Rosemont Mine Supplemental Information (Draft of March 01, 2015) Report Review
Bureau of Land Management Comments

Introduction and Background

The Bureau of Land Management (BLM) is charged with the protection and conservation, in perpetuity, of the significant resources located within the Las Cienegas National Conservation Area (LCNCA). We appreciate the effort the US Forest Service, Coronado National Forest has taken to analyze the impacts of the proposed Rosemont Copper mine project through its Final Environmental Impact Statement (FEIS) and draft Supplemental Information Report (SIR). As a cooperating agency, we look forward to continuing work together throughout this evaluation process.

After review by BLM Arizona including the Tucson Field Office, we remain concerned about potential impacts to waterways and associated riparian resources within LCNCA, including impacts described in the FEIS and draft SIR. USFS analysis demonstrates adverse impacts to Empire Gulch and Cienega Creek that BLM believes are inconsistent with the purposes of LCNCA.

In an effort to complete a robust analysis and reduce uncertainty regarding these impacts, please accept BLM's comments and recommendations, found below. Specifically, there remains uncertainty in the draft SIR regarding the impact of the preferred alternative on groundwater that sustains Empire Gulch and Cienega Creek. BLM encourages the project team to take additional steps in the Final SIR, or subsequent documentation, to further refine this analysis specific to LCNCA so that BLM can conclude, with adequate basis, whether the conservation values of this important landscape are reasonably protected.

Cumulative Impacts, Page 10, first bullet

> *The BLM proposes to approve an MPO to expand the Andrada Mine limestone quarry in the Davidson Canyon drainage system north and northeast of the Santa Rita Mountains. The Andrada Mine is located approximately 4 miles from the Tucson, Arizona, city limits and 1 mile from the Vail, Arizona, city limits. This expansion has the potential to impact paleontological resources should they exist in the areas proposed for disturbance.*

The BLM has not finalized its environmental analysis of the Andrada proposal as required under NEPA. BLM will make a decision concerning the proposed Andrada Quarry expansion proposal upon completion of the environmental analysis.

BLM Recommendation: Remove reference to the approval of the Andrada Quarry MPO.

The Andrada Quarry is not located in the Davidson Canyon drainage system. The ephemeral washes draining the Andrada Quarry site drain directly to the Santa Cruz River.

The proposed Arizona Portland Quarry (CalPortland) straddles Davidson Canyon on AZ State Trust surface estate and state and federal mineral estate. Any updates to the status of this proposed quarry should be disclosed here. The U.S. Army Corps of Engineers may be able to provide information on the current status of their environmental review of the proposed CalPortland project. Also note that Vail, AZ is not an incorporated city.
Any changes in the status of the Imerys - Santa Rita Quarry on Forest Service lands should be disclosed here. The status of the quarry remains unchanged on the portion of the quarry on BLM administered lands.

BLM Recommendations: Correct the description of the watershed location of the Andrada quarry. Confer with US Army Corps of Engineers on status of their environmental review of proposed CalPortland project in Davidson Canyon. Ensure that most up to date information on Imerys-Santa Rita Quarry on Forest Service lands is included.

On page 65, discounting the consistent upward trend in the number of well extractions in the Sonoita area underestimates the impacts of future pumping of groundwater within the Cienega Creek groundwater basin to streamflow on Cienega Creek within the LCNCA.

The cumulative effects of similar past, existing, and reasonably foreseeable activities affecting the groundwater resources affected by the Rosemont Project have not been adequately addressed and disclosed. Considering Cumulative Effects Under the National Environmental Policy Act, Council on Environmental Quality, January 1997 [http://ceq.hss.doe.gov/publications/cumulative effects.html], provides a framework for scoping, describing, and analyzing cumulative effects in NEPA documents.

BLM Recommendation: The existing upward trends in well extractions in the watershed, particularly in the Sonoita area should be included in the cumulative effects analysis. Additional information as described in BLM's comments in the Groundwater Quantity section below may be necessary for this analysis.

Air Quality and Climate Change, page 14:

> *Specifically, for each alternative, the analysis assumed the first 25 haulage trucks would have Tier 2 engines and the remaining trucks would have Tier 4 engines*."… "*haulage trucks represent the largest amount of emissions from the mine equipment (roughly 80 to 90 percent).*

It is unclear how many of each type of truck (Tier 2 and Tier 4) will be utilized and what the rationale used to determine the mix of trucks is. Has Rosemont committed to purchasing Tier 4 engines when available? Will Tier 4 engines be available in a timely manner to allow Rosemont to limit the purchase of Tier 2 trucks to the specified 25 trucks?

BLM Recommendations: The rationale used to determine the mix of Tier 2 and Tier 4 engines should be provided as well as the estimated total numbers of trucks both Tier 2 and Tier 4.

Groundwater Quality

The BLM continues to have specific concerns about the modeling used in the EIS and SIR as the modeling continues to be a source of uncertainty in the prediction of impacts to the significant water resources of the LCNCA and the biological communities dependent on those water resources.

On page 16: "*In January 2015, Rosemont Copper provided updated monitoring results for groundwater wells, springs, and surface water monitoring, including groundwater levels (Hudbay Minerals 2015e).*"

Pre-monsoon monitoring in late June or early July would produce better monitoring results to obtain a fair and accurate understanding of the stress period for LCNCA water resources.

Also on page 16: "*Several modeling issues were reviewed as part of the Section 7 discussions between May and November 2014. None of these were pertinent to the overall groundwater quantity analysis, as they focused specifically on distant water sources at Empire Gulch*."

The "*distant*" water resources within the LCNCA are exactly what concern the BLM. The purpose of the models is to provide predictions of the impacts of the alternatives where resource concerns exist. The models used are inadequate for evaluating impacts to distant, but important, surface waters.

The use of constant head boundary conditions artificially allows the model to provide an unlimited supply of water to the Cienega Creek valley. The water balance in Tetra Tech's calibration shows that 60% of the water budget is unrestrained flow in and out of the external model boundaries; and it appears (per contours) that the external inflow is modeled primarily as inflow from the Whetstone Mountains (we know that the largest recharge basin is in the Santa Rita Mountains), which should have been constrained with a recharge estimate for the area between the model boundary and the Cienega basin boundary. Apparently the model has a large flow through the Cienega Basin which could limit the modeled extent of project impacts to the

southeast into the Cienega Basin. The high inflow from the boundaries may control the ET and streamflow discharges.

The groundwater model discounts cumulative impacts of existing and projected wells and groundwater uses in the basin. With a growing number of wells, groundwater pumpage in the Sonoita area has been an issue of much discussion. This is not a matter of "relative amounts" in a basin-wide water budget. It is a matter of localized site specific impacts. The cumulative amount used by "exempt" wells is significant. It is often the largest cumulative total usage by type. The cumulative effects of existing wells and the estimated reductions of stream flow are foreseeable and significant in the Cienega Creek Basin. It should not be assumed that pumpage is "*negligible*". How was the 400 – 500 AFA estimated for the FEIS? This estimate is not negligible when compared to small and sensitive stream flows within the Las Cienegas National Conservation Area (LCNCA). An inventory of all wells and pumping rates within the basin is necessary information to more accurately analyze impacts to local wells and is not "prohibitively costly and time consuming". It should be conducted to provide a much higher level of confidence in the model predictions. Much/most of the necessary information is available from ADWR records. 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.

BLM Recommendation: Clarify the estimation of 400-500 AFA contained in the FEIS. Complete a sufficient inventory of all wells and pumping rates within the Cienega Creek basin for utilization within groundwater models.

"It is recognized that while pumpage in the basin was not able to be quantified and modeled, pumpage in the basin is increasing, and lack of modeling of this pumpage could 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 from dewatering of the mine pit; therefore, the model may not be appropriate for use elsewhere in the basin without additional revision."

Using basin-wide water balance (budget) to analyze impacts of mine pit lake evaporation losses to local sites such as specific water sources is not valid because it lumps the water budget of the entire basin but fails to address localized site specific impacts (localized aquifer affects) such as those affecting the water and wetland resources of the LCNCA.

Using the full period of stream gage flow record, including flood peak flows instead of a low flow analysis to analyze impacts to baseflows in Cienega Creek masks impacts to Cienega Creek. Peak flows are not controllable or detectably affected by groundwater levels.

BLM Recommendation: Before analyzing potential impacts from declining groundwater levels to riparian habitat in the creek, flood peak flows should be hydrographically separated from baseflows which are critical to aquatic and riparian habitat maintenance during the driest summer times of the year.

The SIR did not address BLM's concerns with calibration inadequacies also contributing to questionable model results and uncertainties that have yet to be addressed. Pump testing only five (5) wells is not enough to accurately calibrate the finite difference transient model, especially when using a homogenous porous media structure in this fractured rock geology. The absolute residual mean of calibration and range of observed values should be provided, as well as the residual standard deviation divided by the range of observed values. Calibration difficulties are further evidence of the uncertainties presented by using a homogenous media model to model a fractured rock system.

"The groundwater modeling experts contracted by the Coronado determined that the reasonable limit of certainty of the groundwater models is the 5- to 10-foot drawdown contour (Ugorets et al. 2012a). Within this contour, the groundwater models would be able to reasonably predict changes to wells, springs, and streams. Changes below this threshold are beyond the capabilities of the models to accurately predict."

"While drawdown of less than 5 feet could cause impacts to springs and surface waters, natural variability in groundwater levels is already causing changes of this magnitude in the vicinity of sensitive surface waters in the analysis area."

The 5-foot drawdown contour is not appropriate because "*natural variability in groundwater levels is already causing changes of this magnitude in the vicinity of sensitive surface waters in the analysis area*." Cienega Creek's perennial base-flow water levels are only inches deep and do not vary by 5 feet, or it would not be perennial.

Precipitation for the mountain peak location from the NOAA Atlas 14 90% Confidence Interval should have been used for the mountain-front recharge estimates in the model instead of Nogales, Green Valley, Vail, Tucson and other distant lesser elevation locations.

Insufficient well areal coverage of the Cienega basin and questionable hydraulic conductivities add further uncertainties to model results and to any other analyses based on those same model results.

Incorrect assumptions on alluvial recharge contributions to perennial base flows raise uncertainties to FEIS conclusions. Any contributions from shallow alluvial sediments are secondary and superimposed on top of regional groundwater levels and would quickly subside to underflows if the regional groundwater levels diminish significantly. The source of perennial flows in Cienega Creek and Davidson Canyon is more likely to be a combination of storage in the limited sediments and banks and groundwater contributions from the regional aquifer – not just bank/sediment storage. These perennial flows persist through long periods of many dry years and are more than that which could be supported by bank/sediment storage alone. The regional bedrock aquifer is likely to be the more significant source for perennial flows.

Incorrect analysis of impairment/reduction mountain-front recharge also raises uncertainties to FEIS conclusions. The loss of mountain front and respective mountain-front recharge that the mine pit would cut-off, would affect mountain-front recharge.

Also on page 16: "*Additional groundwater levels were obtained from Rosemont Copper. Groundwater contours were disclosed in the FEIS; these contours are based on analysis of a large number of wells and groundwater levels throughout the basin. The updated groundwater levels obtained from Rosemont Copper are similar in nature to those observed previously and, when considered with all other groundwater levels, would not change the overall groundwater depths and flow directions disclosed in the FEIS*."

The new information provided by Rosemont Copper is not provided in the SIR appendices. Please append this new information to the SIR.

Also on page 16 the report states that one of the measurement factors included was "*Comparison of mine pit water loss by evaporation with overall basin water balance*." This is not a valid analysis for estimating impacts to local water sources such as the significant water resources within the LCNCA because it lumps the water budget of the entire basin in the comparison and does not address localized site specific impacts.

On page 17: *"Analysis of impact to individual wells was not undertaken in the FEIS, as inadequate information exists to do so in a credible manner. Instead, the overall number of wells that would be impacted by certain levels of drawdown was estimated (see table 66, FEIS, p. 353)."* Therefore, following the same logic, impacts to any specific "*individual*" water source within the LCNCA cannot be analyzed in a *credible manner* either.

Groundwater Quality

The pit's bottom and sidewalls will be fully exposed to air and water (*rapid weathering*), and located in a fractured rock formation. All of the constituents identified as present in leaching

from source rocks in the SIR have not been analyzed and reported in the supporting geochemical modeling report for a complete evaluation of possible impacts to groundwater quality. All of the constituents identified as present in leaching from source rocks in the geochemical modeling report should be analyzed and reported for a more complete evaluation of possible impacts to groundwater quality. Specific byproducts in tailings seepage could be discharged to the environment. Geochemical modeling should have been revised to attempt to incorporate the chemical byproducts that do not have specific aquifer water quality standards, but which can have detrimental environmental impacts.

As the heap leach alternative remains in the EIS, a detailed fate and transport modeling of these scenarios should be conducted. Groundwater flow directions under the heap leach facility are difficult to accurately predict in a fractured rock aquifer, especially when modeled as a homogenous porous media.

Surface Water Quality
Water quality in Cienega Creek can be affected by the diminishment of groundwater which reduces oxygen levels and increases surface water temperatures as well as the resultant concentrations of sediments and other physical, chemical and biological parameters.

Predicted seepage and evaporation rates, as analyzed, cannot dismiss the possibility that any precipitation infiltrating the waste rock or tailing, and from the heap leach pad if the preferred alternative is not chosen, would percolate into the fractured rock aquifer and be transported to surface waters via fractures.

Additional Observations of Aquatic Environment, page 32
Drought and pumping must be considered together impacts they cannot be easily separated and are cumulative.

Additional Technical and Scientific Literature Reviewed, page 32
New data also include wetland location and areal extent data provided by the Desert Botanical Garden. Data on channel characteristics and trend was available from BLM but was not requested and utilized. Instead the Forest Service chose to collect more current data. Summary information was provided in Gita Bodner, Jeff Simms, and Dave Gori, State of the Las Cienegas National Conservation Area: Gila Topminnow population status and trends 1989-2005

New Information or Changed Conditions,
page 34
Wetland data provided by the Desert Botanical Garden constitutes new data relevant to the impact analysis.

page 35

> *"SWCA Pool Depth Survey. The pool depth survey represents a new piece of information describing baseline conditions on Cienega Creek and Empire Gulch. Prior to this survey and the wet/dry mapping, very little was known about the number, extent, and depth of pools on Cienega Creek and Empire Gulch. Analysis of these pool depths has been incorporated into the refined analysis of aquatic impacts contained in this SIR."*

This data was available and available in great detail for 1990 and 2010. Instead of using current data at locations previously inventoried, the Forest Service chose to collect more current data at a larger diversity of sites. One of the sites was dry in 2010, indicating that the surface water was contracting as a result of inadequate groundwater supplies.

Stream Flow, page 37

> *"Stream flow measurements on Cienega Creek Reach 2 have been taken manually by the BLM since April 2006, approximately monthly. June stream flow shows a downward trend (see appendix C, figure C1), while October/November stream flow (see appendix C, figure C2) and overall stream flow (see appendix C, figure C3) remain steady with no statistically significant trend."*

This statement has much biological significance. Averages provided in tables and text are not very useful for analysis of aquatic environments in semi-arid regions. Stream flow is based on groundwater discharge which diminishes until the summer rains arrive in late June to mid-July. In June and July habitat quantity and suitability are affected by diminished or absence of surface flow. Pools in gaining reaches are supported by sub-flow entering and exiting pools while those in loosing neutral or losing reaches often become stagnant. Most of the data presented needs to have extremes presented as well as averages.

Temperature effects are not discussed in the biological impacts section and need to be addressed. It should be noted that sites monitored are in locations where groundwater ameliorates thermal gain. Temperatures in losing reaches downstream are likely to have a greater temperature flux.

Wet/Dry Mapping, page 39

> *"Wet/dry mapping has been conducted on Empire Gulch and Cienega Creek from 2006 through present. The past 2 years of mapping (2012 and 2013) have had the least amount of measured wetted stream length, suggesting a trend toward degrading aquatic habitat. However, when analyzed, there is no statistically significant trend (see table 2 and appendix C, figure C18)."*

If the wet dry conditions assessed for 1990 (pre-GIS and GPS) are taken into account the change is rather large (40%). 2006 is in the middle of a drought and has the additive impact of prolonged GW pumping in the basin.

Summary of FEIS Analysis Methodology and Impact Conclusions, page 42

> *The assumption "That the cross-section at the gage location was similar in nature to elsewhere along upper Cienega Creek, Empire Gulch, and Gardner Canyon; and.."*

This is a misstatement. The cross section here is unique to the system. It is in a bedrock slot (narrow and deep and was created by incision through crumbling shale geology). The unique cross section of this site made it suitable for a gaging station where most other locations visited were not suitable.

Refinements to Analysis of Impacts to Stream Flow, page 43

The baseflow in most years diminishes beyond June into July depending on the initiation of monsoon conditions. The wet dry data does not show minimum conditions but in most years is a close approximation. In years when the monsoons are later than usual the stream continues to diminish in extent and pools continue to dry.

New Analysis of Impacts to Refugia Pools, page 46

> *" However, the overall geomorphology of each key reach is assumed to remain similar, since substrate, slope, and bedrock controls would remain similar. In other words, even if the pools change or migrate, the overall number of pools per reach should remain similar."*

Page 48 - Table 5

> *"Assumes complete and direct hydraulic connection between flowing stream, shallow alluvial aquifer, and regional aquifer."*

Other factors need to be included in the analysis. When surface flows in streams contract in losing reaches above perennial reaches, riparian and semi-aquatic herbaceous plant vigor will decline. This is already the case near the Cienega Ranch Wetland, the reach below Gardner Canyon and below Apache Canyon. Surface flow has largely ceased in these reaches during the spring leading to reduced plant vigor, resulting in concomitant soil loss from banks and beds (accelerated erosion). This sediment is moved by floods and often fills in pools. This mechanism has been observed along Cienega Creek. In addition pools that may have some benefit as refugia do not have that value every year, under current circumstances, as ephemeral tributaries produce sediment slugs that fill in shallow pools eliminating most of their depth, volume, and hiding cover. This situation often results in sub-surface flow or a thin ribbon of surface flow through

some or all pools in a reach, rendering them unsuitable for aquatic animals until flows with a smaller sediment load excavate the pools in subsequent years.

Figure 1. Hydrogeologic framework of key reaches, page 51
The geologic units would provide more of a context if faults were depicted as well.

Seeps, Springs, and Riparian Areas
Summary of Applicable New Information and/or Changed Conditions
Water-level declines in stream channel reaches with riparian vegetation could result in reductions in plant health, density, and distribution. The regional water table would not have to be lowered beyond the root depths to cause canopy dieback in vegetation that is dependent on groundwater. Riparian vegetation will begin to suffer as soon as groundwater levels begin to decline. Vegetation will definitely die when levels fall below the root zones, but impacts including mortality can and usually do occur commensurate to declines. Stressed trees are much more susceptible to insect infestations and disease as water levels decline. Recruitment of young tress is also affected early in the diminishment of baseflows and groundwater levels. More shallow rooted riparian vegetation can be expected to be stressed with smaller declines in the water table. The effects on riparian vegetation in Empire Gulch must be specifically analyzed.

Analysis of Impacts to Stream Flow
Methodology for Translating Groundwater Drawdown to Stream flow Loss
On page 57, the 1:1 relationship is equally valid for streamflow or standing pools. The only caveats are that discharges from the younger alluvium can temporarily augment levels in both lentic and lotic water bodies; and in reaches with shallow underlying bedrock (*geologic shunting*), water levels are sustained longer because upstream flows reaching the site are constrained and kept close to the surface. Any empirical stream flow/groundwater level relationship replacing the 1:1 stream depth/groundwater level relationship should not be used without full peer review.
Also on page 57, the statement that "*There will be a stress placed directly on the regional aquifer, not on the shallow alluvial aquifer*" is not completely correct because the two aquifers are in hydraulic connection. Therefore, the shallow alluvium aquifer would be indirectly stressed. Without the underlying water levels of the regional aquifer, the water levels in the younger alluvium cannot be sustained.

Table 10. Predicted flow status, page 63
The table indicates that Empire Spring (EG1) would be perennial with a water table decline from 0.2 to 1.0 feet. This conclusion does not seem consistent with real-world situation at Empire Spring. The water surface elevation of water pouring out of the spring source pool is less than

0.2 feet. At that change in groundwater elevation, the pool would be full, but not flowing out into the spring brook below. Therefore, surface flow would likely become subsurface flow.

Table 33, page 85

Median changes are not nearly as important to fish as the extremes. Less than one day without water kills fish. Water that is low and is not getting oxygenated can result in stress and mortality to fish. In pools without flow is common to get a cover of diatoms on the water's surface. As the diatoms die they expel their contents (oil) and this caps the water reducing gas exchange that leads to dissolved oxygen levels below the critical threshold. Drawdown in pools increases access of fish and frogs to predation. Since the pools do not drop to the same level in a reach, impacts will differ between pools in the same reach.

Methodology for Predicting Impacts to Riparian Vegetation, page 88

> *"It should also be noted that during discussions between May and November 2014, numeric thresholds that might trigger negative feedback loops were not identified, except that very small increments of change were significant."*

The discussion of negative feedback loops in riparian habitat was centered on areas with vegetation already showing signs of stress from lack of water. The word small was to indicate changes in depth on the order of feet which is consistent with accuracy and precision of modeling outputs. Predictions of groundwater declines of less than one foot are not reasonably estimated as indicated in the EIS.

Table 36, Results of refugia pool analysis for modeling scenarios combined with climate change – number of pools remaining under no-flow conditions, Page 89

During the wet-dry monitoring on Cienega Creek and Mattie Canyon, local variation in depth, depth to bedrock, or other confining material results in a variety of pools with water, without water, and shallow water. Field reconnaissance during late June or early July would make these characteristics of the system clear to the author(s) that conducted the analysis. Modeling (calculating) tends to simplify, generalize, and estimate what can easily be observed and measured empirically.

Biological Analysis – General Comments

General Statement - Analysis is largely geared to abiotic analysis, with less of an emphasis on biological resources.

The SIR attempts to quantitatively estimate the loss of habitat. The analysis overly simplifies the aquatic and riparian system and potential impacts. In addition, the hydrologic models used all rely on similar hydrogeologic inputs and assumptions based on a limited evaluation of the

hydrogeologic setting at the site and basin scale. These generalizations and assumptions are likely to result in some unknown level of error that will only be known should the implementation of the mine occur as planned.

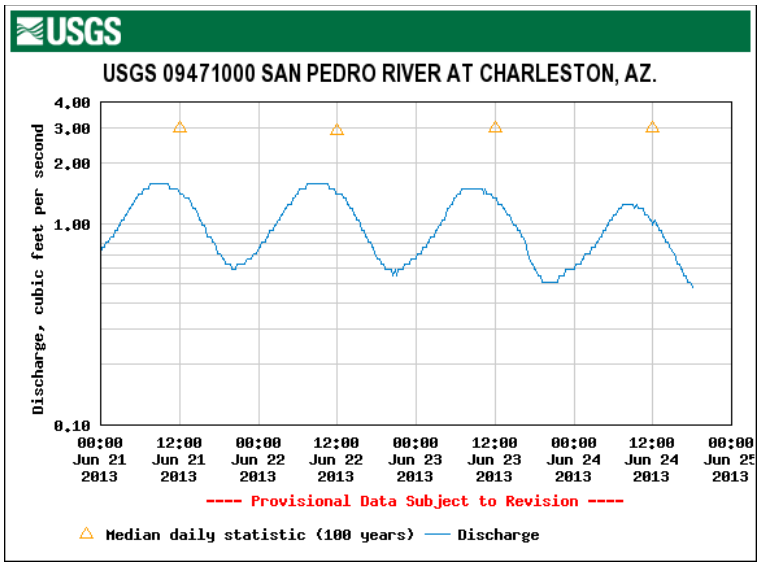
That being said, important factors include pool stagnation and high detrital loads on Cienega Creek and Lower Empire Gulch which have been observed in conjunction with dissolved oxygen levels that will not support fish. Pools in this state do not provide "refuge" for fish prior to the summer rains. In some locations the low water levels leave water in pools, but adjacent banks and channel connecting them are too dry to support aquatic plants such as HWU.

The report does not recognize the gradient of water depths that occurs along Cienega Creek. Additionally, it does not fully recognize the increase in stress on vegetation that is already in poor health in areas where water levels are already impacted by drought and ground water withdrawal elsewhere in the basin; this water stress would spread from addition reductions in ground water elevation that may result in contraction within both the herbaceous and tree components of the riparian community. Negative feedback processes are likely to occur in these areas affecting adjacent stream reaches. When these reaches erode with flood events, the sediment will temporarily fill pools. In some cases the surface water will be temporarily "smothered" leaving behind local areas that can be described as quicksand. Such conditions have been observed to wax and wane for years in Mattie Canyon and Cienega Creek below Wood Canyon.

While the current literature review in the SIR on riparian function in relationship to groundwater levels was enlightening, literature concerning cause and effect feedback loops is not evaluated. Field observation provides information that demonstrates the process, even though that process has not been quantified and thresholds determined. Since the hydrologic modeling can provide only coarse estimates of aquifer drawdown in the vicinity of the LCNCA, the process itself provides insight into risk of aquatic ecosystem degradation. Observations by trained field biologists and hydrologists were labeled as "anecdotal." While these field observations were not followed by empirical studies, the use of careful observation by trained professionals is useful to conceptualize and verify the existence of ecological processes described in the body of scientific literature.

The SIR attempts to provide close approximations of effects to aquatic habitat and riparian function from small increments of drawdown using data collected during a wet winter when stream discharges are greatest and effects from a complex set of environmental conditions are not apparent. In June and July, groundwater elevation are reduced, but other factors are also at play including diurnal swings in groundwater elevation from the effects of evapotranspiration that cause pool depths and surface water extent to rise and fall daily. Measurements of pool

depths in the morning will be much greater in the morning than afternoon when they may actually be dry.
Example of this process from the Charleston stream gauge on the San Pedro River -



While Gila topminnow and longfin dace can survive in thin ribbons of water and shallow pools, adult Gila chub are not likely fare as well.

Present Actions, page 115

> *"The BLM proposes to approve a decision for programmatic aquatic special status species reintroductions at Las Cienegas NCA. This was addressed as a reasonably foreseeable action in the FEIS; however, it is currently being implemented. A new document provided by BLM after publication of the FEIS provides updated information and documentation of the BLM proposal to reintroduce aquatic special status species at Las Cienegas NCA."*

This set of management actions has been ongoing since May 2012. It is being implemented by AGFD and FROG project through the Cienega Creek Partnership (CWP) that received a $379K grant from NFWF in 2010.

Past Actions, page 118, last bullet in section
Typo: The snake's name is "northern" Mexican gartersnake.

Huachuca water umbel (Lilaeopsis schaffneriana var. recurva)
Summary of Applicable New Information and/or Changed Conditions, page 120
New information also provided includes a Huachuca Water-umbel survey conducted by Simms and Anderson 2011. This comprehensive survey was conducted with the help of a BLM botanist

in 2011. 100 patches were located throughout Cienega Creek, a few locations in Mattie Canyon and a single location in lower Empire Gulch.

Desert Pupfish, Direct and Indirect Impacts, P155

> *"No impacts are expected to the desert pupfish in the Empire Wildlife Pond into which they have been reintroduced because the Empire site currently receives water from surface runoff as well as being supplemented by groundwater pumping."*

The primary source for this pond is well water as the watershed is approximately one acre. This is not enough to sustain open water at this pond.