Comment Location (Chapter/Section/Page/Line)	Comment / Rationale / Basis
	CORONADO NATIONAL FOREST PLAN
Ch 2/93-95	Rosemont's preliminary MPO and CNF's preferred Barrel alternative is inconsistent with the current Coronado National Forest Plan, which must be amended to accommodate the proposed mine. The Department emphatically disagrees that amending the Coronado CNF Plan to create the proposed 'Management Area 16" to be carved out of the Coronado (as shown on Figure 19 on p. 94) to accommodate the Rosemont Mine "would likely not be a significant amendment to the Coronado CNF plan" and "would not have wide-ranging effects across the Coronado National CNF". By finding the amendment to be "not significant" CNF avoids the need to undergo NEPA review of the Plan amendment. "A proposed amendment that may create a significant environmental effect and thus require preparation of an environmental impact statement is considered to be a significant change in the plan. If a proposal for amendment requires the preparation of an environmental impact statement, the responsible official must give public notice and an opportunity to comment on the draft environmental impact statement for at least 90 calendar days". 36 CFR § 219.8. To justify this preliminary decision, CNF apparently relies on net reduction calculations of current Livestock grazing, wildlife habitat, semi-primitive dispersed recreation, and riparian areas (as shown in Table 6 on P. 95) (e.g., reduction of wildlife /grazing areas is 7,826 acres, representing "only" 0.69% of the CNF-wide acreage). But CNF's apparent reliance on this statistic ignores not only the breadth of permanent surface disturbance of "Proposed Management Area 16" but ignores the project's potential impacts on the remainder of the Coronado National Forest, such as negative impacts to 13,427 acres within the Santa Rita Ecosystem Management Area with high scenic characteristics; 245,000 acres with project visibility; light pollution; air pollution, including NAAQS exceedances for air particulates; losses of springs and seeps, noise, transportation and public health and safety. The proposed Coronado Plan amendment is significant and requires compliance with NFMA, 16 U.S.C. § 1604(f)(4) involving consultation with other agencies and public involvement.
	SANTA CRUZ SUBBASIN WATER QUANTITY
Ex. Sum/xxiii	The text states that the geographic extent of groundwater drawdown from the Rosemont production wells in the Santa Cruz subbasin will be as great as 70 feet adjacent to the Rosemont production wells and 10 to 15 feet approximately 3 to 4 miles from the Rosemont wells for the first 20 years of pumping. The drawdown will continue to expand for an additional 1-2 miles for up to 140 years after completion of pumping. The DEIS does not disclose or describe (1) adverse effects to Santa Cruz river and other riparian areas or vegetation due to lowering of water table and ancillary losses of wildlife habitat nor (2) describe possible mitigation strategies. The Department first raised the issue of the impact of a lowered water table for wildlife habitat in the Santa Cruz River in its July 8, 2008 letter to CNF in response to the NOI to prepare an EIS for the proposed Rosemont Copper Mine. This question remains unanswered in the DEIS text.

Ch 3/208, 215	The text states: "Furthermore, an inventory of all wells [in the Santa Cruz subbasin] with the necessary information to assess impacts (depth, screened interval, pump setting, current water levels) does not exist and would be prohibitively costly and time consuming to create." (Emphasis added). This statement is neither factual nor accurate. The Arizona Department of Water Resources maintains a database of registered wells throughout the state and each well's construction details, which are public records. Although this database is not comprehensive, it is the official record of wells in the state. Such databases are routinely constructed for regional water resource investigations. An identification of current registered wells, as well as projections of future demands on the water table, is essential to accurately tally present and future projected impacts to the regional water table and its associated effects on riparian areas, vegetation, and wildlife. **Figure 1** (supplied by the Arizona Game and Fish Department) is based on the ADWR well database, and displays a preliminary database for wells near the mine water supply pumping wells. These wells have been categorized for the level of drawdown expected after 20 years of pumping for water supply. Clearly a database and similar figures can be constructed to quantify present and future well drawdown impacts on the regional water table over the estimated 140 years of groundwater drawdown in the Santa Cruz subbasin caused by the Rosemont Mine. The EIS is required to accurately disclose all adverse impacts for public disclosure, including cumulative impacts.
Ch. 3/229	The text states: "The Town of Sahuarita has indicated that the continued pumping of groundwater from the region that serves Sahuarita residents does not meet the Town of Sahuarita objective of encouraging water providers to evaluate water demand within the Town of Sahuarita to ensure the rate of use does not exceed a potential future supply. The Town of Sahuarita has also indicated that the planned pumping conflicts with a Town objective of encouraging water providers to use alternative water sources and water conservation methods and strategies by all users requiring large quantities of water." The EIS should discuss the current and long-term impacts of the Rosemont production well groundwater drawdown on the Town of Sahuarita's water conservation plans and programs, as well as the Town's plans for the preservation of native wildlife and vegetation, the conservation and preservation of the Santa Cruz River and the enhancement of wildlife viewing and recreational opportunities.
Ch. 3/229	The DEIS does not examine as an alternative the delivery by pipeline of CAP water directly to the mine site to supply all or a significant portion the proposed project's water requirements. This alternative mitigates groundwater drawdown impacts to the Santa Cruz subbasin and its riparian resources. The existence of a viable but unexamined alternative renders an environmental impact statement inadequate.
Ch. 3/277	The text states: "With respect to the Upper Santa Cruz Sub-Basin, the mitigation measures are intended to reduce drawdown from pumping as much as possible through recharge and then mitigate remaining effects through the well owner protection program. The extent to which the recharge will be effective at reducing drawdown in the immediate vicinity of the Rosemont Copper pumping is unknown because the exact recharge site is as of yet unknown. Through 2009, 45,000 acre-feet of water have been recharged by Rosemont Copper (15,000 acre-feet per year) at the Pima Mine Road and Avra Valley recharge facilities (Pearce 2010). The

	Pima Mine Road facility is located within the Upper Santa Cruz Sub-Basin approximately 3 to 4 miles from the mine supply pumping and is within the area expected to be impacted by pumping. However, to date only 600 acre-feet of water has been recharged at the Pima Mine Road facility. The remaining 44,400 acre-feet of water has been recharged at the Avra Valley facility, which, while in the Tucson Active Management Area, is not within the Upper Santa Cruz Sub-Basin or near the mine supply pumping (Pearce 2010)." Rosemont has been conducting recharge at the Avra Valley and Pima Mine Road Recharge facilities to offset pumping for the mine water supply. However, based on the volumes of recharge conducted through 2009, nearly all of this recharge has been conducted at the Avra Valley facility. This facility is located in another subbasin, and thus will not physically offset the pumping for mine water supply in the upper Santa Cruz basin. This recharge will provide recharge credits which can be recovered, but will not mitigate the declining water levels at the pumping site.
Ch. 3/275 Cumulative Effects	The DEIS does not analyze the cumulative effects of climate change impacts on the groundwater table for this project which proposes the use of 100,000 acre/feet of water from the Santa Cruz subbasin of the Tucson AMA over its active mine life. Furthermore, the water table dropdown in the Santa Cruz sub-basin will propagate up to the next 100-140 years following mine closure. Where "a proposed project requires the use of significant quantities of water, changes in water availability associated with climate change may need to be discussed in an EIS." CEQ, "Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions" (Feb. 18, 2010).CEQ, "Draft NEPA Guidance on consideration of the Effects of Climate Change and Greenhouse Gas Emissions" (Feb. 18, 2010). The cumulative effects analysis should encompass the period from mine operation through the next 140 years.
	CIENEGA BASIN WATER QUANTITY
Ch. 3/266	The text states: "Approximately 500 to 550 domestic or other production wells registered with the Arizona Department of Water Resources could be impacted by drawdown in groundwater levels over 10 feet; approximately 95 percent of these are smaller domestic, stock, or exempt wells. Note that this is not considered a comprehensive inventory of wells in the area, nor are there adequate well construction and operation details to determine whether this drawdown would impact well performance." The Arizona Department of Water Resources maintains a database of registered wells with details of individual well construction. Using the ADWR registered well database, an Arizona Game and Fish query of registered wells in the Cienega Creek subbasin within the boundary of the model domain yields 1,370 wells, not "500 to 550" wells as estimated by the DEIS. Another 205 wells are located in the Davidson Canyon subbasin area, within the model domain. *See* the attached **Figure 2** (supplied by the Department and showing the location of all ADWR-registered wells in the Cienega Basin). An accurate count of all current registered wells, with estimated projections of future development in the Cienega Basin, is essential in analyzing foreseeable impacts to the water table over time and its cumulative impacts on groundwater-dependent seeps, springs, and intermittent and ephemeral surface water bodies. The Department cannot properly analyze all adverse effects on wildlife and habitat in the Cienega Basin without a better understanding of long-term impacts on surface water sources.

Ch. 3/206	The text states: "The proposed open-pit mine may reduce groundwater availability to private and public wells in the vicinity of the open pit. . ." This should be quantified through drawdown estimates and completion of a database of ADWR-registered wells to evaluate well impacts, including total or partial loss of production and additional pumping energy costs due to declining water levels. Research of registered well records at ADWR can be completed at a reasonable cost to better evaluate and disclose impacts to owners of domestic, stock, and agricultural wells in the Cienega Creek and Davidson Canyon areas. Stock and agricultural wells provide sources of drinking and open water for wildlife. Vague statements such as "the proposed open-pit mine may reduce groundwater availability" does not constitute an adequate analysis and disclosure of effects under CEQ regulations, and does not constitute a "hard look" absent a justification regarding why more definitive information could not be provided. Here, the information is a matter of public record and requires analysis and disclosure.
Ch. 3/254-57 (Figures) Ch. 3/266	The modeling drawdown graphics (water level decline maps simulated at various future times) were not presented in the DEIS, and too few contour lines are included in the figures to define and disclose impacts to individual wells. These impacts need to be more clearly quantified with better modeling drawdown contours at intervals of 20, 50, 150 and 1000 years, in order to more accurately define the extent and timing of adverse impacts for all well owners within the vicinity of mine drawdown. Vague statements such as "groundwater availability is highly likely to be affected by the drawdown from the mine pit" represents an inadequate analysis of adverse impacts. The EIS is required to inform the public of all significant impacts to the quality of the human and natural environment.
Ch. 3/217	The text states: "It was assumed that any groundwater pumpage within the [Cienega Basin] model area was negligible. Groundwater pumpage within the basin was estimated between 400 and 500 acre-feet per year." On Page 223 the text states: "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". Groundwater pumpage does not appear to be negligible, since this represents around 5% of the overall water budget for the area (M & A model simulates 9,000 to 10,000 acre-feet per year). Based on the ADWR database of registered wells, pumpage can be assessed and simulated for existing wells, and, based upon the statement on page 223, it is increasing and thus may be become more important. The EIS is required to analyze all cumulative effects of groundwater usage, including future foreseeable effects. *See* Comment below.
Ch. 3/237	The text states: "Water use by domestic and stock wells has steadily increased in the basin. In 1980, approximately 630 domestic or stock wells were known to be in the Cienega Basin. By 1990, the number of domestic and stock wells had increased to more than 1,000, and by 2010, the number of domestic and stock wells had increased to more than 1,800 (Arizona Department of Water Resources 2011c)."

	ADWR commonly assumes 0.5 to 2.0 acre-feet per year as an estimated usage for domestic/stock wells. Based upon the number of wells in the basin, water usage in the Cienega Basin is higher than estimated in the DEIS (400-500 acre-feet). The ADWR registered well database identifies 1,575 wells within the model domain. This strongly suggests water usage in the basin is in fact underestimated. **Figure 2** illustrates registered wells within the model domain. It should also be noted that there are many wells near the boundaries to the southeast of the model domain, near Elgin. The cumulative impacts of current and future groundwater usage, and the associated impacts on groundwater-dependent seeps, springs and surface waters and the wildlife which depends on such surface water resources should be more clearly presented and analyzed in the EIS.
Ch. 3/220 Ch. 3/223 Ch. 3/386	The text states: "It is recognized that while pumpage in the [Cienega Basin] basin is relatively minor, compared with the overall basin water balance, pumpage in the basin is increasing and lack of modeling of this pumpage [by Montgomery and Associates and Tetra Tech] may affect future predictions". In Vol. 2, the text states: "Additionally, the actual impacts of groundwater drawdown, combined with the impacts of global climate change over time within the analysis area, are uncertain". The Department repeats its PDEIS comment: "The PDEIS does not address the cumulative impacts of the mine project and other non-project groundwater withdrawals on riparian resources. An EIS must address existing, proposed or reasonably foreseeable cumulative impacts. 40 CFR 1508.7." CNF has failed to model and analyze the cumulative effects of future development and groundwater pumping in the Cienega Basin, as well as the effects of climate change on groundwater and surface waters in the southwest and in the project area. Where, as here, "a proposed project requires the use of significant quantities of water, changes in water availability associated with climate change may need to be discussed in an EIS." CEQ, "Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions" (Feb. 18, 2010). CNF should re-run the predictive models with cumulative effects inputs in order to allow the Department, other agencies and the public to properly analyze the cumulative effects of the project on water availability for domestic use, wildlife and habitat at mine closure and for at least 500 years into the future.
Ch. 3/222	The text states: "A change in the amount of post mining mountain-front recharge was analyzed. The Tetra Tech Mine Site model assumed that recharge would actually increase slightly (about 2 percent), from a premining recharge of 9,900 acre-feet per year to a post-mining recharge of 10,092 acre-feet per year. The Montgomery Mine Site model assumed that postmining mountain-front recharge would decrease by about 1 percent. Because of this difference in approach, Tetra Tech conducted a sensitivity analysis by modeling an unchanged recharge after construction of the mine. 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." (Emphasis added). This is a critical observation which suggests that the change in recharge configuration and volume may be a critical factor after the mine pit dewatering occurs. The model recharge changes should be re-evaluated with respect to this issue. The results of all

	sensitivity analyses should be disclosed, along with the revised modeled reductions in streamflow in Davidson Canyon and Cienega Creek.
Ch 3/274 Impact to Springs	The text states: "In all, 63 springs are *likely* to have impacts to their function as a resource (directly impacted or indirect impacts categorized as major or possible)." The May 31, 2011 "*Revised Springs Inventory for Rosemont Project Area- for Cooperating Agency Draft of the DEIS"* cited a number between 84 and 86 "total springs impacted (direct or indirect)". The EIS should reconcile this discrepancy.
Ch. 3/223-224	With respect to the Tetra Tech modeling of an intrusive dike in Davidson Canyon which served to minimize propagation of groundwater drawdown impacts on Outstanding Arizona Waters of Davidson Canyon (and seeps and springs), The Department repeats its PDEIS comment: "The text states that the peer review process determined that a specific concern with the Tetra Tech Mine site model was the inclusion of the intrusive quartz-porphyry dike across Davidson Canyon which acts as a barrier to groundwater flow and which prevents propagation of drawdown in Davidson Canyon. The text further states that a sensitivity analysis has been conducted to analyze the impacts of including the intrusive dike, "which is currently being reviewed". "AGFD anticipates the results of the sensitivity analysis to be included in the draft DEIS for public comment. There are no available data to support the Tetra Tech hypothesis that the dike has a hydrological impact. No field analyses of the potential effect of the dike on hydrology, such as the installation of wells on the upstream and downstream sides of the dike showing head differences, have been conducted. The Montgomery groundwater model does not model this dike and, as a result, shows the propagation of groundwater drawdown down Davidson Canyon to Cienega Creek and I-10". The DEIS text now states: "Overall, the peer review process determined that the model predictions are reasonable; however, *one specific concern remaining with the Tetra Tech Mine Site model was the inclusion of the intrusive dike across Davidson Canyon, which acts as a barrier to groundwater flow and may therefore underestimate impacts along Davidson Canyon*. The peer review suggested that additional sensitivity analyses be conducted to analyze the impacts of including the intrusive dike. This sensitivity analysis has been conducted and is currently being reviewed. 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". "The intrusive dike was analyzed by varying the hydraulic conductivity by an order of magnitude. Results indicated that the intrusive dike does act to minimize propagation of impacts down Davidson Canyon. One recommendation by SRK during their final review was for additional sensitivity analysis to be conducted, as the simulation of the dike is "less than fully supported by the analyses and conclusions." (Emphasis added). SRK Consulting's independent review supports the Department's initial analysis. The intrusive dike feature is critical to the propagation of drawdown simulated in the Tetra Tech model. Data does not currently exist to support the simulated impact of this dike. To the contrary, Tetra Tech's own data strongly suggests the absence of any hydraulic barrier properties of the intrusive

	dike. The Tetra Tech model predicts a 300-foot drop in water levels across the dike, but the water level drop is not documented in *Regional Groundwater Flow Model, Rosemont Copper Project* (Tetra Tech, 2010), Figure 6-2 (*Observed Pre-Mining, Steady-State Potentiometric Surface Map and Upper Most Model Layer with Constant Head Cells).* In addition, Tetra Tech's model calibration, as shown in *Regional Groundwater Flow Model, Rosemont Copper Project* (Tetra Tech, 2010) Figure 6-26 (*Unweighted Water-Level Residuals for Calibrated Steady-State Model)* reflects that measured water levels in wells in the vicinity of the dike are 100 to 334 feet below the model prediction, which reflects that the model is overestimating water elevation at the location of the dike and is poorly calibrated to actual water levels. This is not simply a difference of professional opinion. Tetra Tech's own data fails to support the existence of the dike as modeled. An accurate modeling of impacts, and potential losses of surface water resources in Davidson Canyon is essential for the Department to properly analyze related impacts to wildlife and habitat. Analyses of impacts based on theoretical modeling must be supported by credible scientific evidence and data, not conjecture. CEQ, 40 CFR 1502.22. The Department expects the results of the sensitivity analysis, and its effects on groundwater propagation down Davidson Canyon, to be fully reflected in the EIS.
Ch 3/261-267	The Department repeats its PDEIS comment: "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. In response to this PDEIS comment, the DEIS merely makes the vague prediction that baseflows in Davidson Canyon "may" be affected by seasonal variations. This does not constitute a "hard look" at the cumulative impacts of dry seasons or drought on baseflows in Cienega Creek and Davidson Canyon and their riparian habitats.
	WATER RIGHTS
	The United States holds a reserved water right pursuant to the Organic Act of 1897 for those unappropriated seeps, springs and stock tanks in the Cienega Basin that will be or may be dewatered by the proposed project. This federal reservation vests on the date of the reservation and is superior to the rights of future appropriators. *Cappaert v. United States*, 426 U.S. 128, 138, 96 S.Ct. 2062, 48 L.Ed.2d 523 (1976). Any appropriative rights established after reservation date of a national forest are subordinate to the federal reserved water rights and only water in excess of minimal amount needed to fulfill purposes of national forests are available to subsequent appropriators.

	CNF has acted arbitrarily and capriciously by failing to determine the existence of federal reserved water rights to the seeps, springs, and stock tanks on the CNF affected or potentially affected by the project. and whether the effects of the proposed action constitute an unlawful appropriation of such federal reserved rights.
Ch. 3/268 [Effects on Springs and Seeps] Ch. 3/312 [Loss of Stock Tanks]	The text states that "[s]everal of the springs and seeps in the analysis area have been developed in the past, and all of the springs are believed to be being used for stock and wildlife watering as well as recreational purposes". The text also states that "ongoing grazing activities and associated stock tank development and maintenance occur on and around the project area. Stock tanks associated with the project include those located on deeded land and on Coronado National Forest land,. . " Federal Public Water Reserve No. 107 (No. 107) provides: "It is hereby ordered that every smallest legal subdivision of public land surveys which is vacant, unappropriated, unreserved public land and contains a spring or water hole, and all land within one quarter of a mile of every spring or water hole located on unsurveyed public land, be and the same is hereby withdrawn from settlement, location, sale or entry, and reserved for public use in accordance with the provisions of Section 10 of the Act of December 29, 1916". The purpose of the reservation is to prevent monopolization by private individuals of springs and waterholds on public lands for human consumption and stock watering. of water needed for domestic and stock watering purposes." *United States v. City & County of Denver,* 656 P.2d 1, 32 (Colo.1983). CNF has acted arbitrarily and capriciously by failing to determine the validity of PWR 107 to the seeps, springs, and stock tanks on the CNF or whether the dewatering in perpetuity of such springs, seeps and stocktanks by the proposed open pit will defeat the reserved federal water rights intended for human and animal use.
Ch. 3/268 [Effects on Springs and Seeps] Ch. 3/312-14 [Loss of Stock Tanks]	The proposed action unlawfully diverts federal reserved water rights. Water rights on the federal public domain may only be acquired under the doctrine of prior appropriation, here, the General Adjudication for the Gila River System and Source. CNF has acted arbitrarily and capriciously by failing to determine the project proponent's right to divert water subject to federal reservation.
Ch. 3/309-311	The text does not identify surface water rights filed with ADWR associated with Cienega Creek.
Ch. 3/309-311	Tables 77 and 78 identify surface water rights filed for springs and stock tanks on deeded and CNF lands associated with the project. The identities of the surface water rights claimants are not shown. The EIS should identify all such surface water claimants and properly disclose the adverse effects of the proposed Rosemont Mine on their filed water rights claims.
Ch. 3/309-311	CNF has failed to determine the project proponent's legal right to appropriate surface waters subject to a claims of surface water claimants in the General Adjudication for the Gila River System and Source under the Arizona doctrine of prior appropriation.

	CIENEGA BASIN WATER QUALITY
Ex. Sum/xxiii Ch. 1/CNF Service/7	CNF's Barrel alternative, along with all other alternatives, creates a mine pit which will create 1,288 million tons of waste rock and tailings placed in the Barrel Canyon drainage. The DEIS does not analyze the economics of the mine to determine, as a viable alternative, whether a smaller pit configuration can reasonably achieve the proponent's goals while reducing or eliminating adverse environmental impacts on CNF surface resources and waters of the United States. The DEIS assumes as a given that the project proponent is entitled to access all minerals for which it claims rights and either fails to identify meaningful mitigation measures or labels the losses as an irretrievable commitment of resources. CNF has the authority to reject an unreasonable MPO while still allowing reasonable mineral operations under the mining laws.
Ch. 3/287	The Rosemont Heap Leach Facility will contain approximately 70-75 million tons of oxide ore material. Heap leach processing will occur for the initial 6 years of the mine, after which time the application of raffinate will cease and the spent process solutions will drain to the PLS pond for treatment and disposal. Tetra Tech's conceptual model for the Heap (2010a) estimates draindown of the Heap Leach facility to be 10 gallons per minute for 3 years following the end of leaching. The SRK Consulting peer-review Technical Memorandum (February 14, 2011) points out that the San Manuel Heap Leach Facility, although a larger facility than the Rosemont facility is expected to be (90 million tons) has a seepage rate from its covered heap facility of greater than 10 gpm after 8.5 years of closure. SRK cautions that it may take considerably longer than 3 years for the Rosemont heap leach draindown to decrease to 10 gpm. The EIS should reflect these modeling uncertainties and SRK's comments.
Ch. 3/287	The text states: "Seepage will also be present and collected approximately 3 years after cessation of leaching, at which time the heap leach facility will be closed and encapsulated with waste rock. At the time of closure, seepage from the heap leach facility is estimated to be approximately 10 gallons per minute. The DEIS notes that the heap leachate exceeds Arizona Aquifer water quality standards for cadmium, fluoride, nickel, and selenium. If, at time of heap leach closure, heap leachate will continue to generate at the rate of 10 gallons per minute for the next three years, this represents 600 gallons per hour, 14,400 gallons per day, 432,000 gallons a month, and 5,184,000 gallons a year. Yet the DEIS text states that with the encapsulation of the heap leach with neutral waste rock, in order to prevent infiltration and to neutralize potential acid generation (PAG) materials, "access to collect and treat the heap leach seepage after encapsulation has not yet been determined; this will be determined as part of the aquifer protection permit". It appears from the text that either Rosemont collects the large quantities of heap leachate through the leachate collection system or does not do so due to the waste rock encapsulation. This appears to be an major unsolved technical problem representing a potentially significant adverse effect on groundwater and surface water quality in the decades after mine closure. The DEIS does

	not describe the consequences of either strategy in terms of adverse effects, alternatives or mitigation strategies.
Ch. 3/287	Following closure of the heap leach facility, seepage is expected to continue for 115 years and cause numeric aquifer water quality exceedances for cadmium, nickel, and selenium, all hazardous substances under CERCLA. The DEIS states that the specific techniques for collection and treatment of the "long-term discharge" (presumably meaning, for the hundred or so years after the mine ceases operations) "will be determined by ADEQ". An EIS must outline steps that might be taken to mitigate adverse effects, both on and off site. No analysis of alternatives or mitigation measures are proposed in the DEIS to resolve this threat to water quality. CEQ, 1502.14(f); 1502.16(h); 1508.14.
Ch. 3/287	The EIS must consider the effects on groundwater, surface water and ecosystems in the event the acidic heap leachate continues to discharge and is not treated or collected and disposed of. The EIS must analyze indirect effects on water resources and ecosystems which are caused by the action and are later in time or father removed in distance, but are still reasonable foreseeable. CEQA, 40 CFR 1508.8.
Ch. 3/287	The text states: "Modeling indicates that heap leach seepage will decrease to 5 gallons per minute 5 years after closure and to 1 gallon per minute 45 years after closure and that seepage will cease approximately 115 years after closure ". At the rate of 1 gallon per minute, long after Rosemont has closed the mine, and for the next 100 or more years, heap leachate will continue to drain from the heap leach pad at the modeled rate of 60 gallons per hour, 1440 gallons a day, 43,000 gallons a month, and 518,400 gallons a year. What is the fate and transport of this uncollected leachate? What are the environmental consequences if this leachate comes into contact with stormwater and is allowed to discharge into the Barrel Canyon drainage and towards Davidson Canyon and Cienega Creek? The text should analyze the impact of such seepage mixing with stormwater discharges from the facility and degrading the water quality of Davidson Canyon and Cienega Creek, in violation of permit conditions or after the mine closes. The DEIS must consider indirect effects related effects on water and ecosystems which are caused by the action and are later in time or father removed in distance, but are still reasonable foreseeable. CEQA, 40 CFR 1508.8. The hallmarks of a 'hard look' are thorough investigation into environmental impacts and forthright acknowledgment of potential environmental harms.
Ch. 3/296	The Text states: "The design and location of the heap leach facility is designed to collect all possible drainage and solution, is on top of a stable rock location, and will be encapsulated by waste rock to protect from stormwater infiltration up to the maximum reasoned storm event." The statement that the heap leach facility "is designed to collect all possible drainage and solution", applies only to the period of time that the heap leach facility is in operation and during the closure period.

	The heap leach facility is designed to be a zero discharge facility only during operations and the initial three-year drain down period following cessation of leaching. During drain-down, the acidic heap leachate, along with infiltration and stormwater runoff from the surface of the heap leach facility, will be collected in the Pregnant Leach Solution (PLS) Pond. After this period, residual seepage will continue, but project proponent has not solved the major technical problem of post-closure heap leachate generation, which is estimated to continue for 115 years.
Ch. 3/287-90	The text states: "While modeling demonstrates the ability to meet groundwater standards with treatment, the actual requirements for treatment, discharge, and monitoring of seepage following closure of the heap leach facility and burial in waste rock will be determined by the Arizona Department of Environmental Quality. A long-term maintenance plan to ensure continuation of treatment, if needed, has not yet been developed and is expected to be included under the Aquifer Protection Permit program administered by the Arizona Department of Environmental Quality". The Draft ADEQ Permit issued for public comment (December 2011) does not address or resolve this issue. The EIS must analyze and describe all foreseeable consequences, and not make vague assumptions that regulatory agencies will somehow solve a potentially adverse effect down the road. It is unrealistic to assume that the APP Permit will require proponent to monitor, treat, and discharge or dispose of acidic heap leachate in compliance with Arizona Aquifer Water Quality Standards for the next 115 years, or that project proponent or a corporate successor will be in existence to fund such efforts. The EIS should discuss mitigation measures to fund the collection, treatment and disposal of heap leachate following permit termination. CEQA, 1502.14(f); 1502.16(h); 1508.14.
Ch. 3/282/289/290/295/ 326/341/343/344	The DEIS describes an "engineered biological system" of heap leachate to reduce sulfate and hazardous constituents exceeding Arizona Aquifer Water Quality standards, based on a small-scale laboratory model performed by Tetra Tech, Rosemont's consultant. No description of this modeled passive "engineered biological system" can be located in the technical documents. The only description found in the Tetra Tech memoranda suggests that after closure of the PLS and Stormwater ponds in accordance with ADEQ's BADCT guidance, the ponds "may" be converted to a "passive treatment system" involving the placement of manure, straw, wood chips and sawdust in the PLS pond to "treat" the acidic heap leachate. The leachate would then be routed to the former interconnected stormwater pond for further treatment with crushed limestone. One of the Tetra Tech Technical Memoranda (Revised Heap Leach Facility Fate and Transport Modeling and Treatment Options, April 12, 2011) claims that the "performance of the modeled passive biological treatment system achieves both sulfate reduction and a reduction of all constituents below AWQS". There is no description in the DEIS or Tetra Tech memoranda whether this form of treatment would be effective or whether it has achieved measurable results at other acid mine drainage sites; how much volume in liquids the "passive biological system" can treat before the materials must be replaced; what contingency plan will be devised if the treatment fails field tests; or how the

	system can be effectively maintained over decades, and by whom. CNF is strongly encouraged to request a peer review of this "engineered biological system" from the United States Environmental Protection Agency. Any analysis of modeled effects and treatment strategies for hazardous substance releases must be based on proven treatment technologies generally acceptable to the scientific community. CEQ, 40 CFR 1502.22.
Ch. 3/326 Ch. 3/389	Vol. 1, Table 87, Summary of Effects, claims "Untreated heap leachate is expected to exceed water quality standards; treatment with engineered biological system meets standards. There is no potential, however, for heap leach to reach surface waters". However, the text in Ch. 3/389 states that heap leach seepage may exceed aquifer and water quality standards for wildlife. There are no citations to the literature or any peer-reviewed scientific basis for the claim that acidic heap leachate can be successfully treated on a large scale and over a long term with straw and manure. Furthermore, the categorical statement that heap leachate will not reach surface waters is not supported in an analysis of project proponent's relevant technical documents. The possibility that untreated heap leachate will impact groundwaters, reach downstream surface waters and create an exposure pathway to identified wildlife over 115 years of discharge is a foreseeable adverse consequence that must be discussed in the EIS.
Ch. 3/287-9	CNF should demand sufficient financial assurance from project proponent to monitor groundwater and surface water quality, and to collect and treat all uncontrolled hazardous substance discharges from the heap leach facility for the next 100 or more years. Project proponent is clearly an owner or operator of a facility and a responsible party strictly liable for all costs of response under 42 U.S.C. §9607(a) of CERCLA for all hazardous substance releases into the environment from the Rosemont minesite. The costs of long-term remediation at the Rosemont site should not be borne by the public because the known and foreseeable adverse impacts were not mitigated by the Forest Service with sufficient bonding. CNF should consult with the Environmental Protection Agency for an informed estimate of costs of responding to acidic mine discharges over the next estimated 115 years of discharge. CNF should consider a determination that the MPO is unreasonable and decline to issue a permit until this major environmental issue is resolved.
Ch. 3/341-344 (and Tables)	The text states: "In order to estimate the potential for other contaminants to come into contact with stormwater at the mine pit itself, processing facilities, and tailings and waste rock disposal areas, geochemical fate and transport modeling was performed for the dry-stack tailings facility, heap leach facility, and waste rock storage area (Hudson and Williamson 2011; Tetra Tech 2010e). The model was constructed using 21 constituents for the waste rock area, 25 constituents for the heap leach facility, and 28 parameters for the dry-stack tailings. The attached Tables 94-96 compare the predicted waste rock, heap leach and dry stack facility seepage with the Arizona aquifer water quality standards.

	The DEIS text and Tables (Expected water quality from facility seepage) analyzes the surface water impacts from such seepage only by reference to the Arizona Aquifer Water Quality standards. The CNF-commissioned peer-review Technical Memorandum by SRK Consulting (Technical Review of *Infiltration, Seepage, Fate and Transport Modeling Report-Revision1, Part 2, Geochemical Fate and Transport Modeling)*, recommends that additional comparisons can be made against relevant surface water quality standards or wildlife water quality standards. This was not done. The Department concurs with SRK's recommendations. A comparison is essential to determine the potential adverse impacts of mine-related seepage discharges to surface waters and wildlife. The text fails to analyze the effects of such seepage on Arizona Surface Water quality standards, including antidegradation protection for Tier 3 Outstanding Arizona Waters (A.A. C. R18-11-107 and 107.01). Tier 3 protection states that a new or expanded point-source discharge directly to an OAW is prohibited.
Ch. 3/341-344 (and Tables)	The DEIS text and Tables (Expected water quality from facility seepage) must also analyze the surface water impacts from such seepage by reference to Arizona surface water quality wildlife standards, found at A.A.C. R18-11-108 and 18-11-109 and App. A.
Ch. 3/295	The text states: "Narrative water quality standards must also be met. These standards indicate that a discharge shall not cause or contribute to a violation of a water quality standard established for a navigable water of the state and that a discharge shall not cause a pollutant to be present in an aquifer that impairs existing or reasonably foreseeable future uses of water in an aquifer." Tables 94-96 should compare all constituents in modeled mine seepages with Arizona Surface Water Quality numeric and narrative standards, including pH and suspended sediment concentrations. Contaminants in seepage may be toxic to aquatic and wildlife in downstream receiving waters. The Arizona narrative water quality standards (A.A.C.R18-11-108) provide: A surface water shall not contain pollutants in amounts or combinations that: 1. Settle to form bottom deposits that inhibit or prohibit the habitation, growth, or propagation of aquatic life; 5. Are toxic to humans, animals, plants, or other organisms; 6. Cause the growth of algae or aquatic plants that inhibit or prohibit the habitation, growth, or propagation of other aquatic life or that impair recreational uses; 7. Cause or contribute to a violation of an aquifer water quality standard prescribed in R18-11-405 orR18-11-406; or 8. Change the color of the surface water from natural background levels of color. B. A wadeable, perennial stream shall support and maintain a community of organisms having a taxa richness, species composition, tolerance, and functional organization comparable to that of a stream with reference conditions in Arizona. The text should also describe the potential violations of Tier 3 antidegradation surface water quality standards for OAWs Davidson

	Canyon and Cienega Creek and its consequences for wildlife and habitat.
Ch. 3/295	The text states: "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". A portion of the tailings facilities is outside the capture area of the mine pit, and any seepage will drain north and east down Barrel Canyon Wash. The data reflects that the dry-stack tailings will release a long-term (500 years) sulfate plume. The waste rock facility may release arsenic. The DEIS does not model this plume, nor describe the potentially long-term adverse effects to groundwater, downstream surface waters or well owners.
Ch. 3/295	The text states: "The dry-stack tailings facility uses filtration technology to dewater tailings prior to placement. By doing so, dry-stack tailings will achieve a greater degree of engineering control than typical slurried tailings with high moisture content. Geochemical modeling of potential seepage from the dry-stack tailings facility demonstrates that the design is capable of preventing discharge of contaminants to groundwater". (Emphasis added). This statement is misleading and is not supported by the *Infiltration, Seepage, Fate and Transport Modeling Report – Revision 1* (Tetra Tech, August 2010). The Report at 94 notes that based on the modeling presented in the *Dry Stack Tailings Storage Facility Final Design Report* (AMEC, 2009), the dry stack tailings facility is expected to discharge seepage until drainage of the pore water within the tailings is complete. Figures 6.7 and 6.8 detail dry stack tailings production seepage rates starting at year 1 of operation, peaking at Year 18 at 8.4 gpm, with seepage continuing for the next 500 years. At "Closure Year 100" the seepage rate is 7.5 gpm, which is approximately 10,800 gallons a day or 3,942,000 gallons per year. Furthermore, a portion of the dry stack tailings is outside the capture zone of the mine pit, and the seepage will proceed north and east down Barrel Canyon drainage. *See Rosemont Area-Wide Fate and Transport and DIA Summary* (Tetra Tech 2010). The DEIS text should model and fully describe the fate and transport of the dry stack tailings seepage over the next 500 years. Potentially contaminated groundwater is likely to recharge surface water bodies (seeps, springs, streams) impairing surface water quality and providing an exposure pathway to wildlife. This adverse effect is known and foreseeable and the DEIS should fully describe and disclose all adverse consequences to wildlife and potential impacts to groundwater drinking water wells.
Ch. 3/344	The table showing expected water quality from the dry-stack tailings seepage does not include values for aluminum, arsenic, antimony, beryllium, cadmium, chromium, iron, lead, nickel, silver, thallium, and zinc. The text reflects that the constituent "was not present in the laboratory leached tailings solution or was below laboratory detection limits". Dissolved copper is not referenced at all in the text. SRK's review of Tetra Tech's modeling (Technical Review of *Infiltration, Seepage, Fate and Transport Modeling Report-Revision1, Part 2, Geochemical Fate and Transport Modeling)* notes:

	'The information reviewed to date indicates the tailings seepage quality results, when compared with AWQS for reference purposes only, will not exceed AWQS. The only exception to this statement is that sufficient analytical data are not available for Sb, Tl, and radionuclides to make a determination for these parameters. The seepage is expected to be elevated in sulfate with a slightly acidic pH of 5.87". Given the size of the dry stack tailings facility, and its location directly in the Barrel Canyon drainage, SRK should re-review the modeling protocols for the dry stack tailings for a determination that the laboratory protocols, including the method detection limits, is supported by credible scientific evidence. CEQA, 40 CFR 1502.22.
Ch. 3/295-6	SRK Consulting also noted that a conclusive opinion is not possible on the waste rock constituents where the laboratory method reporting limit exceeds the AWQS (primarily Sb and Tl) or where the analyses were not performed (radiochemicals). The EIS should report the results of all constituents, with an explanation why laboratory method detection limits were set above AWQS.
Ch. 3/344	Table 96 showing expected water quality from dry-stack tailings seepage does not report a value for copper. The ADEQ Draft 2010 Impaired Waters List in Arizona (CWA 305.b and 303.d) reflects the presence of dissolved copper in several surface waters located in mining districts. The EIS text should either provide a value for copper, or an explanation for its absence.
Ch. 3/295-6	The text states: "Geochemical modeling of potential seepage from the waste rock facility demonstrates that the design is capable of preventing discharge of contaminants to groundwater". This statement is not supported by the Tetra Tech infiltration and seepage modeling report, which notes that "under the influence of the 100-year, 24-hour storm event and the multi-day storm event, there is increased infiltration into the waste rock in the areas of ponding. The flow of water appears to be downward, and then toward the toe of the facility." The seepage of the waste rock storage area indicates arsenic slightly above AWQLs. The DEIS text should be amended to reflect this statement and describe all adverse consequences of waste rock storage area arsenic releases to groundwater. The EIS should also contain a fate and transport analysis of these releases for a determination of whether such releases are within the mine pit capture zone, or will migrate down the Barrel Canyon drainage toward Davidson Canyon.

Ch. 3/332	The text states that the reach of Davidson Canyon designated as an OAW "begins approximately where perennial and intermittent stream flow begins, which is associated with discharge from the Reach 2 Spring". Table 61 on Page 268 and the text on page 274 claims a "minor" likelihood of indirect impacts from the mine with expected 10 percent reductions in reduced ephemeral stream flow; but if the spring is connected to the regional aquifer, "greater impacts could occur". The adverse effects of these "greater impacts" should be described, including potential diebacks or losses of riparian vegetation within the Davidson Canyon OAW.
Ch 3/315	The text states that the analysis area included Davidson Canyon Wash to its confluence with Cienega Creek. If the surface water and ground water levels will be significantly reduced in Davidson Canyon Wash, it will likely greatly affect the established native riparian habitat along Cienega Creek, so a larger acreage of riparian habitat will be lost or greatly degraded than is indicated. The EIS should analyze this possibility.
	The text states that groundwater modeling reflects that the groundwater table will be impacted by less than 5 feet at the confluence of Davidson Canyon and Cienega Creek. Groundwater and surface flow declines are adversely altering riparian ecosystems throughout the southwest, resulting in a decline of pioneer trees *Populus fremontii* (Fremont Cottonwood) and *Salix goodingii* (Goodding willow). In a study of the San Pedro River, *P. fremontii* and *S. gooddingii* were dominant over *T. ramosissima* (tamarisk) at sites where surface flow was present more than 76% of the time, inter-annual ground-water fluctuation was less than 0.5 m, and average maximum depth to ground water was less than 2.6 m. Abundance of *S. gooddingii* declined sharply as ground-water fluctuation exceeded 0.5 m and *P. fremontii* declining as ground-water fluctuation exceeded about .8 m. Degraded water tables lead to a species composition shift to the more drought-tolerant tamarisk which lowers wildlife habitat quality and leads to loss of scenic areas for recreation. *Surface water and ground-water thresholds for maintaining Populus–Salix forests, San Pedro River, Arizona,* S.J. Lite, J.C. Stromberg (Arizona State University*, 2005)*; *Cottonwood and Willow Ecology Notes*, Blackman and Ingraldi, (Arizona Game and Fish Department). The EIS should analyze all effects of an altered groundwater and surface water system caused by the proposed project, as well as other cumulative effects, such as climate change, on riparian corridor vegetation and wildlife habitat of Davidson Canyon and Cienega Creek.
Ch. 3/345	The DEIS text states that a small (2 acre-feet) porous, flow-through rock dam will be constructed at the lower end of the Barrel Canyon drainage and will represent the last point of detention of stormwater from the mine site. "Water would temporarily impound behind the dam during storm events and then would be slowly released downstream through the porous rock-fill embankment. Design of the compliance point dam is such that large flows are expected to overtop and occasionally destroy the dam".

	The Arizona Pollutant Discharge Elimination System (AZPDES) Fact Sheet for the Multi-Sector General Permit for Stormwater Discharges Associated with the Mineral Industry (December 2010) states: 'At mining sites, especially large active sites, preventing stormwater from contacting polluting materials is generally not feasible. Directing flows to non-discharging areas (pits), or installing runoff containment, may be the most appropriate control measure". The text fails to describe the adverse consequences to the Outstanding Waters of Davidson Canyon and Cienega Creek, their riparian resources and aquatic organisms if a stormwater discharge carrying contaminants flows through this rock dam or breaches or destroys the Barrel Canyon Dam and proceeds downstream to Davidson Canyon and Cienega Creek.
Ch.2/33	The text states that stormwater from the waste rock and tailing facilities, including the waste rock buttresses that are not reclaimed or stabilized, would be routed to sediment control structures, where any overflow discharging offsite would be monitored for chemical and sediment content in accordance with the [ADEQ] mining stormwater general permit. The 2010 AZPDES Multi-Sector General Permit for stormwater discharges for the mineral industry will not authorize any discharges lowering the water quality of waters designated as outstanding Arizona waters (OAW). The water quality of Davidson Canyon and Cienega Creek must be maintained and protected. Stormwater will continue to be shed off the mine site and discharged to downstream receiving waters, during construction, operation, and following closure. The DEIS does not describe the adverse effects to Davidson Canyon and Cienega Creek, both OAWs, in the event contaminated stormwaters are discharged down Barrel Canyon. It typically takes a laboratory several days to analyze and report the results of water quality sampling for chemical constituents. By that time, the stormwater discharge has already reached downgradient receiving waters. Given that the heap leach pad, tailings and waste rock piles alone impact 2,895 acres, the source of the discharge may prove to be difficult to determine. What corrective measures will be taken to prevent all contaminated stormwater discharges from the mine site impacting the Outstanding Water Quality protected uses of Davidson Canyon and Cienega Creek? NEPA requires an EIS to outline steps that might be taken to mitigate adverse effects, both on and off site. CEQ, 1502.14(f); 1502.16(h); 1508.14. CNF should not approve any MPO unless and until it has determined that the proposed use will not degrade the protected water quality of Davidson Canyon and Cienega Creek.
Ch. 3/341	The text states: "In order to estimate the potential for other contaminants to come into contact with stormwater at the mine pit itself, processing facilities, and tailings and waste rock disposal areas, geochemical fate and transport modeling was performed for the dry-stack tailings facility, heap leach facility, and waste rock storage area (Hudson and Williamson 2011; Tetra Tech 2010e). The model was constructed using 21 constituents for the waste rock area, 25 constituents for the heap leach facility, and 28 parameters for the dry-stack tailings. The attached Tables 94-96 compare the predicted waste rock, heap leach and dry stack facility seepage with the Arizona aquifer water quality standards.

	Tables 94-96 should also compare the predicted seepages with Arizona Surface Water Quality numeric and narrative standards. Contaminants in seepage may be toxic to aquatic and wildlife in downstream receiving waters. If this is the case, the text should describe the potential violations of Arizona Tier 3 antidegradation surface water quality standards for OAWs Davidson Canyon and Cienega Creek and its consequences for wildlife and habitat.
Ch. 2/34	"Large storm events would overtop the [compliance point] dam and proceed downstream, as permitted under Section 401 of the Clean Water Act". This statement requires clarification. The permit conditions for an AZPDES permit will not permit the discharge of water in excess of water quality standards to OAWs.
Ch. 3/345-6	The text states that "if the dam were damaged or destroyed by a storm event, it would be repaired and rebuilt as necessary. Because the compliance point dam would be constructed of inert rock and would be rebuilt, any possible effects of the dam's being destroyed are considered insignificant. After closure of the project facilities, the compliance point dam would be evaluated and removed under the prevailing Clean Water Act permitting program". If the dam is destroyed, this means a large volume of potentially contaminated stormwater will proceed down the Barrel Canyon drainage to Davidson Canyon. This is not an "insignificant effect".
Ch. 3/345	The text states: "In order to mitigate potential changes in water quality resulting from stormwater encountering tailings and waste rock, which would form more and more of the disturbed area over time, a series of stormwater controls such as diversion channels and detention pools designed to handle large 100-year, 24-hour storm events (Tetra Tech 2009a) would be constructed to intercept stormwater runoff and route it around the mine facilities. Application to Arizona Department of Environmental Quality for coverage under the General Permit for Stormwater Discharges requires the following: (1) analytical monitoring of stormwater discharges for parameters specific to the copper mining sector, and (2) development of a stormwater pollution prevention plan to outline best management practices that will be used to minimize the discharge of pollutants in stormwater from the site". Rosemont has yet to file an application for an AZPDES permit (which will include a stormwater protection plan). How can the text claim that stormwater discharges from the mine will maintain water quality in protected downgradient streams if the plan has yet to be developed and reviewed by ADEQ?
Ch. 2 /34 - 35	The text states that "active stormwater control" would continue after the mine closes, as required by the ADEQ's mining stormwater general permit and the erosion control provisions of the mine land reclamation bond. This statement is accurate only up to the point the mine closes. Upon closure, the mine qualifies as an "inactive and unstaffed" facility. At that point, the permit holder is required to conduct only one annual comprehensive facility inspection. The permittee is also required to "inspect" the site if severe weather or other events may have damaged control measures or increased discharges. The permittee is otherwise waived from general analytical monitoring, routine facility inspections and visual assessment inspection requirements. Once reclamation is complete, coverage under the permit terminates. The Department concurs with EPA's position that the EIS should discuss necessary long-term post-closure operations and

	maintenance, describe those activities, indicate the projected costs, and discuss the requirement for project proponent to establish, in addition to a reclamation bond, a trust fund or other financial instrument to ensure long-term post-closure care. As stated by EPA, CNF should ensure that the financial assurance does not depend on the continued financial health of the mine operator or its parent corporation. The alternative, as described by EPA, is an "unfunded/underfunded contaminated site that becomes a liability for the Federal government". *See* EPA's comment on the importance of obtaining adequate reclamation and closure bonding from project proponent which the Department adopts by reference *infra*.
Ch. 3/336-7	The text states: "The impact of the movement of soil from the project area is analyzed in this section and is based on modeling performed by Tetra Tech (Zeller 2010a). Impacts to the geomorphology of downstream washes are also discussed in this section. . One of the major functions of a stream is to transport sediment. Ephemeral starved waters cut into channel deposits left by larger flows. This downcutting can ultimately increase the gradient of the channel and is likely to result in the formation of discontinuous gullies as gradient adjustments shift farther and farther downstream. Additionally, as channels become narrower and alluvial bed material is removed, out-of-bank flows will be reduced, and formerly rich floodplain areas can become hydrologically disconnected; this disrupts water, sediment, and nutrient enrichment of these areas (Levick et al. 2008). Modeling of aggradation or scour effects resulting from the project may be conducted prior to the FEIS". No analysis of changes in the geomorphology of Barrel Canyon drainage or Davidson Canyon as a result of altered sediment deliveries caused by the proposed project appears in the text. The EIS must disclose and analyze all adverse effects, including impacts to riparian resources and wildlife habitat as a result of scour and aggradation of Barrel Canyon and Davidson Creek.
	The geomorphology analysis should incorporate a comparison of potential project effects with Arizona narrative bottom deposit criteria for wadeable, perennial streams. A.A.C. R18-11-108.2.
	BIOLOGICAL RESOURCES
Vol. 2/Ch. 3/ Biological Resources	There are many instances when the DEIS uses the word 'may' under Issue 5 and it should be replaced with 'will'. For example, page 351 – Issue 5A: Vegetation, "….and other facilities may result in a …". Issue 5B: Habitat Loss, "The mine and ancillary facilities may result in a…" Remove the word 'may' and replace with 'will'. Also, page 352, Issue 5D, "….increased traffic could result in more wildlife roadkills". Increase traffic WILL result in more roadkills.
Ch 3/352	The Department reiterates our PDEIS comment: "special status species" cites "Wildlife of Special Concern in Arizona" (WSCA). Although WSCA is still currently recognized by Commission Policy, the CNF should reference our most current efforts at identifying special status species in Arizona. Species conservation priorities are identified in the recently updated State Wildlife Action Plan (SWAP-latest revision currently under review by USFWS) in the list entitled: Species of Greatest Conservation Need (SGCN), and further prioritized into tier 1a, 1b, and 1c species (depending on their vulnerability). The Department intends for the SGCN to replace WSCA in the near future, but this transition has not yet been formalized by Commission Policy. At this time the Department's publicly available Habitat Data Management System database references only species listed in the 1996 WSCA and will do so until the Commission formally directs the Department to discontinue use of this list in Commission Policy. Although SCGN is not presently recognized under Commission Policy, the CNF should consider the impact of the Rosemont project on species listed in SGCN (especially tier 1a and 1b species).

Ch. 3/ 353	The Arizona Game and Fish Department is the only entity that has statutory management authority and public trust responsibility for all wildlife species. The Department is a Cooperating Agency, yet our most up to date and current information is excluded from analysis even though we have asked for it to be included. Why was not the State Wildlife Action Plan consulted? The State Wildlife Action Plan (SWAP) lists Species of Greatest Conservation Need (SGCN) and Species of Economic and Regional Importance (SERI). We provide a public website called HabiMap Arizona which provides graphical representation of SWAP data. These lists are available from the Department. The analysis of the impacts to SGCN and SERI data is missing from the DEIS and no mitigation is described addressing our SWAP.
Ch 3/361	Missing from the State section is ARS Title 17 and AAC Rules Promulgated under Title 17. The Department regulates take of all wildlife under Arizona's Revised Statutes Title 17. ARS 17-101.18 defines take as "pursuing, shooting, hunting, fishing, trapping, killing, capturing, snaring or netting wildlife or the placing or using of any net or other device or trap in a manner that may result in the capturing or killing of wildlife." 17-309 prohibits the take of wildlife except as authorized under Title 17 or by Commission order. ARS 17-236 prohibits the taking of injury of any bird or harassment of any bird upon its nest, or the removal of the nests or eggs of any bird, *except* as may occur in normal horticultural and agricultural practices and as authorized by commission order.
Ch 2/69	The text states: '[p]rocess water ponds, such as raffinate ponds, pregnant leach solution collection ponds, or chemical or fuel storage areas, would be enclosed, covered or otherwise managed to protect wildlife, livestock, and public safety. Location and construction criteria . . .would prevent deleterious exposure of livestock, wildlife or birds to toxic chemicals or hazardous conditions . . resulting from process operations. Further details are contained in the preliminary MPO". Please cite the source of this statement. There is no description of these protective measures in the 2007 Mine Plan of Operations. The Rosemont draft Aquifer Protection Permit (December 2011) does not require any protective covers or other mitigation measures to prevent migratory bird injuries or deaths from exposure to highly acidic/metalliferous process pond waters. Injury to migratory birds through exposure to toxic substances in process ponds constitutes a violation of the Migratory Bird Treaty Act.
Ch 2/32 Plants and Animals	The text states: "all precipitation that falls on top of the active tailings area would remain on top and evaporate". The DEIS fails to describe how the evaporating water will concentrate contaminants and become acidic and toxic to wildlife, particularly migratory birds. This situation developed at inactive tailings at Freeport McMoran Mine in Morenci and the Tyrone Mine in New Mexico, resulting in avian mortalities. Unless alternatives are described in the DEIS, this situation will exist in perpetuity. Describe this foreseeable event in the EIS.
Ch. 3/389	The text contains a general discussion of adverse biological effects to fish, invertebrate, and amphibians resulting from exposure to mine pit lake water or heap leach seepage. Other than dictionary descriptions of the effects of metals exposure to these bioorganisms, no particularized analysis of the species affected, the potential exposure pathways, or the loss of species diversity or

	abundance is described. Exposure to metalliferous or acidic waters in the mine pit lake will cause mortality to migratory birds and waterfowl in perpetuity. The exposure pathway is direct contact and ingestion of acidic waters. These adverse effect requires further analysis, including analysis of alternatives and mitigation strategies.
Ch 3/362	Top of the Page, the reference to "… (see figure 1)." is incorrect. Figure 1 in Ch1, Vol 1 does not depict Barrel Canyon.
Ch 3/370 Animal Movement Corridors	It needs to be stated in this section that the mine footprint would interfere with the north/south movements of wildlife within the Santa Rita Mountains themselves. The Critical Wildlife Movement Corridor analysis that was completed by cooperating agencies assumed that the Santa Rita Mountains were to be conserved as a contiguous block of protected habitat (this now will not be the case).
Ch 3/370 Animal Movement Corridors	Although this section identifies habitat linkages and the species used to model them, it does not adequately address the effect of the project on wildlife movement. The linkages shown depict the best linkages between this important wildlife habitat to adjacent habitat blocks. The CNF should identify the impact of the project on the wildlife dependent on the linkages. The CNF must identify the impact on the wildlife and identify effective mitigation for impacts to the species from that impact. The Department suggests identification of means to enhance linkages or portions thereof which can increase their viability for affected species. Such enhancement might be purchase of unprotected portions of the linkages, construction of crossing structures over roads and other fragmenting infrastructure, modification of fences in the linkages to facilitate greater permeability to wildlife, vegetation treatments to enhance wildlife use and movement within linkages (such as removal of invasive shrubs and trees in former grasslands for pronghorn or funding "stepping stone" aquatic habitats for leopard frogs). This section does not describe the importance of the Santa Rita habitat block to the viability of wildlife populations in adjacent habitat blocks. This section also does not describe the impact resulting from loss of connectivity between sky islands. The project severs the habitat in the south from the northernmost tip of a central sky island providing habitat to a number of species that move between them. Moreover the sky islands act as stepping stones linking mountain species habitat in the Sierra Madre to similar habitat on the Mogollon Rim. Mobile species which might have previously moved through the project area with ease, such as mountain lions, jaguars, ocelots, and black bears would be forced to circumvent the project area (and face a gauntlet of increased motorized traffic) before reaching the northern terminus of the habitat block and the modeled linkage, or they may have to leave the habitat block before reaching the linkage – thereby traversing an area of lesser suitability or at least an area not yet modeled for suitability. Both outcomes may create greater exposure to mortality potential, increased energy expenditure, and cause stress to individual animals. For rare species, one lost linkage may be of critical significance to the viability of the sky island region and beyond for that species as the linked habitat, which may provide access to critical resources or mates (on either side of the former linkage) is made unavailable. The effect on animal movement corridors identified for this area may be profound. The movement corridors were modeled between habitat blocks assumed to be available as viable habitat with movement facilitated between them to increase the stability of the

	overall population. In this case the anchor point of three identified wildlife linkage areas will be rendered largely non-functional as wildlife habitat. This will have the effect of nullifying the functionality of all three linkage areas and thereby reducing the functionality of the other blocks as viable habitat. In this instance the effects of the Rosemont Copper Project are manifested in the neighboring habitat blocks, effectively impacting the ecological stability of the entire region. Because of the size of the ecological system, it is difficult to envision the importance of any given habitat block's subpopulation to the larger population. The loss of any one habitat block increases vulnerability of all other subpopulations (dependent on immigration and emigration to and from other habitat blocks) to localized extinction events and stochastic events. Overall populations of common species, such as mountain lions (Puma concolor), are likely resilient enough to survive losses of major habitat blocks and linkages due to the availability of other habitat blocks, their adaptability as a species, and their ability to use marginal linkages. For uncommon species; species endemic to the sky islands, species at the extremity of their range, species already in decline, and species whose habitat has been impacted to the point of local extirpations in the sky islands, such losses of discrete habitat blocks and dependent linkages may be devastating. No attempt is made to describe these impacts.
Ch 3/386, 395	Under the section, Impacts Common to All Action Alternatives (beginning on p. 386), the discussion of impacts to special status species says (p. 395), "All action alternatives could result in direct impacts to Chiricahua leopard frogs because this species was observed in a stock tank within the footprint of the proposed mine pit in 2008, which *apparently serves* as a nonbreeding dispersal site (WestLand Resources Inc. 2009b)" (emphasis added). "Additionally, numerous Chiricahua leopard frogs have been observed within the analysis area; therefore, direct impacts could occur during wet years, when individual frogs could disperse from breeding sites within other portions of the analysis area into the proposed mine footprint and could be crushed or trampled." In our comments we pointed out the problems with describing sites where CLF had been found as "nonbreeding dispersal sites." Modifying that statement with "apparently serves as" does not address the underlying issue, i.e., that the landscape including the footprint of the mine is Chiricahua leopard frog habitat.
Appendix, Draft Monitoring Plan: H. Biological Resources at 129, Objective 2	How will the proponent ensure the viability of species occurring in the project area? Performing a population viability analysis for each species (i.e., collecting all the necessary parameters such as fecundity rates, survivorship, etc.) would be a large undertaking. The Department questions whether the authors of meant to use the word viability. The word "presence" may be more appropriate.
Ch 3/395-98, 400, 408, 410, 412 Chiricahua leopard frogs, Lesser long nosed Bats, Rosemont talussnails	The "Impacts Specific to the Barrel Alternative" section continues to assume that a site where few CLF were observed in 2008 – 09 as an "additional nonbreeding dispersal site for this species" (p. 408) despite our comments. The same assumption is perpetuated for two other alternatives: for the Barrel Trail Alternative, "The Barrel [*sic*] Alternative would result in direct impacts to an additional nonbreeding dispersal site for this species" (p. 410); and for the Scholefield-McCleary Alternative: "The Barrel [*sic*] Alternative would result in direct impacts to an additional nonbreeding dispersal site for this species" (p. 412). It is worth noting that repeated errors that result from careless cutting and pasting, as in the quotes above, suggest that the effects analysis was not taken particularly seriously. Further, it is unclear how the DEIS distinguishes between impacts that "would" take place from impacts that "could" take place. For example, for lesser long-nosed bats (p. 398), "All action alternatives *would directly impact* at least one known lesser long-nosed bat postmaternity roost site" (emphasis added), i.e., bats were seen at a roost (i.e., non-breeding) site. However, for CLF (p. 395), "All

	action alternatives *could result in direct impacts* to Chiricahua leopard frogs because this species was observed in a stock tank within the footprint of the proposed mine pit" (emphasis added). Is there more certainty that bats (for which detectability at roosts is quite high) will continue to occupy a particular roost site, than CLF (for which detectability is typically quite low) *might* occupy any number of aquatic habitats? The same disparity in language was applied to Rosemont talussnails (p. 400), for which up to 29 acres of likely occupied habitat will definitely be destroyed. One of the principal causes of the decline of CLF has been "massive loss of habitat that has historically occurred on the large river systems…and the more recent drought induced drying" (USFWS 2007). As pointed out in the CLF Recovery Plan, "…remaining Chiricahua leopard frogs [often] occur in relatively isolated locations near the headwaters of stream systems [and]… it is important to maintain and recover populations in small watersheds as well as larger watersheds. Numerous local populations scattered through a relatively large watershed area can function as a metapopulation, and *protection and reestablishment of such populations is important to recovery*" (USFWS 2007:H4, emphasis added). Thus, recovery depends on landscapes, not on particular sites that might or might not be occupied at a particular point in time. Lowe and Johnson (1979) reported *Rana pipiens* (which probably included CLF and lowland leopard frogs) on the Rosemont site as "[c]ommon to abundant. At larger earthen-dam stock tanks..." and "...the conspicuous amphibian of the Site..." As we pointed out in our earlier comments, the distribution of CLF in the northern Santa Rita Mountains is both spatially and temporally dynamic, and a 2 or 3 year snapshot (i.e., surveys by Westland Resources) is generally insufficient for drawing conclusions. However, we are certain that the area within the footprint of the mine supported CLF historically (Lowe and Johnson 1979), and CLF occurs in the analysis area now (note: published data indicate that CLF and LLF occurred sympatrically at a number of sites in the action area [Frost and Platz 1983, Platz and Frost 1984]).
Ch 3/395-96, Chiricahua leopard frog	The project area has been identified in the CLF Recovery Plan as comprising parts of two Management Areas, and therefore is considered to have some of the "greatest potential for successful recovery," and for several years it has been an area targeted for CLF recovery activities. There is no discussion at all about the impacts to the two MAs and how those impacts might affect recovery overall, except the statement that the "project would result in indirect impacts to Chiricahua leopard frogs through long-term habitat alteration" (p. 395). The discussion of Critical Habitat is limited to "[t]he project could directly or indirectly impact some of the primary constituent elements of proposed critical habitat for this species, including suitable dispersal habitat proposed for critical habitat (i.e., the 6.57 miles of ephemeral and intermittent drainages and 1,311 feet of associated uplands within the analysis area). Project activities would create a barrier for individual Chiricahua leopard frogs moving overland to disperse to and from proposed critical habitat" (p. 396), without further discussion. Again, "could directly or indirectly impact" does not adequately capture the effects. If NEPA requires agencies to take a "hard look" at environmental consequences and adequately disclose those impacts to the public, and that an EIS is supposed "to provide a full and fair discussion of significant environmental impacts" (40 CFR 1502.1), then this was not done with respect to Chiricahua leopard frogs.

Ch 3/395 Chiricahua leopard frog	The Department disputes the term "nonbreeding dispersal site." Whether or not a site is, has been, or may be suitable for breeding is not apparent from any recent survey which may or may not have detected presence of frogs. Chiricahua leopard frogs have declined throughout their range due largely to disease. Historic records for the analysis area indicate that leopard frogs were common and abundant in the stock tanks of the area. Earthen stock tanks provide breeding habitat for leopard frogs even if they dry from time to time and ephemeral habitat that is "nonbreeding" cannot be discounted as having little value to the species as seems to be implied here. In fact, "nonbreeding dispersal sites" may be of critical importance to leopard frog metapopulations which may face localized extinction events and require repopulation from time to time from unaffected sites. In the case of disease, ephemeral tanks that serve as stepping stone habitat linkages during wet times, also serve to isolate populations during dry times, thereby protecting them from disease outbreaks.
Ch 3/396 desert tortoise	Desert tortoises are protected by state law per Title 17 of the Arizona Revised Statutes (17-231, 17-234 and 17-309), which prohibits the taking of wildlife outside of its prescribed hunting season. Per Arizona Game and Fish Commission Order 43, there is no open season on desert tortoise, meaning it is always illegal to capture or kill them without a special license. The Department provides guidelines for survey, handling, and mitigation for projects impacting desert tortoise at http://www.azgfd.gov/hgis/guidelines.aspx . Desert tortoises are highly vulnerable to increased traffic and road effects. This section should describe these and other impacts and identify mitigation such as proper fencing of roadways and use of crossing structures, as well as those applicable per Department Desert Tortoise Mitigation Guidelines.
Ch 3/396-97 giant spotted whiptail	The giant spotted whiptail inhabits the Rosemont area and has been documented at the minesite. The species has limited distribution and is dependent on riparian resources. DEIS does not identify mitigation strategies for this species.
Ch3/397 Gila Chub, Topminnow	The uncertainty of modeling impacts to surface flow in Cienega Creek has been cited within the DEIS. The CNF acknowledges that due to this uncertainty, Cienega Creek could suffer unmodeled impacts and greater losses in flow. Potential adverse impacts to Gila chub and topminnow could occur due to possible impacts to Cienega Creek. The CNF must provide for means to monitor this potential impact so that if it should occur, conservation measures can be implemented that will mitigate impacts to chub and topminnow. Potential for impacts to chub and topminnow are also foreseeable in the event of a mining-related discharges reaching Cienega Creek. What mitigation measures will the CNF require to prevent such a toxic discharge from reaching the creek and taking chub?
Ch 3/397-98 Green ratsnake	Green ratsnakes are also vulnerable to direct impacts from increased traffic volume on all roads associated with the project, including traffic volumes already occurring in preparation for mining. Mitigation measures that prevent take by vehicles should be coordinated with the Department.
Ch 3/378,398 Jaguar	Impacts to the jaguar must be considered. The three records of jaguar in the Santa Ritas were within or proximate to the project area. Although jaguar densities have been extremely low in recent decades, the analysis area is well within historic range for the species and impacts to the species must be considered with special emphasis on connectivity for this extremely wide ranging

	species. Large carnivores require a large amount of area to maintain a viable population and, as a result, are often highly vulnerable to habitat fragmentation and loss of connectivity. Indeed loss of connectivity between the sky islands, particularly the construction of Interstate 10, may have significantly impacted jaguar movement in the region and may be one reason this species has been restricted to southern Arizona. Such potential causes of lack of viability of jaguar habitat has great remediation potential as conservation for this species becomes better understood. Loss of strategically located habitat, in effect a hub for 3 potential corridors with potential for restoration must be considered. Effects further limiting jaguar in the sky islands must be considered cumulative to previous effects such as fragmentation by highways. The CNF must identify impacts and mitigation such as the Department described for wildlife linkages above for page 370.
Ch 3/398 Lesser long-nosed bat	The impacts of the artificial lights on the movement patterns, foraging and roosting habitat of the Lesser long-nosed bat is not analyzed in the DEIS.
Ch 3/399 Northern Mexican Gartersnake	No mitigation is identified. Mitigation similar to that the Department described for Chiricahua Leopard frogs should be identified. Mexican garter snakes are protected by state law per Title 17 of the Arizona Revised Statutes (17-231, 17-234 and 17-309), which prohibits the taking of wildlife outside of its prescribed hunting season. Per Arizona Game and Fish Commission Order 43, there is no open season on the species, meaning it is always illegal to capture or kill them without a special license.
Ch 3/400 Rosemont talussnail, Sonoran talussnail, springsnails, Gila chub, Gila topminnow, longfin dace	The Department reiterates its PDEIS comment: There will be permanent habitat loss for some talussnail populations within the proposed mine footprint and project area, although that is not likely to jeopardize the species (whether singular or plural species). It is unknown if the numerous nearby populations of talussnail to the west and south of the project area will be indirectly affected by mining activities—such as ground vibrations from use of explosives and earth moving, filling in of talus interstitial spaces from accumulated dust over time, and local changes in local air and ground moisture levels from loss of surrounding vegetative community. Regardless of whether the Rosemont talussnail is a valid taxon or not, the various talussnail populations/species within the project area and vicinity should be protected, managed, and monitored under a signed conservation agreement similar to the one being finalized for the several species of landsnails in the Pinaleno Mountains. The agreement signatories would be the mine owners/operators, USFS Coronado NF, USFWS, Pima County, BLM, and AZGFD. Actions under the conservation agreement would need to: (1) secure most of the snail-occupied talus slopes, (2) mitigate for the loss of snail-occupied habitat within the proposed mine footprint and project area, (3) establish a monitoring program for the talussnail populations for the duration of the mine operations, (4) convene at least annual signatory and stakeholder workgroup meetings; and (5) conduct research on establishing new populations in suitable talus habitat to make up for populations lost to mining operations and also track local micro-climate changes (if any) among nearby talussnail populations. While Westland Resources Inc. did a commendable job on inventorying the numerous talus slopes and talussnail populations within the project area and vicinity, as well as gaining some new life history information on the snails, they should have their research

	peer-reviewed and published to increase the credibility and dissemination of their findings. The AutoCAD technique for snail shell morphology was interesting, but is not a widely recognized or accepted method for taxonomic assignment for mollusks. We recommend that they submit talussnail specimens for genetic analysis (nuclear and mitochondrial DNA) to an outside third party, not conducted in-house. Specimens for this genetic analysis should be from multiple populations throughout the project area and vicinity (including 1-2 outgroups, elsewhere in southern Arizona); with batches of 20-30 snails per population to ensure the samples are robust enough to determine population-level variability. Genetic research should also be peer-reviewed and published to help resolve any taxonomic uncertainties with the talussnail species in the area. The Department believes a more thorough search of local spring and seep habitat in the project area and vicinity for potential populations of native springsnails (genus Pyrgulopsis) is necessary. This survey effort needs to be done to ensure that we may not be losing any previously undiscovered populations of these tiny mollusks. Potential groundwater and surface water losses from proposed Rosemont mining activities over the long-term (decades, if not hundreds of years) in the project area and vicinity will likely degrade or diminish habitat for endangered Gila topminnow, endangered Gila chub, and longfin dace in Cienega Creek, in proximity of the Davidson Canyon confluence. Likewise, potential contamination of groundwater and surface water from mine tailing and waste rock leaching via Davidson Canyon into Cienega Creek will likely impact the native fishes in that portion of Cienega Creek. Cienega Creek is one of the last natural populations of Gila topminnow that occur in stream habitat, and is one of the largest populations of wild Gila topminnow and Gila chub that remain in the State. The EIS should discuss the following: • Genetic analysis of talussnail populations as described above. • Research on how mining activities cause indirect impacts to talus habitat via vibration, dust accumulation, and local micro-climate—suggest doing baseline studies at the Rosemont site now and parallel studies at similar talus habitat near other large-scale open mine mines elsewhere in southern/eastern Arizona. • Conduct thorough surveys of springs and seeps in the project area and vicinity for potential Pyrgulopsis populations. • Determine baseline conditions of surface water flow, groundwater volume and depth, water quality and water chemistry, and background pollutants along two or more sites in Davidson Canyon, including the confluence with Cienega Creek.
Ch 3/400 Southwest willow flycatcher, Western yellow-billed cuckoo	Given the identified uncertainty of surface and groundwater modeling, and the potential for Cienega Creek to suffer greater losses to surface flow than has been modeled, the CNF must identify impacts that may be associated with those losses and develop mitigation to compensate for those losses.

Ch 3/400 Western yellow-billed cuckoo	No mitigation is identified for the Western yellow-billed cuckoo. Mitigation should replace habitat lost, and compensate for lost individuals.
Ch 3/401 Other special status animal species	As stated previously, the CNF neglected to address Species of Greatest Conservation Need and Species of Economic and Regional Importance from our State Wildlife Action Plan. How will the SWAP species be impacted and what mitigation will be required to offset those impacts?
Ch 3/401 Migratory Birds	Madrean oak woodlands are important to not only permanent resident birds, but for the 250+ migratory birds that use these areas as important stop-over sites each year. ARS § 17-236 prohibits the take or injury of any bird, the harassment of any bird upon its nest, or removal of nests or eggs ***except*** as may occur in normal horticultural and agricultural practices and except as authorized by Commission order. The project must be planned so as to avoid violations of ARS § 17-236 and be in compliance with the Migratory Bird Treaty Act in coordination with the Department and the USFWS. Appropriate mitigation in coordination with Arizona Game and Fish must occur if any violation of § 17-236 is anticipated as this take may not occur except as permitted by the Arizona Game and Fish Commission.
Ch 3/401 Migratory Birds	For bird status the DEIS frequently notes that "The species was not observed in the Rosemont Area during surveys conducted by Russell et al. (1978)." In the Department's opinion, the authors should not be putting much faith in bird distribution data that was collected over 30 years ago. The distribution of many bird species have steadily changed since that time and these changes have escalated during the past 10 years due to habitat change and likely influenced by the warming climate. For breeding birds, the Department has already provided the CNF with what species of birds were documented in the area during the AZ Breeding Bird Atlas (1993-2000) via the Atlas database. Even since then, the distribution of some species has greatly expanded from the south. The Department suggests that the CNF 1) use the data the Department has provided and 2) survey the area thoroughly.
Ch 3/402 Bald and golden eagles	The statement "Foraging eagles would probably just shift their foraging activity to other nearby areas" is inaccurate due to the size of the foraging area impacted. These mining activities could lead to the loss of golden eagle territories. Other nearby areas (if already suitable) are presumed occupied by resident golden eagles and the mining activities would therefore increase the probability of a locally territorial golden eagle displacing individual(s) from a neighboring territory.
Ch 3/402 Migratory Birds	Need to include another "bullet" that states: traffic volume along primary road network.
Ch 3/403 Other Plants and Animals	"Impacts to other plants that occur . . ." This phrase is duplicated. The Department assumes the CNF intended to use "animals" instead of plants for one of these paragraphs. "any individuals [animals] present within the footprint of the mine infrastructure or in the path of either the water or transmission lines could be crushed, trampled, or forced to relocate owing to project activities. The construction and operation of the mine could both directly and indirectly disrupt the local movement corridors for some species. Any individuals present in the analysis area outside the mine footprint could experience direct impacts from noise, vibrations, and light and indirect impacts from noise,

	vibrations, light, and groundwater drawdown to suitable habitat, including changes in food source and habitat conversion. Take of all wildlife is regulated under state law per Title 17 of the Arizona Revised Statutes (§§17-231, 17-234 and 17-309), which prohibits the taking of wildlife except as expressly permitted by the Arizona Game and Fish Commission. The CNF must take a hard look at what wildlife will be taken, what wildlife resources will be lost, and determine what mitigation for those losses are feasible in coordination with the Arizona Game and Fish Department.
	MITIGATION
Ch. 2/62 Mitigation	The DEIS cites the CEQ definition for mitigation which includes avoiding, minimizing, rectifying, reducing or eliminating, and compensating. The Department asserts that mitigation has not been adequately addressed in the EIS. In fact, mitigation described in the EIS does not meet even minimum expectations of the Department (see our letter dated 12/15/2009 incorporated here by reference). The extent of mitigation generally appears to be what would be considered "best management practices" which are to be expected independent of mitigation. Although best management practices minimize and reduce impacts, they do not compensate for lost values. The CNF has made but small attempts to utilize mitigation tools other than minimization and reduction of impacts onsite. Chapter 2 should identify mitigation that rectifies and compensates the public trust for the resources lost. A minimum should be an acre for acre replacement for wildlife habitat in kind and in time, and available for all uses that occurred prior to mine development. The DEIS should identify mitigation that will compensate the public trust for that land lost to the purpose of wildlife habitat. Such land should be of equal or higher value as wildlife habitat. Another option for rectifying and compensating the public for land lost as wildlife habitat would be to enhance currently degraded land to provide higher quality wildlife habitat. Habitat enhancement might include purchase of state or private lands currently in degraded condition and bringing those lands into a state of higher biological function. Our letter dated December 15, 2009 and incorporated here by reference stated "the Department would like to see the cost to the public quantified in terms of direct loss of wildlife now and into the future, loss of indirect benefits of wildlife now and into the future including loss of wildlife-related recreation." These costs have not been calculated for the purposes of mitigation and no mitigation has been offered to offset these costs.
Ch. 2/85 Relocating Waste Rock and Tailings	The CNF appears reluctant to address alternatives including mitigation that occurs geographically outside of CNF boundaries. The CNF must take a hard look at all relevant, reasonable mitigation measures that could improve the project even if they are outside the jurisdiction of the agency. The CNF eliminated from detailed study the potential for relocating waste rock and tailings to brownfield sites or other less biologically significant sites off-CNF. The decision not to utilize non-CNF land was made without thorough analysis of the potential for this alternative which could significantly mitigate environmental impacts.

	Resolution Copper in Superior, Arizona has committed to using brownfield sites for tailings from their proposed mine near Superior. This dramatically reduces the potential impacts of tailings from that project on the environment. The Resolution tailings would be transported a significant distance which suggests that the statement justifying lack of analysis based on "transportation logistics" has not been adequately addressed. The impacts of the Rosemont Copper Project would be significantly eliminated by transporting tailings to a non-NFS site of less biological value. The Department contends that this alternative component, which could so significantly change the environmental impact of the project, should have been studied in detail. If the CNF had considered this option, a suitable site may have been located. If brownfield sites are unavailable, certainly sites of less environmental import are. Moreover, sites off NFS lands could be used. The Ray mine is investigating the potential for transporting tailings to state trust lands. Were State Lands analyzed as a potential tailing site? The EIS states that "other off-CNF options were constrained by lack of availability of enough available open land". The Department has checked the Species and Habitat Conservation Guide on the HabiMap Arizona website and notes that the tailings will be located in an area of high biological value. Equally apparent is that much unoccupied private and state land of lesser biological value is available nearby. How then does the CNF explain their use of the "lack of available open land" as a reason for not analyzing this alternative? The Department suggests that detailed analysis of this alternative may have provided a number of alternative sites for tailings and dumps available at market value. This would shift the cost of land for the tailings from the public trust to the project proponent. Wildlife resources held in public trust by the state would be impacted to a lesser degree if a less biologically rich site were used and especially if a brownfield site were used. Moreover, all public trust values would be retained on the NFS lands not used. The Department requests that a more detailed analysis of availability of less biologically rich lands for waste rock and tailings deposits be undertaken for the Final EIS.
Ch 2/64 Mitigation	The DEIS does not adequately describe all environmental effects to wildlife and habitat and related recreation, and as a result, the mitigation proposed in the DEIS fails to address these impacts. At a meeting regarding compensatory lands on May 26, 2009, the Department identified several tracts of wildlife habitat that could be considered for purchase by project proponent to compensate the public for the loss of multiple generations of wildlife resources. These proposals were sent to CNF the following day by email. None of these proposals, or similar mitigation lands, appears as an alternative or potential mitigation in the DEIS. The CNF's preferred alternative does not include any element that stipulates that compensation be made to the public through purchase and transfer of lands containing habitat of equal value. As a result, the Department believes that neither the proposed action nor any action alternative adequately describes adverse effects on wildlife and habitat, alternatives or mitigation strategies to compensate the public for the known and foreseeable losses as is more fully described in greater detail in the following comments.

Ch 2/69: Plant and Animals	There is no mention of any mitigation actions for the loss of plants and animals in this section. There will be many ecological services lost due to the mining actions. There will be lost ecological services over time relative to the baseline conditions of the area. There is no mention of providing any mitigation actions that would be needed to restore lost ecological services (as is presented for recreation mitigation actions).
Ch 2/69 Plants and Animals	The text states that Rosemont would revegetate disturbed areas, the specifications of which are to be included in the reclamation plan. No details are provided.
Ch 3/321	The text states: "These mitigation efforts will be developed in cooperation with …." The Arizona Game and Fish Department needs to be specified in the list of appropriate agencies.
Ch 2/69 Plants and Animals	As a mitigation measure, Rosemont proposes to "fence selected exclusion areas of highest value riparian habitat to restrict livestock access from breeding areas for sensitive wildlife species within the Rosemont Ranch lands system, including NFS lands within the Rosemont, Thurber, DeBaud and Greaterville grazing allotment permits". No details are provided as to what adverse effects this "mitigation" is intended to offset; what riparian areas are proposed; how the fencing will benefit a species, what species will benefit; or how much acreage will be fenced. There is no reference to any enforceable conservation easement. This perfunctory description is reflective of CNF's exclusion of the Game and fish Department in the preparation of this DEIS and is completely inadequate to meet CNF's responsibility to develop mitigation measures for all effects. CEQ, 1502.14(f); 1502.16(h); 1508.14. The EIS and the Record of Decision should also indicate the likelihood that such measures will be adopted and enforced by CNF. CEQ, 1502.16(h), 1505.2.
Ch 2/66	The text describes a "Santa Rita Mountains Community Endowment Trust" to fund "priority community projects" to include conservation easements and restrictive covenants donated by Rosemont in the first year of production. This trust concept was developed without any input from the Department. The identity of the trustees and beneficiaries are unknown. The "projects" to be funded are not specified. It is unclear what identified adverse environmental effects this endowment trust is intended to mitigate, or whether this fund will effectively reduce any identified environmental impacts of this project. There is no detail regarding which lands will be subject to conservation agreements or what "restrictive covenants" are to be imposed, or where. No analysis of the effectiveness of this trust in reducing impacts to the environment is provided. This vague discussion of mitigation is inadequate under CEQ guidance (February 2011).
Ch 2/ 66	Insert the word "Environmental" into the section titled 'Community, Social and Cultural'; since it explicitly points out that the trust fund can be used for environmental conservation.
Ch. 3/157 Mitigation Effectiveness	The text states that under the mine reclamation plan, Rosemont will provide 1 foot of growth media cover over waste rock slopes, surfaces, and benches, the completed tailings buttress, fill slopes, construction areas, the facility plant site and roads. "Sediment control structures would be installed or other best management practices implemented as needed to protect growth media from loss". No engineering details of these "sediment control structures" are provided, or whether such structures will be effective. How

	will be structures be maintained following mine closure? A major storm event could mobilize the growth media downstream as suspended sediment to Barrel Canyon, Davidson Creek and Cienega Creek. The EIS should analyze this possibility.
Ch 2/69 Mitigation: Plants and Animals	The Department finds the described mitigation for "Plants and Animals" inadequate. Very little actual mitigation is described. Rosemont would "revegetate disturbed areas with native vegetation, excluding the pit area" and "specifications would be included in the reclamation plan." How is the Department to evaluate the efficacy of reclamation if there are no specifics in the DEIS? What native vegetation will be used? What potential for wildlife habitat can the Department expect? Why should the Department expect that reclamation will not resemble reclamation we have observed elsewhere? The Department's experience is that tailings and dumps can be expected to have a very low ecological potential and will support an ecologically depauperate biotic community composed of few species and supporting little in the way of wildlife habitat. Reclamation may minimize the amount of dust blowing off the tailings but does little to compensate for the loss of diverse, biologically rich, vegetative community in a sky island biome that contains some of the highest biodiversity in the state and nation. The Department refers the CNF to our letters dated January 13 2010 for which we outlined mitigation criteria, and December 15 2009, for which we described mitigation requirements. We incorporate those letters here by reference.
Ch 2/71 Mitigation	Rosemont would "consider inclusion of those species important to . . . wildlife uses". This is a very non-committal statement. Rosemont has stated that it would revegetate the area to pre-mining conditions. The CNF should require revegetation to the potential vegetation community. The revegetation potential should be stated and required. If revegetation is not possible the EIS should so state.
Ch 3/320-21 Mitigation Effectiveness Groundwater Quantity	The DEIS references "The Rosemont Water Source Enhancement and Mitigation Plan". The Department does not have this document and a search of the EIS website does not return this document. A search of the Literature Cited section provided with the DEIS does not return this document. Since this document is referred to in the future tense, i.e. the plan "will be developed" we assume that this document is unavailable for the public, or our review. The Department suggests that determining the adequacy of mitigation for the project cannot be determined without reviewing this plan.
Ch 3/320-321 Mitigation Effectiveness Groundwater Quantity	The DEIS references "The Rosemont Water Source Enhancement and Mitigation Plan". The Department does not have this document and a search of the EIS website does not return this document. A search of the Literature Cited section provided with the DEIS does not return this document. Since this document is referred to in the future tense, i.e. the plan "will be developed" we assume that this document is unavailable for the public, or our review. The Department suggests that determining the adequacy of mitigation for the project cannot be determined without reviewing this plan.

Ch. 3/148-157 Revegetation Potential of Waste Rock and Tailings	The text at 149 states "Based on the research conducted by the University of Arizona, use of the selected seed mix *could potentially* result in revegetation on waste rock and tailings piles that would approximate native vegetative conditions" (emphasis added). The Department commends the CNF for developing guidelines and detailing expected success over 100 years. However, the Department questions the expected results. What studies, other than the short term studies by Rosemont, support revegetation success to climax vegetation? The Department questions the ability of the reclaimed sites to support mature trees through normal periods of drought and stress. What is the likelihood, that this success will be realized here and how can the public be assured of success? What recourse will the public have should revegetation fail to produce the desired vegetative community? The Department suggests that reclamation to "approximate native vegetative conditions" including alligator juniper and Emory oak 4 feet tall after 20 years and 8 to 20 feet tall after 100 years to be highly optimistic. Page 157, *Mitigation Effectiveness* does not describe how effective this revegetation will be. As is stated on page 551, "Even when vegetation is established during reclamation efforts, the composition of plan species in a recovery area is often different from the original plant community."
Ch 2 Mitigation -Reclamation	The Department suggests that reclamation as described will not restore the ecological function of the site to pre-disturbance levels. The EIS should clarify this for better public understanding. Statements that tailings piles, heap leach, waste rock etc will be reclaimed should be qualified relative to their potential to match ecological function of the former and surrounding native landscape. The following section from the Society for Ecological Restoration "SER Primer on Ecological Restoration" , www.ser.org, 2002 which provides minimal criteria for evaluating ecological restoration, may be helpful: "Section 3. Attributes of Restored Ecosystems This section addresses the question of what is meant by "recovery" in ecological restoration. An ecosystem has recovered - and is restored - when it contains sufficient biotic and abiotic resources to continue its development without further assistance or subsidy. It will sustain itself structurally and functionally. It will demonstrate resilience to normal ranges of environmental stress and disturbance. It will interact with contiguous ecosystems in terms of biotic and abiotic flows and cultural interactions. The nine attributes listed below provide a basis for determining when restoration has been accomplished. The full expression of all of these attributes is not essential to demonstrate restoration. Instead, it is only necessary for these attributes to demonstrate an appropriate trajectory of ecosystem development towards the intended goals or reference. Some attributes are readily measured. Others must be assessed indirectly, including most ecosystem functions, which cannot be ascertained without research efforts that exceed the capabilities and budgets of most restoration projects. 1. The restored ecosystem contains *a characteristic assemblage* of the species that occur in the reference ecosystem and that provide appropriate community structure.

	2. The restored ecosystem consists of indigenous species to the greatest practicable extent. In restored cultural ecosystems, allowances can be made for exotic domesticated species and for non-invasive ruderal and segetal species that presumably co-evolved with them. Ruderals are plants that colonize disturbed sites, whereas segetals typically grow intermixed with crop species. 3. All functional groups necessary for the continued development and/or stability of the restored ecosystem are represented or, if they are not, the missing groups have the potential to colonize by natural means. 4. The physical environment of the restored ecosystem is capable of sustaining reproducing populations of the species necessary for its continued stability or development along the desired trajectory. 5. The restored ecosystem apparently functions normally for its ecological stage of development, and signs of dysfunction are absent. 6. The restored ecosystem is suitably integrated into a larger ecological matrix or landscape, with which it interacts through abiotic and biotic flows and exchanges. 7. Potential threats to the health and integrity of the restored ecosystem from the surrounding landscape have been eliminated or reduced as much as possible. 8. The restored ecosystem is sufficiently resilient to endure the normal periodic stress events in the local environment that serve to maintain the integrity of the ecosystem. 9. The restored ecosystem is self-sustaining to the same degree as its reference ecosystem, and has the potential to persist indefinitely under existing environmental conditions. Nevertheless, aspects of its biodiversity, structure and functioning may change as part of normal ecosystem development, and may fluctuate in response to normal periodic stress and occasional disturbance events of greater consequence. As in any intact ecosystem, the species composition and other attributes of a restored ecosystem may evolve as environmental conditions change. Other attributes gain relevance and should be added to this list if they are identified as goals of the restoration project. For example, one of the goals of restoration might be to provide specified natural goods and services for social benefit in a sustainable manner. In this respect, the restored ecosystem serves as natural capital for the accrual of these goods and services. Another goal might be for the restored ecosystem to provide habitat for rare species or to harbor a diverse gene pool for selected species. Other possible goals of restoration might include the provision of aesthetic amenities or the accommodation of activities of social consequence, such as the strengthening of a community through the participation of individuals in a restoration project."
Ch 2/72 Mitigation Vegetation	The second paragraph on this page states a "goal" of providing "sufficient cover" on all disturbed areas to be reclaimed. Please define "sufficient" and please state whether or not this goal has any expectation of being fulfilled, and any contingency plan for the failure to meet this goal. Also please state what areas *will not* be revegetated. A map of the vegetated versus non-vegetated

	reclaimed areas should be included. The fourth paragraph states "Growth media would be placed on reclaimed areas and revegetated with native grasses, trees, and/or shrubs to meet desired conditions, to be determined by the Forest Service". Please define "desired conditions". Shouldn't the desired conditions be to replicate the vegetation that existed onsite prior to mining? Such vegetation would include a diverse vegetative community that includes mature trees. The Department suggests the CNF provide a map depicting expected vegetation areas. Mitigation for loss of vegetation should include replacement of said vegetation *in kind, in time.* The Department refers the CNF to our letters dated January 13 2010 for which we outlined mitigation criteria, and December 15 2009, for which we described mitigation requirements. We incorporate those letters here by reference.
Ch. 2/72 Mitigation Recreation	"Post mine mitigation measures may not fully rectify or compensate for all impacts to recreational access." Suggest change to "post mine mitigation measures will not adequately rectify or compensate for lost recreational opportunities." The Department requests that the CNF mitigate for the loss of recreational opportunities resulting from direct conversion of wildlife habitat to mine tailings, pit, and facilities, and indirect loss due to access restrictions to unaltered CNF lands, as well as potential losses resulting from degradation of wildlife habitat beyond the footprint of the mine from water quality and quantity reductions, fragmentation of habitat due to increased motor vehicle traffic, and direct wildlife mortality due to animal/vehicle conclusions. The DEIS has not analyzed the impact on recreation to the extent that any numbers can be generated to quantitatively estimate mitigation measures. The Department suggests that a minimum goal to strive for in mitigating losses to public recreation is 100% compensation to the public *in kind, in time*. In other words, if the public will lose 3760ac (directly to mine use) currently available to recreation, mitigation must include providing 3760ac of land of equal or greater recreational value available to public recreation *at the same time* the public has lost access to the land in the project area. Moreover, since the Rosemont Copper Project will significantly alter and degrade the land currently available for public recreation *permanently*, any newly available access should be made permanent. Examples of this type of mitigation might include replacing lost Mearn's quail hunting opportunities by purchasing hunting access on an equal number of acres lost where hunting access is currently unavailable. Or, similarly, loss of wild turkey hunting opportunities in the Santa Ritas might be mitigated by translocating wild turkeys into a previously unpopulated native habitat or otherwise enhancing wild turkey habitat to increase hunting opportunities. Degradation of public recreational opportunities outside the mine footprint resulting from reduced wildlife populations and impaired ecosystems should also be mitigated by providing newly available opportunities or enhancing existing opportunities. For example, damage done to wildlife populations dependent on the linkages modeled between the Santa Ritas and Whetstones might be compensated by funding the construction of a crossing structure across Interstate 10 to help restore the wildlife linkage between the Whetstones and the Rincons currently fragmented by the freeway. The Department refers the CNF to our letters dated January 13 2010 for which we outlined mitigation criteria, and December 15

	2009, for which we described mitigation requirements. We incorporate those letters here by reference.
Ch 3/276-78 Mitigation Effectiveness for groundwater quality	Given the uncertainty of the accuracy of groundwater modeling noted in the DEIS and elsewhere, the Department is concerned that the potential effects on groundwater as presented in the DEIS may be a conservative prediction, i.e. the best case scenario, and offers that the CNF should consider possibilities outside the modeled probable outcome. During Cooperators meetings, questions were raised regarding the potential for greater dewatering due to fractured geology. The CNF should implement mitigation standards based on the expected outcome, but should also provide for potential mitigation needs not predicted by the models, but within the realm of possibility, and require such mitigation should significant dewatering events occur that may be caused by the Rosemont Project. Again, the Department emphasizes the need for meaningful mitigation to be identified for the loss of groundwater quantity including springs, seeps, and stream flow. See our comments on Ch 2 P. 75 regarding springs and seeps. The Department respectfully requests that meaningful mitigation be developed for the loss of springs and seeps as habitat components for wildlife. Mitigation identified in the EIS is ineffective to compensate for the potential loss of stream flow in Cienega Creek and Davidson Canyon, particularly considering the uncertainty of the modeling. With average estimated reductions in flow of 1 to 3 percent for Cienega Creek, and up to 41 percent for Davidson Canyon, the Department suggests that such losses may be mitigated through riparian enhancement elsewhere. It is the Department's understanding from groundwater discussions at the cooperators meetings, that the unknown geologic structure of the area could result in a situation dramatically different than the modeled outcome, i.e. if a fracture directly connected to water sources for Cienega Creek or Davidson Canyon also intersects the pit, dramatic dewatering of natural flow for those streams could occur. The CNF should evaluate the possibility of such an outcome and determine what measures could mitigate such a significant resource lost from the public trust. Mitigation for the loss of Cienega Creek seems beyond calculation as this resource, once lost, cannot be re-created. However, transfers of significant parcels of perennial habitat to the public trust and enhancement of those parcels to increase their potential as fish and wildlife habitat would be the most logical form of mitigation available. Potential mitigation parcels may be located on the San Pedro River, Sonoita Creek, Upper Santa Cruz, and other riverine systems. Augusta should share the risk of such an event with the public whose resources may otherwise be lost without recourse.
Ch 3/413 Mitigation Effectiveness	This section does not address the complete loss of approximately 7,000 acres of wildlife habitat. The document needs to include the compensatory mitigation action of replacing this wildlife habitat through the protection/restoration of equivalent habitat lost. In addition, this section does not address how the proponents will mitigate for the temporal loss of the biological services during and after the mining operations. Overall this section is severely lacking in any of the appropriate mitigation actions that would be necessary for the impact this mining operation will have on numerous wildlife species and their habitat.
Ch 3/413 Mitigation Effectiveness	The Department refers the CNF to our letters dated January 13 2010 for which we outlined mitigation criteria, and December 15 2009, for which we described mitigation requirements. We incorporate those letters here by reference and ask that compensatory

	mitigation be identified.
Ch 3/413 Mitigation Effectiveness	Revegetation of disturbed areas to an ecological state of low function does not mitigate loss of this habitat during the 25 years it is lost, nor does it adequately mitigate in to the future as the state of the reclaimed areas will not be restored to ecologically functioning habitat. We have identified mitigation criteria and measures which must be taken to adequately mitigate including purchase of compensatory lands, conservation of threatened lands, enhancement of degraded lands, and other measures.
Ch 3/413 Mitigation Effectiveness	Fencing of riparian habitat on NFS lands is a best management practice and does not compensate or mitigate for any activities of the mine. This should be required of Rosemont regardless of the mine.
Ch 2. Mitigation – With emphasis on mitigation for losses regarding Chiricahua leopard frogs	The mitigation measures incorporated into the project design do not deal directly with effects on Chiricahua leopard frogs. It is abundantly clear from the last few decades of study of ranid frogs in general, and the last decade-plus of Chiricahua leopard frog recovery activities that, "[w]ithin [Recovery Units], it will be important to implement recovery actions over large landscapes with the greatest potential for successful recovery" (USFWS 2007). As indicated above, the Recovery Plan delineated many of those large landscapes as "Management Areas" (MAs) within Recovery Units. Two of those MAs comprise a large percentage of the action area and mine footprint, yet the mitigation measures do not propose any actions to offset loss of recovery potential within those MAs. The Water Source Enhancement and Mitigation Plan proposes to replace guzzlers, stock tanks and other water supply structures "lost to wildlife" such that there would be "no net loss" of such structures. Replacement of structures does not replace the landscape from which they came, or the effects of loss of those structures on CLF that occupy that landscape. In addition, the DEIS provided no discussion of the impacts to springs and seeps, other than their loss. These can provide additional sites for dispersal and breeding, depending on their size and dependability. Because the loss is the landscape, we propose a relatively generalized mitigation strategy. The Chiricahua leopard frog Recovery Plan outlines mitigation and conservation strategies, particularly in appendices A, H and I. In Appendix I, the following Compensation Determination and a formula with which compensation may be determined is outlined (included here in its entirety, from pp. I13-14): "The goal of compensation is to prevent the net loss of Chiricahua leopard frog habitat quantity and quality in MAs, to maintain or enhance movement corridors among populations, and to make the net effect of a project neutral or positive. To achieve this goal, compensation should be based on the area of frog habitat degraded or lost, degradation or loss of movement corridors, growth inducing effects, and the duration of the effects. Compensation should be determined by the following formula: **Area = A (B + G + D +1)** Area is the suitable frog habitat land area that must be purchased or restored/created to compensate for residual effects. Other variables are evaluated as follows:

A Net area (acres or hectares) in a MA of occupied frog habitat or habitat in a selected restoration/creation sites that is degraded or lost (including areas where adverse effects to habitat, frogs, or both occur) due to the project, after all on-site conservation measures have been applied. Frog habitats include wetlands and associated riparian vegetation in which frogs may forage or disperse. Frog habitats may be degraded if corridors to other suitable habitats are disrupted or compromised.

B Barrier to movement within MAs:
The project will not block or impede movement among occupied and/or restoration/creation sites 0
The project will block or impede movement between two occupied and/or restoration/creation sites 0.5
The project will block or impede movement among three or more occupied and/or restoration/creation sites 1.0

G Growth inducing effects (the project facilitates other development, recreation, introduction of non-native predators or disease, or other activities that will, in the future, adversely affect frogs or their habitats in a MA):
The project will have no growth inducing effects 0
The project will have growth inducing effects 0.5

D Duration of effect:
The effects of the project are expected to be short term (< 10 years).....0
The effects of the project are expected to be long term (> 10 years).....0.5

Applying the compensation formula above will result in 1:1 to 3:1 compensation, depending on the nature of the residual effects, as defined above. Within MAs, action agencies or project proponents should purchase and donate suitable habitat, or promptly create or restore replacement habitat in the quantity defined by the compensation formula. Quality of habitat should be equal to or greater than that lost or degraded. Action agencies may require project proponents to pay a monetary equivalent (including administrative costs) that is required to purchase and/or restore the required habitat."

In addition, Appendix H (p. H12) provides watershed use and maintenance guidelines that can be incorporated into a mitigation program, including:

1. Permanently protect suitable habitat and dispersal corridors through land acquisition or conservation easements, or other agreements with willing landowners on private lands or water-right holders on private or public lands, and commitments for appropriate land management on public lands.

2. Restore hydrological regime through watershed management, retirement of stream diversions, and local restrictions on groundwater pumping on public lands.

	3. Manage livestock grazing to maximize benefit and minimize detrimental effects to Chiricahua leopard frogs. 4. Manage for minimal impact, or eliminate where necessary, activities that have the potential to degrade Chiricahua leopard frog habitat in occupied watersheds – grazing, recreation, mining, timber harvest, flood control activities. 5. Minimize opportunities for introduction of non-native predators and disease and conduct non-native predator control where prudent. 6. Eliminate control point and non-point sources of contamination, and air-borne contaminants where possible, in occupied watersheds. 7. Employ fire management practices (i.e., prescribed burns, emergency fire suppression, and emergency water use) that decrease incidental impacts and increase benefits to the Chiricahua leopard frog. 8. Implement watershed management and protection plans using cooperative agreements and existing incentive programs. Finally, specific mitigation measures need to incorporate goals for Recovery Unit 2 in its entirety, in general, and for the Santa Rita and Empire Cienega MAs, in particular. These specific measures should incorporate recovery activities outlined by AGFD, USFWS and their partners through the local recovery groups. These activities include habitat restoration and enhancement, identifying and implementing opportunities for translocations, captive propagation or headstarting, and release, commitments to monitoring, etc.
Ch 3/413 Mitigation Effectiveness	Impacts to talus slopes (and all habitat) must be mitigated *in kind, in time*. Best management practices do not compensate for losses to the public trust values. We have offered extensive recommendations in the PDEIS and reiterated here regarding losses to talussnail habitat.
Ch. 3/400 Rosemont talussnail	A conservation agreement should be implemented for the talussnail populations in the project area and vicinity, as described above. This agreement needs to be fully funded and staffed (can be contracted work) for the duration of mine operations at Rosemont. Mine. In Davidson Canyon and its confluence with Cienega Creek, establish a series of test wells to determine baseline and periodic conditions of water flow, volume, depth, quality, chemistry, and pollutants. Among a set of talussnail populations in the vicinity of the mine, monitor the daily air temperatures and relative humidity with remote sensors (like Onset's HOBO temp sensors). Use a few control sites far enough away from Rosemont that local environmental conditions are not affected by mining activities. Also set out sediment/dust traps within several nearby and distant talus slopes to determine if accumulated dust is a long-term problem or not. The mine owners/operators should set aside a mitigation trust fund that is interest-bearing to fund mitigation and monitoring efforts

	for the duration of mining operations plus several years (or a decade or more) post-operations. Sufficient funding should be earmarked for habitat improvements and for clean-up efforts in case of contamination. The more toxic tailings and waste rock areas should have a thick bentonite or concrete-lined base and an impermeable perimeter barrier to prevent groundwater and surface water contamination and spills due to high precipitation events.
Ch 3/415, Irretrievable and Irreversible Commitment of Biological Resources	Even if the replanted/rehabilitated areas are 100% successful (which is highly unlikely), there will still be a loss of 20 years of natural resources services (e.g., the reproductive output of all the breeding resident passerines over the 20 year period until full habitat recovery). A statement addressing these losses must be included in this section.
Ch 3/550 Mitigation Effectiveness for loss of recreation opportunities	The text states: "Mitigation would consist of removal of the perimeter fence after mining operations" Allowing the public to return to their lands which have been totally altered after 25 years of loss due to mining operations cannot be called "mitigation". Mitigation should compensate the public in kind, in time for the loss of their lands to recreation. The EIS must identify mitigation that compensates the public trust for losses to public trust resources. The Department expects the CNF to identify mitigation *in kind, in time* for lost recreation opportunities associated with wildlife resources. See our comments on Chapter 2 and again the Department refers the CNF to our letters dated January 13 2010 for which we outlined mitigation criteria, and December 15 2009, for which we described mitigation requirements. We incorporate those letters here by reference. In our January 2010 letter we suggested a starting place for identifying compensatory lands: "Mitigation Lands identified for addition to the public trust should: 1) Be offered for mitigation "in-kind, in-time", i.e. provide equal or greater resource and habitat value; no losses to the public trust should occur prior to mitigation lands becoming available to the public trust. 2) Regardless of location within or outside of Pima County, use mitigation ratios consistent with Pima County's Conservation Lands System (CLS) for mitigation (~8,800 acres) as the starting point for any negotiations, notwithstanding the potential for indirect and cumulative impacts which may occur offsite or extend far from the footprint of the project to land, air, and water, and which may require substantial additional mitigation. 3) Be protected in perpetuity with legal instruments that secure minerals and water, and other land interest. 4) Be managed for conservation purposes and allow for habitat enhancement and restoration consistent with the Department's goal of 100% habitat compensation. 5) Be monitored to assure the mitigation intent is being met. 6) Are accessible to the public."
Ch. 2/75 Ch. 3/277 Water Source Mitigation Plan	The text states: "Rosemont Copper would replace or repair water guzzlers, stock tanks, and other human created water supply structures lost to wildlife or grazing use, whether through direct or indirect project related impacts. The result would be no net loss in the current preproject number of human created water sources for livestock and wildlife. This requirement would be stipulated in a water source enhancement and mitigation plan"

While the Department is pleased that Rosemont has made some commitment to mitigating loss of water sources the perfunctory nature of the description of this mitigation falls short of CEQ requirements. There is no discussion of the goals of such mitigation, what the mitigation will attempt to achieve or how, where such replacement waters will be placed, how this will compensate for the loss of these waters, or what losses are being replaced other than "water supply". There is also no mention of the extent of the commitment to maintain these waters. The Department fails to see how mitigation measures can be properly analyzed and their effectiveness determined if they have yet to be developed. Furthermore, created stock tanks require regular maintenance. CNF should describe how the replacement stock ponds will be managed and maintained over the life of the mine and following post-closure. The Department has a long history developing and maintaining waters and can provide input on this topic should the CNF request it.

Water is a component of wildlife habitat, either as drinking water for various species, or for aquatic, semi-aquatic, and amphibious species, as a medium for whole or partial life history. Building another stock tank to replace a stock tank that will be lost is more complicated than it may seem without knowledge of what habitat that particular water provided to which species. For instance, removing a stock tank integral to a metapopulation of Chiricahua leopard frogs, may, in fact, impact the whole dependant metapopulation habitat consisting of multiple stock tanks that have otherwise been unaffected by the mine except for the fact that one component of the dynamic system has been removed, causing the entire system to fail. Moving a water used by bats for foraging habitat and drinking water may cause an otherwise unaffected bat roost to no longer be usable if food and water are not available nearby. Replacing this water elsewhere, away from other bat habitat may not mitigate the loss of the use of that water to bats. Many such situations likely exist which require detailed analysis beyond a simple inventory of existing waters and promise to replace such waters elsewhere as mitigation. True mitigation compensates for the negative impact on the habitat, not simply counts one water for one water without analysis of the habitat lost.

The Department suggests that the CNF should inventory all waters and determine what habitat components these waters likely provide to which species. Habitat mitigation standards that compensate for lost values should be described in the EIS. Once habitat components are better understood, mitigation should be required to replace those habitat components in a meaningful way.

Where will newly constructed waters compensate the public for the wildlife values that have been lost? If a stock tank is lost that is used by a metapopulation of leopard frogs, will that metapopulation be impacted, and if so, where can additional stock tanks not only be added, but how will that entire metapopulation be replaced? Or, can the stock tank be moved to maintain/enhance the viability of the existing metapopulation?

Will replacement waters mitigate wildlife losses or will they simply replace water? Building new waters where they are not needed would be a wasted effort. Any replacement waters should enhance/replace the wildlife values lost, i.e. increase resident populations, strengthen viability of resident populations, or create habitat for new populations.

In some instances, waters are important for wildlife movement, and the loss of waters creates fragmentation zones between viable habitats. The CNF has not addressed the impact of the loss of human made water sources here on the movement of wildlife. The Department previously identified the Santa Rita Mountains as an unfragmented habitat block which anchored several wildlife linkages between neighboring mountain ranges. The habitat block will be fragmented by the mine, partially due to loss of waters.

	How will this effect be mitigated?
Ch. 2/75 Water Source Mitigation Plan	The CNF has committed to mitigation for lost human-made waters but makes no mention of mitigation for loss of natural waters. The Department understands that some springs will be classified by the Army Corps of Engineers as qualifying as jurisdictional wetlands for which mitigation will be required, but the majority of them will not be categorized as such. The CNF has identified 84 springs that will be impacted by the preferred alternative. Will impacts to these springs be mitigated? If not, why not? If so, how? Natural springs are often more valuable than human made waters which must be continually maintained. In addition, natural springs may provide habitat for native species that have existed because of these springs for thousands of years. A search of Chapter 3 indicates no mention of spring snails. Were the springs inventoried for spring snails? The Department is concerned that spring snails may be present and that the potential for impacts to these species have not been evaluated.
Ch 3/551 Mitigation Effectiveness for loss of recreation opportunities	"Mitigation mentioned in chapter 2 includes the intent to reduce or eliminate future development of private lands currently owned by Rosemont Copper that will eventually be located on top of waste rock and tailings piles" Does this statement say that as mitigation for burying public lands in waste rock and tailings piles Rosemont promises not to "develop" the waste rock and tailings piles in the future? Please explain what is being mitigated by not developing waste rock and tailings piles. The Department has noted in a comment that stormwater collected on top of mine tailings can acidify and cause injury or mortality to migratory birds and waterfowl. This adverse effect requires further discussion in the EIS.
Ch 3/551 Mitigation Effectiveness for loss of recreation opportunities	"Unavoidable adverse impacts to recreation" . . . "include the loss of public access roads throughout the project area" The Department suggests that the CNF commit to acquiring equivalent access to other, inaccessible areas of the CNF. Many access problems have been identified by the CNF and by our Department. There is no reason the CNF cannot identify opportunities to mitigate access.
Ch. 2/73 Mitigation Transportation	Highway 83 already fragments wildlife habitat but traffic is relatively light compared to post-mine construction projections for 24 hour use. The CNF has not addressed the effect of increased vehicular traffic on Highway 83 on wildlife populations or suggested mitigation for this increased traffic. The Department suggests that fencing and wildlife crossings per AGFD guidelines be constructed to mitigate additional fragmentation. Inventory and monitoring will be necessary to identify the best areas for crossing structures and to monitor their effectiveness. Mitigation suggested in the Transportation Plan section at the bottom of page 73 states that Rosemont has committed to "installation and maintenance of wildlife crossing structures (e.g. corrugated metal pipes) under the primary access road at locations of known wildlife concentration." The Department questions how effective this mitigation will be. What is the "known wildlife concentration" if any? If no "known wildlife concentration" exists, will these "corrugated metal pipes" be installed? How were "corrugated metal pipes" chosen as the best means of creating wildlife crossings? The text does not mention the species

	involved nor the size, design, or placement of the pipes. The Department has conducted original research on wildlife crossings and possesses some expertise in this topic. We have not been consulted regarding this plan or these structures. The Department suggests the CNF should consult with us in determining placement of proper wildlife crossing structures and mitigation for roads within the Rosemont Copper Project, for Highway 83, and for connected actions with a transportation component. The Department needs to be heavily engaged in both developing the plan and in gathering species movement data previous to design or construction. We need to know what species are involved and where best to place crossing structures and funnel fencing. We also need to work closely with designers during all phases of design and construction. In some cases pipes used to drain water across roadways can serve a dual purpose by also moving wildlife, but usually are not adequate for all species and have their own design problems of egress and ingress. Design of the crossings and fencing needs to be species specific; one size does not fit all. Obviously small pipes or culverts will not pass larger animals, but is adequate for some species. Nor are metal pipes the best conduit for many species for a variety of reasons. For instance, some species prefer natural substrate to metal footing. Since deer (and perhaps large carnivores) may need to cross some of the roads, round, metal pipes are totally inadequate for them as crossing structures. Unless huge, they are too confining and also reverberate sound. Not mentioned in the text is the fact that crossing structures need funnel fencing to be most effective and to keep wildlife off roads, thereby preventing mortality from vehicles. In some cases it may be desirable to have wildlife go over the road, such as we have for sheep on Hwy 93. It is known that many species prefer overpasses to pipes and culverts. Areas leading to ingress or egress of crossing structures also need to be considered. It does no good to get an animal across a roadway to end up in a parking lot or other inappropriate area. The total movement corridor needs to be considered when placing crossing structures. Timing of vehicle passage to allow relatively free traffic windows does not sound practical. Again this needs to be addressed in the Plan. Besides roadways, there may also be opportunities for wildlife connectivity throughout other mine infrastructure through planning, design and maintenance of wildlife corridors. Again we need to work closely with mine engineers and planners after we know what species we are dealing with and how animals move around the area. The Department suggests the CNF should consult with us in determining placement of proper wildlife crossing structures and mitigation for roads within the Rosemont Copper Project, for Highway 83, which will incur heavy increase in vehicle traffic as a result of the mine, and for all connected actions with a transportation component.

Ch.2/73 Transportation and Transportation Plan	The text states that the "mitigation measures described in this section are mandatory should one of the alternatives be selected for implementation". But the mitigation measures to improve highway safety on SR 83 have merely been "identified" by Rosemont, such as developing a carpool system to reduce Rosemont employee commuter trips and requiring Rosemont mine truck traffic to avoid SR 83 during high local commuter or school bus traffic times. There no suggestion in the text that Rosemont is committed to fund and implement these highway safety "concepts". Instead, the promised "Rosemont Copper Transportation Plan" would merely "identify carpooling opportunities" for its employees. Rosemont will "manage trucking . . .to the extent possible" to avoid local commuters and school buses. These mitigation measures are merely statements of good intention, and are not "mandatory". The EIS and the Record of Decision should indicate the likelihood that such measures will be adopted or enforced by CNF. CEQ, 1502.16(h), 1505.2. CNF is under a duty to adequately identify risks to public safety and wildlife in the event these "concepts" are not put into place.
Ch 3/551 Mitigation Effectiveness for loss of recreation opportunities, and Irretrievable Resources Ch 3/744 Recreation and Tourism	The Department has recalculated our estimates of hunter opportunity lost based on the revised mine life of 25 years and provides as an attachment to these comments the printed spreadsheet used to calculate permits lost for white-tailed deer, Javelina, and Mearn's quail. What we have not calculated is the total losses of all huntable species, losses due to lost opportunities for trophy animals, or losses of an intangible nature. Given that current world records for white-tailed deer for both rifle and archery came from the Santa Rita Mountains, it is accurate for the Department to state that this is a substantial loss for hunters looking to harvest record book quality white-tails. For the Barrel alternative, the Department expects a loss of 11980 hunter days for white-tail, 2720 hunter days for javelina, and 2850 hunter days for Mearn's quail. In terms of economic losses this equates to an annual $3,916 revenue lost to the Department which would have funded wildlife conservation, or $97,907 total loss of revenue to the Department over 25 years (using static dollars) which would have funded wildlife conservation over the mine life. Using figures based on Silberman's 2002 figures (found here http://www.azgfd.gov/w_c/survey_results.shtml) for value generated by hunting and fishing the Department estimates economic losses from hunting to equate to $1,356,713 (See J. Heffelfinger, Rosemont Game/Hunter effects spreadsheet attached). Why is no mitigation offered for these losses for recreation, and even money which would have been spent on wildlife conservation? As we have stated before the public must know how much the mine is costing them, and that cost should be compensated with mitigation. This calculation is only for direct losses associated with the footprint of the mine over 25 years. As is stated on page 551 "it would take decades or centuries before the project footprint is no longer apparent. Even when vegetation is established during reclamation efforts, the composition of plan species in a recovery area is often different from the original plant community." Losses could easily be extrapolated out to 100 years or in perpetuity dependent on the actual estimate of how much of the ecological integrity is expected to return to the site. Moreover, this only quantifies losses in terms of hunting. The area is also extremely popular with nonconsumptive wildlife users including wildlife watchers.

	RECLAMATION AND CLOSURE; POST-CLOSURE FINANCIAL ASSURANCE
Ch. 2/79-80 Postclosure Monitoring/Financial Assurance	The Department is greatly concerned about the possibility of releases of mine-related hazardous substances, contaminants and pollutants in groundwater and surface waters from the site in the years and decades following mine closure. As the mine is directly upgradient of protected surface waters and riparian habitat in Davidson Canyon and Cienega Creek, this foreseeable event should be fully disclosed and described in the EIS. CNF has not determined the length of time Rosemont would be required to conduct postclosure monitoring of the site to determine the efficacy of the reclamation. The text states that the financial assurance to be required of project proponent should allow CNF to conduct maintenance and monitoring "for as long as required" to "return the site to a stable and acceptable condition," but the mine heap leachate will continue for over 100 years and a sulfate plume from the dry-stack tailings will discharge for 500 years.
Ch 2 Reclamation	The Department concurs with the following comment of the Environmental Protection Agency for the Rosemont PDEIS and adopts the statement by reference as its position: "Experience has shown that reclamation and closure is a key issue and may represent the greatest area of public liability, if not public interest, and is of major importance in regulatory decision-making. Improper or poorly executed Reclamation and Closure can and has led to severe and irretrievable environmental impacts at other mine sites, including those in the state of Arizona. EPA therefore considers Reclamation and Closure to be an absolutely critical component of the DEIS. The DEIS should contain a detailed discussion and summary of the Reclamation and Closure Plan and the ways in which the Plan will address and prevent potential post-closure contamination (including issue specific measures to the extent feasible). As a key part of the alternative analysis, the reclamation and closure plan should be altered for each alternative, or reclamation measures can be considered themselves as an alternative. Some reclamation and closure measures may be common to all alternatives, but some measures may be specific to a given alternative. A given alternative likewise might better accomplish reclamation and closure objectives. We also recommend that the Reclamation and Closure Plan be attached as an appendix to the DEIS. In addition to a description of the closure and reclamation plan, EPA recommends that the Draft EIS identify the bond amounts for each closure and reclamation activity at all of the proposed project facilities. The Draft EIS provides the public the opportunity to weigh in on the adequacy of the bond amount. The viability of the bond can be a critical factor in whether a project is environmentally acceptable. Therefore, this information should be disclosed in the DEIS. The DEIS should also discuss whether and how the Forest Service can modify the bond during the course of operations if temporary, long-term, or perpetual treatment and/or remediation needs are discovered during operations. Identify who would be responsible for any post-closure cleanup actions should they be necessary. In addition to determining the actual cost of reclamation, the bond calculation should consider the extra expense of taking over reclamation at a critical time during operations, such as at the end of heap leach operations prior to additional mining accomplishing encapsulation of the acid spent ore, during wet periods when the water balance is high and surplus water must be treated, or when environmental or reclamation measures have not been successful in controlling pollution and must be redone. The Draft EIS should describe bonding requirements or other measures that the Forest Service will have in place to ensure funds would be immediately available should the mine operator or its insurer be unable to fund the required reclamation or closure activities.

	The Draft EIS should also discuss whether long-term post-closure operations and maintenance may be necessary, describe these activities, indicate the projected costs for these activities, and discuss any requirements the Forest Service would impose on the mine operator to establish a trust fund or other funding mechanism to ensure post-closure care. The financial assurance necessary to fund post-closure activities must be kept current as conditions change at the mine, and the Forest Service should ensure that the form of the financial assurance does not depend on the continued financial health of the mine operator or its parent corporation. The Draft EIS should include general description of the trust fund intended for long-term post-closure care. The mechanics of the fund are critical to determining whether sufficient funds would be available to implement the post-closure plan and reduce the possibility of long-term contamination problems. The discussion in the DEIS should include the flowing information: • Requirements for timing of payments into the trust fund; • How Forest Service would ensure the trust fund would be bankruptcy remote; • Acceptable financial instruments; • Tax status of the trust fund; • Identify the trust fund beneficiaries; and • Identify the operator with responsibility/liability for financial assurance at this site. If a long-term trust fund will be part of the proposed project, EPA believes this information is essential in the DEIS because it could make the difference between a project sufficiently managed over the long-term by the site operator, or an unfunded/under-funded contaminated site that becomes a liability for the Federal government. In the absence of an appropriate guarantee, EPA could consider a project unacceptable if it could result in unmitigated impacts exceeding environmental standards on a long-term basis".