leopard frog, Gila chub, Gila topminnow, Huachuca water umbel, jaguar, ocelot, lesser long-nosed bat, Mexican spotted owl, Pima pineapple cactus, and southwestern willow flycatcher) may not be adequate if, on a case by case basis and in each particular location in relation

	• Stakaer Parsons concrete batch plant and aggregate operations Decommissioning of Forest Roads 4032 and 505 • Extension of Central Arizona Project water into Farmers Investment Company actively farmed pecan groves and activation of groundwater storage facility • Closure of approximately 35 abandoned mines in the Santa Rita Mountains • Anticipated increase in demand for groundwater in the Sahuarita area by 200 percent in year 2030 • Expansion of limestone quarries in the Davidson Canyon drainage system north and northeast of the Santa Rita Mountains • Continued precious metal exploration throughout southeastern Arizona Specific projects included by the ID team typically need to have a level of documentation describing the type and location of proposed activities, such as a permit application submitted to a Federal, State, or local agency. Projects without this level of documentation are considered speculative and are not considered "reasonably foreseeable." Some projects in the area were not included as reasonably foreseeable actions in part because this level of detail was not met. This includes the future	to the occurrence of a listed species, any of these possible non-federal actions are reasonably certain to occur.

	mining by Rosemont Copper of other mineral deposits in the area, specifically the Peach-Elgin, Copper World, and Broadtop deposits. Currently, no proposals for development of these projects have been submitted to the Coronado or other land management agency.	
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Groundwater Quantity/Mine Site Models in the Davidson Canyon–Cienega Basin/215 DEIS/Chapter 3/Affected Environment and Environmental Consequences/Groundwater Quantity/Montgomery Mine Site Model,/Potential Limitations and Current Usability of the Model/220	Unlike for the Santa Cruz Valley, no regional groundwater models have been constructed that incorporate the project area; all modeling for the area has been conducted specifically for the proposed project. It is recognized that while much of the Cienega Basin was included in the model domain, the purpose of this model was to analyze impacts in the vicinity of the mine, and therefore the model may not be appropriate for use elsewhere in the basin without additional revision. The model has been used for the impact analysis in this DEIS as one out of three models that have been prepared for the project area, and it is not presented as the sole prediction of impacts. Perennial reaches of Cienega Creek and Davidson Canyon are included in the model. The perennial reaches	The models may not include the entire area impacted by the project, may not present the entire prediction of impacts, assume pumpage within a model area is negligible, no estimation of pumpage was made for one model, one model may not fully reflect fractures that supply water to wells, seeps, or springs, and one model may not be appropriate for use elsewhere in the basin outside of the mine. Changes are expected in groundwater quality and to springs or seeps associated with this groundwater. Because the pit lake is expected to be a hydraulic sink, with water leaving only through evaporation, dissolved chemical constituents are expected to concentrate over time. At the 200 year simulation mark, one model showed evapoconcentration of some constituents about 1.3 times that of local groundwater (Tetratech 2010). Because the water associated with the project comprises approximately 1% of the Cienega Creek Basin (Tetratech 2009), detailed analyses should be required to include potential effects of this change in water quality in the Cienega Creek Basin to listed species and their habitat. Water tracing tests to-date may be inadequate to determine the source, amount, direction of flow, and rate of flow and effects to the Cienega Creek Basin. Compounding, synergistic, and interacting effects from pit lakes and debris-filled drainages should be better analyzed, along with climate change effects and any non-federal cumulative effects to listed species within the Cienega Creek Basin. ***BLM Manual 6840.1F5a**: "Providing Information. During formal consultation, the BLM shall provide the FWS and/or NMFS with the best scientific and commercial information available for an adequate review of the effects that a proposed action may have on a listed species or designated critical habitat. If information is lacking, the FWS and/or NMFS can request that the BLM conduct additional surveys or studies to better address listed species issues. Although additional surveys or studies are not required by the ESA, and in many situations may not be practicable, they can be in the BLM's best interest, as

	were modeled using a streamflow routing package (SFR1).	the FWS and/or NMFS generally err on the side of conserving listed species when rendering a biological opinion based on limited information." ***This citation will be referenced in additional comments below.**
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Groundwater Quantity/Tetra Tech Mine Site Model/221	Tetra Tech assumed that any groundwater pumpage within the model area was negligible; no estimate of pumpage in the area was made.	
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Groundwater Quantity/Tetra Tech Mine Site Model/222	On a regional scale the porous media model is reliable for predicting water level impacts, but on the scale of individual wells, seeps, springs, or other hydrologic features, the model may not fully reflect the individual fractures that supply water to those features.	
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Groundwater Quantity, Tetra Tech Mine Site Model/Potential Limitations and Current Usability of the Model/223	The reduction in recharge resulted in greater modeled reductions in streamflow in Cienega Creek and Davidson Canyon, drawdown advancing up to an additional 3 miles beyond the mine pit, and greater reduction in evapotranspiration. It is recognized that while pumpage in the basin is relatively minor, compared with the overall basin water balance, pumpage in the basin is increasing, and lack of modeling of this pumpage may affect future predictions. It is recognized that while much of the	

	Cienega Basin was included in the model domain, the purpose of this model was to analyze impacts in the vicinity of the mine; therefore, the model may not be appropriate for use elsewhere in the basin without additional revision.	
Chapter 3/Affected Environment and Environmental Consequences/ Biological Resources/ Introduction/349	Therefore, the action area includes the following: 1) springs and drainages that receive surface water discharge from the mine site, including Davidson Canyon wash to its confluence with Cienega Creek; 2) springs and seeps within the area of projected groundwater drawdown associated with the mine pit; and 3) areas adjacent to the mine site and transportation corridors that may be impacted by noise, dust, and light.	Please provide a more detailed description of the action area so that the action area is clearly delineated for agency and public notification and review. Please reword to "2) springs and seeps within the area of projected groundwater drawdown associated with the mine pit, including Empire Gulch and Cienega Creek;"
Chapter 3/Affected Environment and Environmental Consequences/ Biological Resources/ Analysis Methodology, Assumptions, Uncertain and Unknown Information/352	In order to reduce the amount of uncertainty in the impacts analysis, surveys were completed in order to assess the distribution of several special status plant and animal species within portions of the analysis area. However, for many species, surveys were not conducted, and it is not known whether these species actually occur within the analysis area.	See BLM Manual 6840.1F5a above.
Chapter 3/Affected Environment and Environmental Consequences/ Biological Resources/	The Migratory Bird Treaty Act (16 United States Code 703–711) provides Federal protection to all migratory birds, including nests and eggs. Under this act, it is unlawful to take, kill, or	Please include a statement regarding BLM Migratory Bird Treaty Act Policy from BLM Information Bulletin 2010-110.

Relevant Laws, Regulations, Policies, and Plans/Migratory Bird Treaty Act/359	possess migratory birds. The Southwestern Regional Office of the Forest Service recommends analyzing the impacts as follows: (1) on Species of Concern listed by National Partners in Flight; (2) on important bird areas; and (3) on important overwintering areas, as discussed in a 2008 memorandum of understanding between the Forest Service and the U.S. Fish and Wildlife Service.	
Chapter 3/Affected Environment and Environmental Consequences/ Biological Resources/ Existing Features/Biophysical Conditions/362	This is evident in the analysis area, as there are no perennial drainages present.	The analysis area for biological resources includes Cienega Creek and Empire Gulch. These drainages are perennial.
DEIS/Chapter 2/Alternatives, Including the Proposed Action/Introduction/	For the purposes of this DEIS, the term "project area" refers to those areas that would be excluded from public access to accommodate mine activities and includes the open pit, waste rock storage area, tailings area, heap leach facility, plant site and ancillary facilities, fenced area around the mine, and mine primary and secondary access roads. Unless specifically noted, the term "project area" does not include the linear water and electricity utility corridors. The term "analysis area" is specific to each resource and is explicitly defined	

	in each resource section of chapter 3. The analysis area includes all areas necessary to adequately assess impacts to resources and often includes areas beyond the project area, including utility corridors. In the analysis area, this vegetation community is mapped in portions of Box, McCleary, Sycamore, Scholefield, Wasp, Barrel, Davidson, and Gardner Canyons; Empire Gulch; and Cienega Creek…	Empire Gulch Springs and Upper Cienega Creek are perennial.
Chapter 3/Affected Environment and Environmental Consequences/ Biological Resources/ Existing Features/Biophysical Conditions/Riparian/ Ephemeral Fluvial Systems Supporting Upland Vegetation/369		
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Plants/Huachuca water umbel/374	The majority of plants in Arizona are found along the San Pedro River. Surveys for this species have not been conducted within the analysis area for the purposes of this project.	Based on the 2011 Huachuca water umbel survey of Cienega Creek during wet/dry mapping, a substantial population of Huachuca water umbel occurs along Cienega Creek. During 2009 survey for Huachuca water umbel on the San Pedro Riparian NCA (Vernadero 2010), 65 metapopulations were detected. During 11 June 2011 wet/dry mapping of Cienega Creek, 61 metapopulations of Huachuca water umbel were detected in only the Mattie Canyon to Narrows reach (Marcia Radke, pers. obs.), which does not include any detections in other portions of Cienega Creek, Mattie Canyon, or Empire Gulch. Therefore, Cienega Creek contains a significant portion of the population of Huachuca water umbel, and may contain the majority of plants in Arizona. It should be noted in the species description that Huachuca water umbel is a federally endangered species (e.g. as it is noted in the description for Gila chub). See BLM Manual 6840.1F5a above.
DEIS/Chapter 3/Affected Environment and Environmental		It should be noted in the species description that Pima pineapple cactus is a federally endangered species (e.g. as it is noted in the description for Gila chub).

Consequences/Special Status Species Plants/Pima pineapple cactus /374		
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Animals/Chiricahua leopard frog /376	Several frogs were observed within the analysis area during these surveys, and this species has also been reported to occur in other locations in the Louisiana Gulch, Cienega Creek, and Empire Gulch basins within the analysis area (Arizona Game and Fish Department 2011d; WestLand Resources Inc. 2009a, 2009b).	Chiricahua leopard frogs are not only reported from Empire Gulch, but do occur there. This sentence should be reworded so that the documented occurrence of Chiricahua leopard frog in Empire Gulch is clear. See the Chiricahua leopard frog recovery plan (USFWS 2007), page I-12 "To the extent possible, groundwater pumping, impoundments, and surface water diversions should not be authorized where such activity would adversely affect occupied Chiricahua leopard frog sites or project sites selected for restoration or creation, unless such activities are unavoidable. If unavoidable, the action agency or project proponent should take every reasonable measure to ensure effects are mitigated to the maximum extent practicable. Conservation measures will need to be tailored to each project, but may include: relocating the project to a site where effects are minimized; minimizing the amount or duration of water pumped, diverted, or impounded; providing replacement water to frog habitats to offset impacts; temporarily relocating frogs if disturbance to hydrology is temporary; replanting riparian and wetland vegetation if temporary impacts desiccate these plants" See also Chiricahua leopard frog recovery plan (page I-13): "Compensation is the least preferred option to address the impacts of a project on the frog or its habitat, and should only be considered if efforts to avoid, minimize, rectify, or reduce the impacts of the project have been expended. Given that frogs occupy relatively small areas, most projects should be able to avoid contact. To ensure no net loss of habitat quality of quantity, we recommend action agencies charge compensation to project proponents if net residual effects still would occur after all reasonable on-site conservation measures have been applied. Projects may have beneficial effects (e.g. see livestock grazing and management, above) that could balance adverse effects. Compensation funds should be used to acquire, protect, or restore Chiricahua leopard frog habitat, or to carry out other high priority recovery actions. Determining whether compensation is needed. To evaluate whether it is appropriate to collect compensation, the action agency should consider whether, after all on-site conservation measures have been applied, the project would still have a net adverse affect to : 1) quality or quantity of occupied frog habitats or restoration/creation sites, 2) Chiricahua leopard frogs, or 3) corridors for movement of frogs among existing populations and/or project sites selected for restoration/creation in

		MAs. If any such net adverse residual effects still remain, then compensation is desirable. However, a project proponent or action agency does not need to compensate if the same or a different project proponent or agency already paid compensation for a particular area, That is, compensation is only needed once for multiple disturbances to a particular area. Compensation Fund Accounts. Each of the action agencies should maintain an accounting of all compensation funds paid and collected.. These accountings should be incorporated into the annual monitoring report for implementation of the recovery plan. One of the agencies should serve as a clearinghouse for all compensation funds and accounting data. Project proponents would pay that clearinghouse agency through the action agency that authorizes the project. The Stakeholders Subgroups should be consulted as to how the funds are expended."
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Animals/Desert tortoise, Sonoran population /377	Surveys have not been conducted for desert tortoise within the analysis area for the purposes of this project; however, it is expected that they may occur in portions of the analysis area, such as within area proposed for utility corridors and in lower Davidson Canyon and Cienega Creek.	Candidate species are considered BLM sensitive species. See BLM 6840.2B. Planning. When BLM engages in the planning process, it shall address Bureau sensitive species and their habitats in land use plans and associated NEPA documents (as per BLM 1610 Planning Manual and Handbook, Appendix C). When appropriate, land use plans shall be sufficiently detailed to identify and resolve significant land use conflicts with Bureau sensitive species without deferring conflict resolution to implementation-level planning. Implementation-level planning should consider all site-specific methods and procedures needed to bring species and their habitats to the condition under which management under the Bureau sensitive species policies would no longer be necessary. C. Implementation. On BLM-administered lands, the BLM shall manage Bureau sensitive species and their habitats to minimize or eliminate threats affecting the status of the species or to improve the condition of the species habitat, by: 1. Determining, to the extent practicable, the distribution, abundance, population condition, current threats, and habitat needs for sensitive species, and evaluating the significance of BLM-administered lands and actions undertaken by the BLM in conserving those species.
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Animals/Desert tortoise, Sonoran population /377	There is anecdotal information that this lizard currently inhabits the footprint of the proposed mine and areas within Davison Canyon, Empire Gulch, and Cienega Creek, but the lack of focused surveys conducted recently for this lizard in the analysis area prevents identification of the	See previous comment.

	drainages in which this species occurs.	
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Animals/Gila chub/377		The monitoring data for Empire Gulch and upper Cienega Creek is incomplete. See BLM Manual 6840.1F5a above.
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Animals/Gila topminnow/378		The monitoring data for Empire Gulch and upper Cienega Creek is incomplete. See BLM Manual 6840.1F5a: above. See the Revised Gila topminnow recovery plan (USFWS 1998): "Task 1. Prevent extinction by protecting remaining natural and long-lived reestablished populations."
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Animals/longfin dace/379		The monitoring data for Empire Gulch and upper Cienega Creek is incomplete. See BLM Manual 6840.1F5a above.
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Animals/jaguar /377-378	Surveys for this species have not been conducted within the action area for the purposes of this project.	It should be noted in the species description that jaguar is a federally endangered species (e.g. as it is noted in the description for Gila chub). Jaguars have been documented since 1980 in the area from the Peloncillo Mountains west to the Baboquivari Mountains in Sky Island mountain ranges and from the international boundary north to Interstate 10. Based on recent documentation of jaguar in southeastern Arizona near the action area, data does suggest that appropriate habitat does occur in the action area for jaguar. The possible designation of jaguar critical habitat may include such elements as: consideration of space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species. Due to recent documentation of jaguar in southeastern Arizona near the action area, survey through camera trapping for the species should occur within the

		resource analysis area for purposes of this project and could be conducted concurrently with ocelot survey. See BLM Manual 6840.1F5a above.
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Animals/lesser long-nosed bat /379		It should be noted in the species description that lesser long-nosed bat is a federally endangered species (e.g. as it is noted in the description for Gila chub). Roosts and foraging areas within the project area for lesser long-nosed bat were identified in the technical report (Westland Resources 2009). Although compensation is not addressed in the USFWS lesser long-nosed bat recovery plan (1994), mitigation and compensation should be considered for destruction of occupied and potential foraging and roosting habitat. Please see the following excerpt from the lesser long-nosed bat recovery plan: "Protection of all known roost sites and food plants within a radius of 50 miles (81 km) around known roosts will help to prevent this species from going extinct. Protection of food resources along migratory pathways may also be important to the survival of the species."
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Animals/ocelot /381-382	Surveys for this species have not been conducted within the analysis area for the purposes of this project.	It should be noted in the species description that ocelot is a federally endangered species (e.g. as it is noted in the description for Gila chub). Due to five recent documentation of ocelot in southeastern Arizona, survey through camera trapping for the species should occur within the action area for purposes of this project. See BLM Manual 6840.1F5a above.
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Animals/southwestern willow flycatcher /382-383	Willow flycatchers have not been found along this reach before or since. There is no designated critical habitat for this species within the analysis area. Surveys for this species have not been conducted within the analysis area for the purposes of this project. There are no known occurrences of this species within the analysis area; however, habitat matching this description is present within the analysis area in Davidson Canyon at	Willow flycatcher at Empire Gulch were documented with the "fitz-bew" call per USFWS protocol on a territory just west of net #10 of the Empire Gulch Monitoring Avian Productivity and Survivorship (MAPS) station on 08 and 17 June 2011, listed as "probable breeder-song" for these dates of the Empire Gulch MAPS station, an after-hatch-year willow flycatcher was caught in net #10 on 17 June 2011, and a hatch-year bird was caught on 06 August 2011 in net #7 of the same MAPS station (M. Radke, pers. obs.). This was reported as such to USFWS and AZGFD per scientific collecting permit requirements. Willow flycatcher were also listed as "likely breeder" for the 2011 year status for the Empire Gulch MAPS station (M. Radke, pers. obs.). From 76 FR 50544: "A territory is defined as a discrete area defended by a resident single flycatcher or pair of flycatchers within a single breeding season (Sogge et al. 2010, p. 34). This is usually evidenced by the presence of a singing male, and possibly one or more mates (Sogge et al. 2010, p. 34). In

	the confluence with Cienega Creek, in Empire Gulch, and along Cienega Creek, so it is possible that this species occurs within the analysis area.	addition, a southwestern willow flycatcher was documented on Cienega Creek during formal surveys on 7 August 2003 (Keith Hughes, BLM files). A willow flycatcher was also documented at the Empire Gulch MAPS station on 27 July 2006. Also include in the BA the discussion of proposed critical habitat on Cienega Creek from 76FR 50542-50629: "The Santa Cruz River and Cienega Creek segments were identified in the Recovery Plan as areas with substantial recovery value (Service 2002, p. 91). These two segments are anticipated to provide flycatcher habitat for metapopulation stability, gene connectivity through this portion of the flycatcher's range, protection against catastrophic population loss, and population growth and colonization potential. As a result, these river segments and associated flycatcher habitat are anticipated to support the strategy, rationale, and science of flycatcher conservation in order to meet territory and habitat-related recovery goals." See BLM Manual 6840.1F5a above.
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Animals/yellow-billed cuckoo /383	Surveys for this species have not been conducted within the analysis area for the purposes of this project.	The monitoring data for Empire Gulch and Cienega Creek is incomplete. Yellow-billed cuckoo were documented in Cienega Creek on 18 June 2010, with at least seven individuals along the reach between Rd. 901A and the Gardner Canyon confluence (M. Radke, pers. obs.). In addition, at least three individuals were documented at Empire Gulch during 2010, individuals were heard and listed as "probable breeder-song" on 15 June, 25 June, 02 July, 17 July, 24 July, and 03 August 2010, and listed as "breeder" for the 2010 year status for the Empire Gulch Monitoring Avian Productivity and Survivorship (MAPS) station (M. Radke, pers. obs.). Individuals were observed as recently as 06 June 2011, individuals were heard and listed as "probable breeder-song" on 08 June, 29 June, 08 July, 19 July, 29 July, and 06 August 2011 as part of the MAPS breeding status list, one after-hatch-year individual was caught at net #08 of the Empire Gulch MAPS station on 29 July 2011, and YBCU were also listed as "breeder" for the 2011 year status for the Empire Gulch MAPS station (M. Radke, pers. obs.). Also, one male was documented downstream of the Narrows on Cienega Creek on the 8 August 2011 Arizona Bird Conservation Initiative riparian bird survey plot #2196 (M. Radke, pers. obs.). See BLM 6840.2B. Planning. When BLM engages in the planning process, it shall address Bureau sensitive species and their habitats in land use plans and associated NEPA documents (as per BLM 1610 Planning Manual and Handbook, Appendix C). When appropriate, land use plans shall be sufficiently detailed to identify and resolve significant land use conflicts with Bureau sensitive species without deferring conflict resolution to

		implementation-level planning. Implementation-level planning should consider all site-specific methods and procedures needed to bring species and their habitats to the condition under which management under the Bureau sensitive species policies would no longer be necessary. C. Implementation. On BLM-administered lands, the BLM shall manage Bureau sensitive species and their habitats to minimize or eliminate threats affecting the status of the species or to improve the condition of the species habitat, by: 1. Determining, to the extent practicable, the distribution, abundance, population condition, current threats, and habitat needs for sensitive species, and evaluating the significance of BLM-administered lands and actions undertaken by the BLM in conserving those species.
DEIS/Chapter 3/Affected Environment and Environmental Consequences/Special Status Species Animals/migratory birds/384		Please include a statement regarding BLM Migratory Bird Treaty Act Policy from BLM Information Bulletin 2010-110. What birds of conservation concern may occur on the BLM land proposed for utility corridors, and what conservation measures will be utilized to prevent disturbance to eggs and nestlings during any construction activities?
DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Biophysical Features/386	However, riparian vegetation also has the potential to be impacted indirectly by changes in surface water and groundwater availability.	These statements are contradictory.
DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Biophysical Features/387	[Impacts to Cienega Creek] Overall, the modeled decreases in groundwater (less than 1 foot) would occur over a long period of time and are unlikely to cause large changes in riparian vegetation extent or health; however, the reduction in stream flow could impact aquatic species needing	The already shallow amounts of surface water in Empire Gulch and Cienega Creek, with even small decreases in groundwater of less than one foot, may result in significant changes in riparian vegetation extent and health. A reduction of less than one foot would likely impact the endangered Huachuca water umbel, which requires saturated soil at a minimum.

	standing or flowing water.	
DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Biophysical Features/387	Cienega Creek is expected to experience drawdown, potentially starting about 50 years after closure of the mine; however, this drawdown is expected to be negligible at this point in time (less than 0.01 cubic feet per second). Drawdown could reduce surface flow by up to 0.04 cubic feet per second after 150 years and could reduce surface flow by up to 0.09 cubic feet per second after 1,000 years after mine closure.	This would serve as an unofficial de facto conveyance of LCNCA water rights.
DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Biophysical Features/388	The Upper Empire Gulch Springs are expected to experience groundwater drawdown up to 1 foot approximately 50 years after mine closure and up to 10 feet approximately 150 years after closure of the mine. Groundwater drawdown of this magnitude would likely cause die-back in some riparian vegetation and would reduce spring or surface flow.	Groundwater drawdown of this magnitude would likely not only reduce spring or surface flow at Empire Gulch, but would stop flow entirely.
DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Ability to meet legal and regulatory requirements for riparian areas/390	Cienega Creek, Empire Gulch, and Gardner Canyon could see potential impacts to mesoriparian and hydroriparian areas from groundwater drawdown. Empire Gulch and Gardner Canyon are modeled to experience levels of groundwater drawdown that could cause die-back of riparian vegetation and reduce spring or surface flow; these impacts would alter the hydrologic and biological	Impacts to Empire Gulch and Cienega Creek, as stated in the DEIS, may conflict with the approved Las Cienegas Resource Management Plan and Record of Decision (LCNCA RMP and ROD; 2003). From the LCNCA RMP and ROD, page 8-9, refer to the riparian vegetation objectives a-d, and Fish and Wildlife Management Objective 1. From the LCNCA RMP and ROD, page 33-38, refer to the Fish and Wildlife Management Actions (including those for listed species). From the LCNCA RMP and ROD, page 72, refer to the Riparian and Aquatic Habitat Objectives. Conflicts with land use plans have been identified in past agency comments regarding the inclusion of Cienega Creek and Empire Gulch into the "analysis area." See also: http://www.blm.gov/wo/st/en/prog/planning/nepa/webguide/40_most_asked_question

	value of the habitat in these areas. Cienega Creek is modeled to experience less drawdown over a much longer period of time. Riparian vegetation could potentially experience less impact, although the potential exists for reduction of surface flows during critical times of the year. This could impact the hydrologic and biological value of this habitat.	s/questions_20-29.html 23a. **Conflicts of Federal Proposal With Land Use Plans, Policies or Controls.** How should an agency handle potential **conflicts** between a proposal and the objectives of Federal, state or local land use plans, policies and controls for the area concerned? See Sec. 1502.16(c). A. The agency should first inquire of other agencies whether there are any potential conflicts. If there would be immediate conflicts, or if conflicts could arise in the future when the plans are finished (see Question 23(b) below), the EIS must acknowledge and describe the extent of those conflicts. If there are any possibilities of resolving the conflicts, these should be explained as well. The EIS should also evaluate the seriousness of the impact of the proposal on the land use plans and policies, and whether, or how much, the proposal will impair the effectiveness of land use control mechanisms for the area. Comments from officials of the affected area should be solicited early and should be carefully acknowledged and answered in the EIS.
DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Special Status Species/Plants/Pima pineapple cactus /393	All action alternatives would result in direct impacts to Pima pineapple cactus and Pima pineapple cactus habitat owing to the placement of electrical and water transmission lines and associated access roads.	Electrical and water lines could be placed under existing roads wherever possible in order to limit to disturbance to Pima pineapple cactus and its habitat.
DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Special Status Species/Animals/Gila chub /397	Direct impacts to Gila chub are not anticipated as a result of this project because there is no habitat and no known occurrences of this species within the footprint of the proposed mine or near the confluence of Davidson Canyon and Cienega Creek.	Monitoring data for Gila chub in Cienega Creek and Empire Gulch is incomplete. See BLM Manual 6840.1F5a above.

DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Special Status Species/Animals/Gila topminnow/397	The Gila topminnow is known to occur within the analysis area in Cienega Creek and may be affected by groundwater drawdown and decreased stream, seep, and spring flows within the analysis area; however, these indirect impacts are not anticipated to begin until 50 years after project closure.	Monitoring data for Gila chub in Cienega Creek and Empire Gulch is incomplete. See BLM Manual 6840.1F5a above.
DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Special Status Species/Animals/jaguar /398	Direct impacts to jaguars are not anticipated as a result of this project: the species' occurrence in Arizona is considered rare, this species has not been observed within 20 miles of the analysis area since 1961, and it is expected that the action area does not contain suitable breeding habitat for this species.	Jaguars have been documented since 1980 in the area from the Peloncillo Mountains west to the Baboquivari Mountains in Sky Island mountain ranges and from the international boundary north to Interstate 10. Based on recent documentation of jaguar in southeastern Arizona near the action area, data does suggest that appropriate habitat does occur in the action area for jaguar. The possible designation of jaguar critical habitat may include such elements as: consideration of space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species. Due to recent documentation of jaguar in southeastern Arizona near the action area, survey through camera trapping for the species should occur within the resource analysis area for purposes of this project and could be conducted concurrently with ocelot survey. See BLM Manual 6840.1F5a above.
DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Special Status Species/Animals/lesser long-nosed bat/398	All action alternatives would directly impact at least one known lesser long-nosed bat postmaternity roost site within the footprint of the proposed mine. All action alternatives would result in indirect impacts to potential lesser long-nosed bat forage plants (i.e., paniculate agaves) in the late summer	Roosts and foraging areas within the project area for lesser long-nosed bat were identified in the technical report (Westland Resources 2009). Although compensation is not addressed in the USFWS lesser long-nosed bat recovery plan (1994), mitigation and compensation should be considered for destruction of occupied and potential foraging and roosting habitat. Please see the following excerpt from the lesser long-nosed bat recovery plan: "Protection of all known roost sites and food plants within a radius of 50 miles (81 km) around known roosts will help to prevent this species from going extinct. Protection of food resources along migratory pathways may also be important to the survival of the species."

	range of the species.	
DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Special Status Species/Animals/ocelot /399	Direct impacts to ocelots are not anticipated as a result of this project: the species' occurrence in Arizona is considered rare, this species has never been documented as occurring within the analysis area, and it is expected that the action area does not contain suitable breeding habitat for this species.	Due to five recent documentation of ocelot in southeastern Arizona, survey through camera trapping for the species should occur within the action area for purposes of this project. See BLM Manual 6840.1F5a above.
DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Special Status Species/Animals/southwestern willow flycatcher/400	None of the action alternatives are expected to result in direct impacts to southwestern willow flycatcher because there are no known occurrences of, or suitable habitat for, this species within the footprint of the proposed mine or within Barrel or Davidson canyons. There is one documented occurrence (in 2001) of the southwestern willow flycatcher within the analysis area in Cienega Creek, and suitable habitat for this species is also present in Empire Gulch.	Willow flycatcher at Empire Gulch were documented with the "fitz-bew" call per USFWS protocol on a territory just west of net #10 of the Empire Gulch Monitoring Avian Productivity and Survivorship (MAPS) station on 08 and 17 June 2011, listed as "probable breeder-song" for these dates of the Empire Gulch MAPS station, an after-hatch-year willow flycatcher was caught in net #10 on 17 June 2011, and a hatch-year bird was caught on 06 August 2011 in net #7 of the same MAPS station (M. Radke, pers. obs.). This was reported as such to USFWS and AZGFD per scientific collecting permit requirements. Willow flycatcher were also listed as "likely breeder" for the 2011 year status for the Empire Gulch MAPS station (M. Radke, pers. obs.). From 76 FR 50544: "A territory is defined as a discrete area defended by a resident single flycatcher or pair of flycatchers within a single breeding season (Sogge et al. 2010, p. 34). This is usually evidenced by the presence of a singing male, and possibly one or more mates (Sogge et al. 2010, p. 34). In addition, a southwestern willow flycatcher was documented on Cienega Creek during formal surveys on 7 August 2003 (Keith Hughes, BLM files). A willow flycatcher was also documented at the Empire Gulch MAPS station on 27 July 2006. Also include in the BA the discussion of proposed critical habitat on Cienega Creek from 76FR 50542-50629: "The Santa Cruz River and Cienega Creek segments were identified in the Recovery Plan as areas with substantial recovery value (Service 2002, p. 91). These two segments are anticipated to provide flycatcher habitat for metapopulation stability, gene connectivity through this portion of the flycatcher's range, protection against catastrophic population loss, and population growth and colonization potential. As a result, these river segments and associated flycatcher habitat are anticipated to support the strategy, rationale, and science of flycatcher conservation in order to meet territory and habitat-related recovery goals."

		See BLM Manual 6840.1F5a above.
DEIS/Chapter 3/Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Special Status Species/migratory birds /401	For all action alternatives, take (manifested as wound or kill, especially for eggs and nestlings) is expected to occur but would be unintentional, as the purpose of the action is extraction of minerals, rather than taking of birds.	Take of migratory birds does not need to be intentional for take to occur.
DEIS/Chapter 3/ Environmental Consequences /Direct and Indirect Effects of Each Alternative/Impacts Common to All Action Alternatives/Special Status Species		Documentation of karst species should be completed. There is lack of information in the technical reports on possible endemic or obligate subterranean species. Obligate subterranean species are concentrated in various hotspots, and levels of endemism in cave fauna may be unparalleled in any other fauna or flora (Jones et al. 2003). Yet, information on subterranean species within the project is lacking. This very critical ecological component of the karst environment within the project area should not be overlooked.
DEIS/Chapter 3/Affected Environment and Environmental Consequences/ Biological Resources		Actions that are yet not proposed may still need to be analyzed in cumulative effects analysis if they are reasonably foreseeable (BLM H-1790-1, Section 6.5.2.1). Actions are connected if they automatically trigger other actions that may require an EIS; cannot or will not proceed unless other actions are taken previously or simultaneously; or if the actions are interdependent parts of a larger action and depend upon the larger action for their justification (40CFR 1508.25 (a) (i,ii,iii). If any planned future pits would rely on the infrastructure in place from the current proposed pit, future pits may be a connected action under NEPA and have not been analyzed in this EIS.