UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
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San Francisco, CA 94105-3901

NOV 07 2013

Colonel Kim Colloton
District Engineer, Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

Subject: Analysis of updated draft Clean Water Act §404 Compensatory Mitigation Proposals for Rosemont Mine, Pima County, Arizona

Dear Colonel Colloton:

On September 10, 2013, our regulatory managers and senior staff met to discuss impacts from the proposed Rosemont Mine and recent conceptual compensatory mitigation proposals. We subsequently received the 4-page *Rosemont Copper Project Conceptual Habitat Mitigation and Monitoring Plan Summary* (Summary) on September 25, 2013. As part of ongoing coordination under our agencies' Memorandum of Agreement, enclosed is our analysis of the Summary for consideration in your permit decision. Briefly, our review reaffirms conclusions from our January 25, 2013 letter (also enclosed) to the U.S. Army Corps of Engineers (Corps) on mitigation that currently proposed activities would be insufficient to avoid "significant degradation" of the aquatic ecosystem. Such degradation would be a substantial and unacceptable impact to aquatic resources of national importance, including the "Outstanding Waters" of Davidson Canyon and Cienega Creek.

The Summary discusses three regional sites where waters of the U.S. (waters) could be preserved and/or potentially enhanced for Clean Water Act (CWA) §404 mitigation credit. As discussed at our September 10th meeting and described in the attached analysis, we agree with your staff's assessment that two of the three sites would not provide appropriate compensatory mitigation for impacts to waters from the Rosemont Mine project. We also agree that one site, immediately below Pantano Dam, would benefit from enhancement activities if water supplies were available and design uncertainties could be overcome, and that those activities could then lend themselves to an In Lieu Fee (ILF) program arrangement for 404 impacts from small projects (*e.g.*, flood control and highway projects). However, the proposal at Pantano Dam is inadequate to compensate for impacts proposed to be permitted at Rosemont Mine.

The proposed copper mine lies within the Cienega Creek watershed, which contains regionally rare, largely intact mosaics of some of the highest quality stream and wetland ecosystems in Arizona. The construction of the mine would permanently fill approximately 18 miles of streams across an

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approximately 5,000-acre project footprint and result in the fragmentation of an intact natural hydrologic landscape unit composed of hundreds of streams stretching many linear miles. The mine pit would reverse groundwater flow direction well beyond the project, and cause permanent regional drawdown of groundwater that currently sustains hundreds of acres of springs, seeps, streams, and wetlands and their aquatic and wetland dependent fish, wildlife and plant species.[1] The persistence and health of aquatic resources associated with Cienega Creek and its major tributaries of Barrel Canyon, Davidson Canyon, Empire Gulch, Gardner Canyon and other waters are dependent on contributions of water from the site of the proposed mine.

These impacts would be a direct consequence of the CWA 404 permit action under consideration by the Corps, and represent a large and permanent change in the regional ecology of the Cienega Creek watershed to a significantly drier, less biologically diverse stream and riparian condition. The region in question includes vast areas of National Forest, federal land preserve, County preservation areas and state-designated "outstanding" resource waters, and is home to ten federally listed endangered or threatened species. In this context, the EPA finds the proposal to enhance the approximately 250-acre Pantano Dam site to be out of balance with the impacts to be permitted.

In our attached discussion, we describe the resource at risk, the current mitigation actions proposed, and key policy considerations related to use of ILF programs, criteria for setting and interpreting mitigation ratios under Corps procedures, and compliance with the CWA 404(b)(1) Guidelines. Based on the information currently available, the permit application does not appear to comply with The Guidelines at 40 CFR 230.10(b), (c) and (d) and should not be permitted as proposed. We hope you will find these comments useful in consideration of your pending permit decision, and we look forward to working closely with your staff on the Interagency Review Team (IRT) for mitigation projects under ILF programs in Arizona. We also remain available to assist the Corps and applicant with a risk-based assessment to determine the full extent of indirect (or "secondary") impacts to waters and an appropriate functional assessment model to scale compensatory mitigation activities under a watershed approach.

Thank you for your ongoing partnership implementing CWA programs. If you have any concerns or questions, please do not hesitate to contact me at (415) 947-8707, or have your Regulatory Division Chief contact Jason Brush at (415) 972-3483.

Sincerely,

Jane Diamond
Director
Water Division

[1] PAFEIS, July 3013, Chapter 3, *Seeps, Springs and Riparian Areas*

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cc: Marjorie Blaine, U.S. Army Corps of Engineers
Jim Upchurch, U.S. Forest Service
Mike Fulton, Arizona Department of Environmental Quality
David Baker, Bureau of Land Management
Steven Spangle, U.S. Fish and Wildlife Service
Chuck Huckelberry, Pima County
Suzanne Shields, Pima County Regional Flood Control District
Applicant

Attachments:

(1) EPA Evaluation of Impacts and to the Aquatic Ecosystem and Proposed CWA Compensatory Mitigation for the Rosemont Mine

(2) EPA letter to Corps LA District dated January 25, 2013

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ATTACHMENT
EPA EVALUATION OF IMPACTS TO THE AQUATIC ECOSYSTEM AND PROPOSED CWA COMPENSATORY MITIGATION FOR THE ROSEMONT MINE
PIMA COUNTY, ARIZONA

I. INTRODUCTION

The U.S. Environmental Protection Agency, Pacific Southwest Region (EPA) has prepared this document to assist the Corps in determining compliance with the Clean Water Act §404(b)(1) Guidelines (Guidelines), particularly with regard to significant degradation of the aquatic ecosystem (40 CFR 230.10(c)), and the compensatory mitigation that may be necessary to avoid it.

The document utilizes information presented and referenced in the Preliminary Administrative Final Environmental Impact Statement (PAFEIS), dated July 2013, prepared by Coronado National Forest; Rosemont's *Rosemont Copper Project Conceptual Habitat Mitigation and Monitoring Plan Summary* (Summary), dated September 2013; meetings with Rosemont, the Corps and Pima County; site visits by EPA staff; and other information contained in documents from multiple sources. EPA's careful review of this information, including our assessment of the full range of probable direct and secondary adverse impacts to the aquatic ecosystem resulting from permit issuance, leads us to conclude that the proposed Rosemont Mine project does not comply with 40 CFR §§ 230.10(b), (c) and (d) of the Guidelines and should not be permitted as proposed.

II. ADVERSE ENVIRONMENTAL IMPACTS TO THE AQUATIC ECOSYSTEM

The environmentally-damaging nature of the proposed project (*i.e.*, a large-scale, long-lasting, extractive mineral mine) and its geographic location (*i.e.*, large, high-functioning, undisturbed landscape) will combine to cause and/or contribute to significant, persistent degradation of the regional aquatic environment. This sensitive area is largely within National Forest boundaries, is adjacent to both federal and local nature preserves, is home to ten federally listed species, and is a hydrologic source area for state designated Outstanding Resource waters. These aquatic resources are recognized as being of regional and national importance.

The project will impact aquatic and wetland resources within Pima County's Cienega Creek Natural Preserve and the Bureau of Land Management's (BLM) Las Cienegas National Conservation Area (NCA). The National Landscape Conservation System was established to protect some of the most remarkable public lands in the American West.[2] At its nearest point, the mine site lies approximately 3 miles from the NCA. The Las Cienegas NCA was established by Congress and the President, in large part, to conserve, protect and enhance the unique and nationally important aquatic, wildlife, vegetation and riparian resources such as those in the Cienega Creek watershed. Six types of rare ecosystems are protected within the NCA, including aquatic ecosystems such as cienegas (marshlands), cottonwood-willow riparian wetlands, and mesquite bosques.

[2]http://www.blm.gov/wo/st/en/prog/blm_special_areas/NLCS.html

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Impacts from the proposed project include direct fill and secondary impacts which will result in the loss, conversion and functional degradation of aquatic and terrestrial habitats over several thousand acres. The consequence of groundwater drawdown from the proposed mine pit is the indirect loss or conversion of hundreds of acres of riparian vegetation, including wetlands, and the drying of streams currently characterized by permanent flow. These large-scale shifts in the amount and species composition of riparian areas and the loss of stream surface flows is an example of an ecological regime shift; a large threshold change in the ecological state or condition of the Cienega Creek watershed to drier conditions.

The project site supports 101.6 acres of waters, including wetlands associated with springs and seeps. The project will adversely affect three types of Special Aquatic Sites (wetlands, sanctuaries and refuges, and riffle and pool complexes, see 40 CFR 230.40-45) as well as Tier 3 "unique waters"; portions of Davidson Canyon Wash and Cienega Creek are designated by the State of Arizona as "Outstanding Arizona Waters" (section 303 of the CWA and 40 CFR 131.12). EPA has identified these waters as "Aquatic Resources of National Importance" pursuant to the CWA §404(q) MOA.

Filling streams, constructing the massive mine pit (2,900 feet deep), and land clearing disturbances will dramatically alter in perpetuity the topography and surface and subsurface hydrology within the Cienega Creek watershed. Placement of permanent fill and other mine-related features within this undisturbed landscape will fragment high-functioning blocks of aquatic and terrestrial wildlife habitat used as foraging and movement corridors, rendering surrounding habitats less suitable for fish and wildlife. [3]

Direct Impacts

The proposed project will directly fill 39.97 acres of waters, including a largely undisturbed network of 18 linear miles of streams comprised of up to 154 individual drainages. In addition, five springs and their associated wetlands will be filled.

Indirect / Secondary Impacts

EPA's Guidelines (40 CFR 230.11(h)) and the 2008 Mitigation Rule (40 CFR 230.93) clearly state the need to compensate for losses of waters due to secondary impacts. The requirement that secondary impacts be fully compensated is consistent with standard practice for projects of this magnitude and essential given that the range, extent and severity of secondary adverse impacts upon aquatic resources are as significant as the direct impacts.

To the extent the Corps may wish to utilize the assessment of secondary impacts provided by the Forest Service's NEPA document for the Corps' decision document, the Corps should consider the limitations of the current assessment. As described below, secondary impacts have yet to be analyzed upstream of

[3]For example, the U.S. Fish and Wildlife Service's biological opinion concludes that, because of the indirect effects of groundwater drawdown, the proposed project is likely to adversely affect designated critical habitat for the federally-listed endangered Gila chub and threatened Chiricahua leopard frog, and likely to adversely affect the federally-listed endangered Gila topminnow.

the mine and downstream of the mine beyond the confluence of Davidson Canyon and Cienega Creek. Moreover, the secondary impacts that are currently assessed by the Forest Service rely upon models that, while valid, lack the sensitivity to detect adverse impacts to much of the affected arid aquatic environment. These assessments will be necessary under the Guidelines to make defensible decisions regarding the regulatory restrictions on discharges and the possibility of mitigation.

Lost Functions to Waters Upstream of Mine - As discussed above, the project site supports 101.6 acres of waters of which 39.97 acres will be directly impacted. The remaining 62 acres of waters on the project site will likely be indirectly impacted. Some of these secondary impacts are accounted for with regard to reduced surface stormwater flows in Barrel and Davidson Canyons within the project area downstream of the mine site. However, there will also be secondary impacts to drainages upstream of the mine. These impacts include severing surface hydrology and connectivity, decreasing quality of wildlife habitat, and fragmentation of animal movement corridors. We believe that secondary impacts to waters that lie upstream from the mine site need to be more completely quantified and ultimately mitigated.

Reductions in Surface Water Flow Downstream of the Mine - At the request of the Corps, Rosemont estimated indirect impacts to jurisdictional waters in Barrel and Davidson canyons downstream from the proposed mine due to modeled reductions in surface water volume resulting from the Rosemont Project.[4] Secondary impacts to downstream waters were estimated at 28.4 acres during mine operation. The estimate shows impacts at the confluence of Cienega Creek and Davidson Canyon, but ceases its analysis at that confluence. EPA believes data showing an impact at this confluence is a signal that impacts are likely to extend some point beyond this confluence, and recommend that secondary impacts to waters downstream from the mine site include the reach of Cienega Creek from its confluence with Davidson Canyon downstream to Pantano Dam. Certainly, reductions in surface water flow volume have the potential to adversely affect other surface waters, including wetlands, in Cienega Creek downstream from the confluence of Davidson Canyon. These surface water impacts are likely to be significant, especially given the cumulative effects of predicted reductions in groundwater levels from the proposed mine pit.

Groundwater Drawdown - Secondary effects on the aquatic environment include dramatic and persistent changes to surface hydrologic and hydraulic regimes driven by groundwater hydrology.[5] Portions of sensitive and regionally significant downstream receiving waters, including Outstanding Arizona Waters, rely in part or whole on groundwater contributions to baseflow. Secondary impacts from project-related groundwater drawdown will reduce streamflows, increase water temperatures, and disrupt breeding, spawning, rearing and migratory movements, or other critical life history requirements of fish and wildlife resources.

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[4] Email from Brian Lindenlaub, Westland Resources to Elizabeth Goldmann, EPA, dated August 16, 2013.

[5] Following mine closure the pit lake will continue to permanently divert, capture and evaporate 35-127 acre-feet of mountain-front groundwater recharge in perpetuity. This natural groundwater would otherwise replenish sensitive downstream receiving waters (PAFEIS. July 2013, Chapter 3, *Alternatives, Including the Proposed Action*; Comment Letter from Pima County to U.S. Forest Service on PAFEIS, dated August 14, 2013). During active mining, the pit will cause significant losses to recharge between 18,000-26,000 acre-feet, or about 900-1300 acre-feet annually.

According to the PAFEIS, eleven springs are highly likely to be indirectly impacted due to groundwater drawdown. An additional fifty-nine springs may be indirectly impacted due to drawdown. An additional 13 riparian areas associated with springs would be directly or indirectly disturbed with high certainty and an additional 36 riparian areas associated with springs may be indirectly disturbed. Although not formally delineated, subsets of these riparian areas contain jurisdictional wetlands and other waters of the U.S.[6]

Modification to the water balance along portions of Davidson Canyon, Empire Gulch, Gardner Canyon and Cienega Creek will adversely impact special aquatic sites. The 2,900-foot deep mine pit will permanently convert the hydrologic regime of the site from a water source area to a terminal sink, significantly lowering the surrounding regional aquifer. The pit will permanently reverse the natural direction of groundwater flow toward and into the mine pit, and away from the sensitive aquatic habitats in Las Cienegas NCA and Cienega Creek Natural Preserve. This will add to a baseline trend of decreasing groundwater, causing a permanent reduction of water in streams and wetlands along Empire Gulch, Mattie Canyon, Gardner Canyon and Cienega Creek with potential adverse impacts to over 30 seasonal and perennial wetlands, and threatened and endangered aquatic habitat dependent plants, fish and wildlife.

Groundwater drawdown will result in stress and degradation of riparian habitat, including wetlands. The PAFEIS estimates that indirect effects from the proposed mine project will change the composition of 1,071 acres of riparian vegetation along Empire Gulch (*i.e.*, 407 acres of hydroriparian) and Barrel and Davidson canyons.[7] Several additional springs, seeps, streams, emergent marshes, and riparian areas within the project assessment area likely contain jurisdictional waters, including wetlands, which will be indirectly impacted by the proposed project, primarily from groundwater drawdown.[8]

Sensitivity and Applicability of Groundwater Models – All three groundwater models utilized by the Forest Service show an increasing, long-term trend of significant declines in groundwater levels due to

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[6] A June 2013 field inspection by EPA, BLM and Pima County staff estimates the presence of tens to hundreds of acres of jurisdictional waters/wetlands in the assessment area likely to be impacted by groundwater drawdown. To date, the geographic extent of potentially jurisdictional waters along Empire Gulch, Gardner Canyon, Cienega Creek, and the other noted waters, has not been formally delineated and therefore secondary impacts to jurisdictional waters have not been quantified.

[7] PAFEIS, July 2013, Chapter 3, *Seeps, Springs and Riparian Areas*

[8] For example, the PAFEIS states that for Empire Gulch and Cienega Creek all three groundwater models predict near- and long-term stream flow drawdown along Upper Cienega Creek. Comparing these projected model drawdowns with minimum monthly stream flows (2001-2010 period of record) for Upper Cienega Creek indicates that the predicted drawdown would cause the stream to go dry during critical low flow months (Chapter 3, Figure 70). The PAFEIS further concludes that a small change in stream flow could result in the loss of surface flow during these drought periods (PAFEIS, Chapter 3, *Seeps, Springs and Riparian Areas*). In addition, the PAFEIS states that Upper Cienega Creek receives surface water [and groundwater] flow from Empire Gulch and the potential exists for a reduction in Empire Gulch stream flow to result in reductions in Cienega Creek's stream flow as well. Small amounts of groundwater drawdown could affect near-and long-term stream flow in Empire Gulch and Cienega Creek and hydrologic changes predicted for Empire Gulch from drawdown could have a potential effect on springs and stream flow, potentially shifting some or all of the stream length from perennial to intermittent (PAFEIS, July 2013, Chapter 3, *Seeps, Springs and Riparian Areas*). Pima County, as well as the BLM which manages the NCA, have expressed similar concerns regarding the secondary effects to Empire Gulch and Cienega Creek surface waters from groundwater drawdown (Comments submitted to the Forest Service by Pima County and BLM on the PAFEIS, dated August 14, 2013). In addition, secondary impacts to intermittent surface flows are likely to occur in Box Canyon, Sycamore Canyon, Adobe Tank Wash, and Mulberry Canyon which all lie within the modeled 5-foot drawdown area (Comments submitted to the Forest Service by Pima County on the PAFEIS, dated August 14, 2013).

the mine pit. Although there are limitations in groundwater model accuracy, the drawdown at Upper Empire Gulch Spring is within the accuracy of the models to predict (*i.e.*, 5- foot drawdown contour) and therefore, we believe impacts to streamflow and wetlands from drawdown within Empire Gulch are reasonably certain and will be significant.[9] We also believe that there is a high potential for many additional waters, including Cienega Creek, Gardner Canyon and others, to be adversely impacted by mine pit drawdown. These resources can be sensitive to changes in groundwater supply measured in inches, and thus EPA has questioned the applicability of even the best available modeling with respect to answering questions about probable impacts.

To address the limitations in the accuracy of the groundwater models, EPA recommends that a risk-based or weight-of-evidence approach be developed to combine multiple lines of evidence on mine projects' impacts from groundwater drawdown. Combining various lines of evidence reduces the probability of making false conclusions based on a single line of evidence (*e.g.*, relying only on models with limited accuracy), allows the use of multiple methods or information sources about the situation being assessed (*e.g.*, likely mine project effects on ground and surface water resources), and consequently allows decision makers to make better informed decisions.

III. ROSEMONT COPPER MINE - 404 CWA MITIGATION

To EPA's knowledge, no compensatory mitigation plan compliant with the regulations has been prepared to date. However, EPA has provided written comments to the Corps and the USFS on different versions of Rosemont's proposed mitigation activities.[10] The most recent information is a 4-page "Summary" dated September 2013, which appears to be a stand-alone document rather than a summary of a more substantive document or plan. A complete mitigation plan that satisfies each element of the 2008 Mitigation Rule will be necessary to issue a 404 permit.

Based on the Summary, proposed 404 mitigation consists of: 1) enhancement of waters and non-aquatic upland habitat at Cienega Creek below Pantano Dam, and, if necessary 2) conservation and establishment of waters at Sonoita Creek Ranch (SCR) and 3) conservation of a 160 acre parcel along a portion of Mulberry Canyon.[11] These components are sequential; the SCR and Mulberry Canyon activities are presented as a contingency if an ILF project with sufficient credits is not available for Rosemont's purchase at Pantano Dam. To date, EPA is not aware of any supporting documentation or assessment demonstrating the mitigation proposed to offset impacts to waters is compensatory.[12]

Cienega Creek Enhancement below Pantano Dam

Rosemont has acquired the rights to purchase 1,122 acre-feet per annum of surface water rights, a groundwater well, and an approximately 2-acre parcel at Pantano Dam supporting open water and

[9] PAFEIS, Chapter 3, Biological Resources, pp. 86-87.
[10] EPA letter to the Corps dated January 25, 2013 addressing mitigation plans at SCR. EPA letters to the USFS dated February 21, 2013 and August 15, 2013, responding to mitigation as presented in the DEIS and PAFEIS.
[11] EPA meeting with the Corps on September 10, 2013 and Rosemont's Summary dated September, 2013.
[12] See EPA letter dated January 25, 2013 regarding the inadequacies of the "functional assessment" for SCR.

riparian habitat. Rosemont proposes to allocate 826 AFY of water rights to an ILF sponsor for development of an ILF project below Pantano Dam. Based on Pima County monitoring, the actual average "wet" water at the site is 360 AFY. The project undertaken by the third party sponsor would include various enhancement actions to generate "credits" under the ILF program for prospective 404 permittees. If Rosemont were to use an ILF program for its mitigation obligations, the total credits needed would be based upon calculation of a mitigation ratio using the Corps' Mitigation Ratio Checklist. Although the crediting mechanism and amount necessary for Rosemont's impacts are yet to be determined, Corps staff has stated that Rosemont's need is anticipated to be at least equal to all the credits generated by the Pantano Dam ILF project as currently described. To mitigate all secondary impacts, Rosemont proposes credit for the water rights transfer, the 2-acre parcel and the water well. [13]

On June 19, 2013, EPA met with the Corps, Pima County Regional Flood Control District (Pima County) and Tucson Audubon Society to discuss the feasibility of such an ILF project in Cienega Creek, downstream of Pantano Dam. On September 4, 2013 the Corps met with Pima County to discuss a revised ILF project. Under the current plan, Pima County as an ILF sponsor would accept 826 AFY of water rights from Rosemont to enhance approximately 150 acres of non-aquatic upland habitat, and 91 acres of Cienega Creek primarily through the release of water at several distribution points. The project would also create in-channel "microbasins" and channel modifications (berms) aimed at correcting head cutting and erosion.[14]

While EPA supports returning surface water to this reach of Cienega Creek, it is uncertain whether proposed water distribution points along Cienega Creek will result in any significant enhancement of aquatic functions; much of the released water will likely drain into the porous substrate and deep aquifer without functionally meaningful improvement in riparian habitat. This concern, and the availability of sufficient wet water for success, have been echoed by the ILF sponsor themselves:

> *We have concluded that significant uncertainty exists regarding our ability to mitigate for streams, seeps, and springs based on approximately 20 years of data documenting progressively declining surface water within Cienega Creek...We estimate that approximately 700 AFY are needed to sustainably raise the groundwater level downstream of the dam to a level that would support hydro-riparian species without continued surface irrigation. The current baseflow is insufficient and may actually decrease if the downward trend in surface water quantity continues. Ongoing irrigation is not a sustainable strategy for the long-term survival of hydro-riparian species nor does it meet the conditions of the 2008 404 Mitigation Rule...The diminishing base flows in Cienega Creek, from studies conducted for over 20 years and most recently by the Pima Association of Governments, is a trend that is expected to continue in to the future. It is possible that, under the best of circumstances, there may only be enough surface flow to maintain the existing riparian vegetation upstream of the dam in the future, if that.* (pp.1-2).[15]

[13] The Summary is unclear, but it appears the ILF credits would be purchased to mitigate only direct fill impacts.
[14] Per EPA phone call September 9, 2013 with Chris Cawein, Pima County, 826 AFY of water rights approximates 350 AFY or less of wet water. Moreover, long-term monitoring clearly demonstrates that there is insufficient wet water available for the proposed project *(i.e.,* no dependable water is available for 40% of the 1908 senior water right, and perhaps none for the remaining water rights).
[15] Letter from Pima County Regional Flood Control District to Marjorie Blaine, Crops, dated July 31, 2013.

Since the mine itself will worsen this baseline condition of diminishing water supplies, EPA questions the viability of ILF or permittee-responsible mitigation below Pantano Dam. [18, 16]

EPA has several concerns with the ILF proposal which in our judgment render the project untenable for the mine's compensatory mitigation needs:

1. **High risk and uncertainty** – To be successful, the project would depend on wet water from rights that haven't produced at the necessary amounts, would require artificial means of retarding or eliminating infiltration (*i.e.,* liners), and is likely to need maintenance in perpetuity.

2. **Ecologically inappropriate** – The project, if successful, would provide credits to mitigate impacts to a high functioning water source area by enhancing a water sink area. The project would purport to replace the functions of 18 linear miles of streams across a landscape with a single segment of stream less than two miles in length.

3. **Counterproductive hydrological interventions** – Rather than provide enhancement, proposed erosion protection structures upstream of Colossal Cave Road may actually exacerbate erosion problems elsewhere along Cienega Creek, further reducing the project's overall value for aquatic resource compensation. Similarly, planned in-channel rock/earthen berms for slowing and retaining surface flows in tributary channels will likely quickly back up with sediment, or be washed away during large storm events.

4. **Jurisdictional area** – EPA believes the reach and extent of jurisdictional waters may be significantly overestimated at the Pantano Dam site. Most of the area proposed for enhancement is non-aquatic, upland habitat.

5. **Mitigation Rule** – the proposal lacks the certainty and other assurances required under the 2008 regulations (such as enforceable and ecologically meaningful success criteria).

6. **Temporal loss** – The amount of time likely required to sever and transfer water rights to the ILF sponsor also makes the consideration of any ILF credits as mitigation for Rosemont Copper unacceptable. The approval process could take two years or more and there are no guarantees Rosemont Copper will obtain approval from Arizona Department of Water Resources to sever and transfer these water rights should irrigation districts and other water right holders object.[17] Although there is discussion of purchasing water rights directly for Pima County, to avoid potential sever and transfer issues, the process issues have not been resolved.

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[16] During the June 19, 2013 meeting with the Corps, Pima County and Tucson Audubon, Pima noted there is incomplete information on the existing geologic condition below Pantano Dam. The potential exists for surface water to percolate deep into the aquifer without providing necessary hydrologic conditions to support enhancement of existing riparian.

[17] p. 44, Supplemental to the Biological Assessment Proposed Rosemont Copper Mine Santa Rita Mountains, Pima County, Arizona Nogales Ranger District, dated February 2013.

Sonoita Creek Ranch

The 1,200-acre Sonoita Creek Ranch (SCR) is six miles south of Sonoita, Arizona. Approximately 590 acre-feet per annum of water rights are appurtenant to the ranch. The SCR proposal described in Rosemont's Summary proposes a site protection instrument on the 1,200-acre ranch, and a permittee-responsible mitigation project including modification of grazing and an unspecified amount of creation of aquatic habitat within the floodplain of Sonoita Creek.

The Corps has determined the Sonoita Creek Ranch (SCR) site is not acceptable compensatory mitigation under § 404 CWA for impacts from the Rosemont Mine.[18] EPA concurs with this determination. EPA recognizes the conservation value of Sonoita Creek Ranch, but given the existing geomorphology of the site, we remain highly skeptical of the proposals to create and enhance wetlands on the ranch. In addition, the site is far removed from the Davidson Creek and Cienega Creek watersheds and therefore, does not provide ecological benefit for the loss of acreage and function that would occur from the proposed copper mine.

Preservation of 160-acre parcel in Mulberry Canyon

In the event that mitigation credits beyond Pantano Dam and SCR are required for the Rosemont Project, the Summary suggests that additional mitigation may be provided by preservation of the 160-acre Mulberry Canyon parcel. There is no information on the extent of aquatic resources on the site. Under this proposal, Rosemont would record a site protection instrument prohibiting certain land uses on the parcel (Summary, p.4).

Pursuant to the 2008 Mitigation Rule, preservation as 404 mitigation can be used when the resources to be preserved provide important physical, chemical or biological functions for the watershed; contribute significantly to the ecological sustainability of the watershed; and are under threat of destruction or adverse modification (33 CFR Part 332.3(h)).

EPA does not believe preservation of this parcel is appropriate compensation for project impacts. This proposed mitigation parcel does not have water rights. The parcel is surrounded by USFS land and is not under any foreseeable threat of destruction or adverse modification. In addition, the mitigation parcel lies downstream from the mine. The proposed Mulberry Canyon mitigation parcel would be adversely affected by the very impacts it is meant to mitigate.[19]

The Corps has determined the Mulberry Canyon parcel is not acceptable compensatory mitigation under § 404 CWA for impacts from the Rosemont Mine.[20] EPA concurs with this determination. Indeed, Mulberry Canyon represents a potential secondary impact area of the project itself that should be assessed, and for which Rosemont may be required to mitigate.

[18] EPA-Corps meeting September 10, 2013; phone conversation between David Castanon and Jason Brush September 26, 2013.
[19] PAFEIS, July 2013, Chapter 3, *Seeps, Springs and Riparian Areas.*
[20] Phone conversation between David Castanon and Jason Brush dated September 26, 2013.

Additional Conservation Lands

Rosemont Copper has developed a Conservation Lands Program, but has not presented this as part of proposed 404 mitigation. The program proposes conservation of lands surrounding the proposed mine to address federal and state endangered and sensitive species, cultural resources and public viewsheds. However, in a meeting with Rosemont and the Corps on August 7, 2013, Rosemont suggested that 1,700 acres at Fullerton Ranch and 940 acres at Helvetia Ranch Annex North might be considered as mitigation under §404 CWA. The Corps determined these conservation lands were not suitable as mitigation under §404 CWA.[21] EPA concurs with the Corps' determination.

Adequacy of Proposed §404 CWA Mitigation

The 2008 Mitigation Rule states, *The fundamental objective of compensatory mitigation is to offset environmental losses resulting from unavoidable impacts to waters of the United States authorized by DA permits* (33 CFR 323.3(a)(1)). EPA has identified significant flaws in Rosemont's plans for offsetting the project's environmental harm. First, the proposals lack an adequate functional assessment characterizing the services performed by streams/springs and wetlands directly and indirectly impacted by the project, or of those resources at the proposed mitigation lands. Second, the compensatory mitigation proposals do not account for the interrelationship of the headwater streams and the surrounding terrestrial ecology and will not replace the high quality resources in the Cienega Creek watershed. Enhancement of existing waters and upland habitat (Pantano Dam) in the lower watershed would not offset the mine's impacts to high quality headwater streams. Third, despite some assurances inherent in ILF proposals, there is great ecological uncertainty in the Pantano Dam proposal. Based on the information to date, EPA finds the proposed mitigation grossly inadequate to compensate for mine impacts. In summary:

- There is no acceptable functional assessment of the mine site or proposed mitigation sites on which to make a determination how the proposed ILF or other proposals compensate for project impacts (2008 Mitigation Rule, 33 CFR 332.8(o)(2), 33 CFR 332.3(f)(1)), ILF Enabling Instrument, June 2013, p. 15);
- There is significant uncertainty whether the ecological condition at the ILF site is suitable to support the proposed mitigation;
- The ILF sponsors will not assume full legal responsibility for the required reestablishment of specific acreage of riparian vegetation downstream of the dam site;[22]
- Additional water rights are necessary to conduct enhancement downstream of Pantano Dam;
- Declining water levels due to drought and exacerbated by climate change, and the proposed mine, will continue to reduce the availability of water in Cienega Creek;
- The proposed ILF project, if approved, would consist of enhancement of existing waters/uplands, providing limited compensation for the loss of aquatic area and function in the watershed as a result of the proposed project;
- The SCR proposal would not benefit the watershed affected by the mine, and its ecological success and sustainability are unlikely, and;

[21] EPA-Corps meeting September 10, 2013 and phone discussion between Jason Brush and David Castanon September 26, 2013.
[22] Memorandum dated August 13, 2013 from C.H. Huckelberry, County Administrator to Pima County Board of Supervisors.

- Preservation of the Mulberry Canyon parcel is an inadequate compensatory measure because it is a probable impact site and is not under foreseeable threat from development.

Usefulness of the Standard Operating Procedure for Determining Mitigation Ratios

The Corps' Mitigation Ratio checklist is a standard operating procedure (SOP) in the South Pacific Division used for determining compensatory mitigation amounts. The SOP seeks to simplify compliance with the 2008 Mitigation Rule by applying stepwise criteria to arrive at a compensation ratio (acres replaced for acres lost). The SOP allows both qualitative and quantitative approaches, but consistent with the Mitigation Rule, requires use of functional or condition assessment data to inform a quantitative approach whenever practicable.

As currently applied, the calculation of a simple ratio through the SOP for a project of this scope and magnitude fails to meet the clear intent of Corps regulations at 33 CFR 320.4(r)(2), which state: *"...all mitigation will be directly related to the impacts of the proposal, appropriate to the scope and degree of those impacts, and reasonably enforceable."*

- The SOP (Checklist Step 3) recommends that a functional/condition assessment should be required for impacts over 0.5 acre or 300 linear feet. The mine would result in 95,040 linear feet of stream impact and 40 acres of fill.
- Absent functional or condition assessment data, it is all the more important that any ratios generated by the SOP be rigorously defensible. The SOP's maximum ratio adjustment of 4:1 for the qualitative method is without adequate justification, and inappropriate in this context of landscape-scale impacts. Particularly with non-aquatic habitat preservation, ratios higher than 4:1 are allowed under the SOP (Question 11 – June 2013, Corps' SOP training PowerPoint).
- Out of kind, preservation-dominated mitigation activities such as those proposed in the Summary fail to address the net loss of function and area within the hydrologic source area landscape.
- Section 4.0 of the SOP defines enhancement as, *"the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource functions, but may also lead to a decline in other aquatic resource function(s)."* Proposed enhancement of non-aquatic upland is not considered enhancement in the SOP, but it is recognized in the Mitigation Rule (p. 19661) only when it has been demonstrated as critical for maintaining the integrity and sustainability of aquatic resource functions. A functional assessment is necessary to make this determination.
- EPA has noted several examples of significant risk and uncertainty above. The SOP notes: *"If too many uncertainty factors are identified this may indicate the overall mitigation proposal design is not acceptable."*(checklist #7, SOP PowerPoint).[23]
- Compensatory mitigation is required for secondary impacts (SOP checklist #9). Secondary impacts are not only wildly underestimated, but to our knowledge, only paper water rights,

[23] The Mitigation Rule Preamble notes the likelihood of success must be considered when evaluating compensatory mitigation proposals. If the potential for satisfying the objectives of a proposal is low, then alternative mitigation proposals with a higher likelihood of success should be required. Risk and uncertainty must be minimized as much as possible (p. 19633).

preservation of a 2-acre site, and retirement of an existing well have been proposed to date as compensation for secondary impacts.

- For ILF projects, an appropriate assessment method or other suitable metric must be used to assess and describe the aquatic resource types that will be restored, established, enhanced and or preserved. The number of credits must reflect the functional or condition assessment or other suitable metric (33 CFR 332.8).
- Separate assessments must be used for each resource impact (*e.g.*,springs, ephemeral waters) and for each mitigation type (*e.g.*, upland buffer preservation, in-stream enhancement)(SOP Section 7.3). The approach taken in the Summary appears to group all impacts into an acreage total and simply apply a ratio.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

JAN 25 2013

Colonel R. Mark Toy
District Engineer, Los Angeles District
U.S. Army Corps of Engineers
Attn: Regulatory Branch (SPL-2004-01399-MB)
5205 E. Comanche Street
Tucson, Arizona 85707

Subject: Draft Rosemont Copper Project Habitat Mitigation and Monitoring Plan (HMMP)

Dear Colonel Toy:

EPA Region 9 appreciates the Corps' ongoing coordination regarding your pending permit decision for the Rosemont copper mine, located on 4,750 acres of predominantly on U.S. Forest Service (USFS) lands in Pima County, Arizona. Enclosed please find comments reflecting our detailed technical review of the project's November 2012 HMMP and related documents,[1] which we trust will be useful to the Corps in advancing the project through the regulatory process.

In summary, we believe implementation of the HMMP would fail to fully compensate for the project's impacts to regulated waters. The methods used to assess aquatic functions at the project site and proposed mitigation sites are scientifically flawed, and therefore fail to adequately identify and quantify those functions. This fundamental error is then compounded by the attempt to establish appropriate compensation ratios. Among the most significant issues are:

- The failure to fully assess the direct, indirect and cumulative impacts from the proposed project;
- The functional assessment methodology does not provide any meaningful assessment of the functions of ephemeral systems across the proposed project and mitigations sites and significantly underestimates the function of impacted waters; and
- The habitat creation proposed at Sonoita Creek Ranch may not be ecologically sustainable and may not result in the creation of jurisdictional waters.

EPA remains concerned that substantial loss and/or degradation of water quality and other aquatic ecosystem functions are likely if the proposed mine is constructed. Although we are pleased to provide the enclosed detailed analysis of proposed compensatory mitigation, the applicant should be reminded that mitigation begins with the avoidance and minimization of impacts, and that compliance with 40 CFR 230.10(a) (alternatives) is prerequisite to assessing compliance with 40 CFR 230.10(d) (mitigation) or the requirements of Subpart J of the 404(b)(1) Guidelines.

[1] All documents November 2012 by WestLand Resources, Inc on behalf of Rosemont Copper Company: (a) *Functional Analysis of Impacted Waters of the U.S.* (RCFA); (b) *Sonoita Creek Ranch Functional Analysis and Mitigation Ratio Determination* (SCR); and (c) *State Route 83 Corridor and Davidson Parcels: Functional Analysis and Mitigation Ratio Determination* (SR83/Davidson).

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Thank you for your ongoing partnership in implementing CWA programs. As additional information on this project's regulatory progress becomes available, please ask your staff to coordinate with Elizabeth Goldmann at (415) 972-3398 or Dr. Robert Leidy at (415) 972-3463.

Sincerely,

Jason Brush
Supervisor
Wetlands Office

Attachment

cc: Rosemont Copper Company
U.S. Forest Service
U.S. Fish and Wildlife Service

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Rosemont Copper Mine
404 Comments on HMMP

Proposed Project Impacts

In our evaluation of the proposed HMMP, it is important to identify in advance the discrepancy that exists between EPA's and Rosemont's assessment of project impacts upon which the HMMP has been developed. In addition to other significant concerns (*e.g.*, functional analysis) described in this letter, the HMMP fails to provide compensation as required by the Guidelines and 2008 Mitigation Rule for the entire scope of direct and indirect/secondary project impacts associated with the proposed project.

The proposed project site supports 101.6 acres of waters, including wetlands, in the Cienega Creek watershed providing hydrologic, chemical and biological connectivity to Cienega Creek and the Santa Cruz River. In developing the HMMP, Rosemont identified only 39.97 acres of direct impacts and 2.79 acres of indirect impacts in their mitigation analysis.

EPA maintains the impacts from the proposed project include direct fill, secondary impacts resulting in functional degradation, and habitat conversion of aquatic and terrestrial resources over a large geographic area. The project will result in the loss or conversion of approximately 7,000 acres including semi-desert grassland, Madrean evergreen woodland, and Sonoran desert scrub communities, and their associated aquatic and riparian habitats, that form a vast, largely unfragmented, natural landscape.

The proposed project will authorize the direct fill of 39.97 acres of waters, including a largely undisturbed network of 18 linear miles of stream comprised of up to 154 individual drainages. There will also be direct impacts to aquatic habitats associated with several springs. Secondary effects on the aquatic environment include dramatic and persistent changes to hydrologic and hydaulic regimes within the project and adjoining watershed, adversely affecting the function of sensitive and regionally significant downstream receiving waters, including wetlands. The U.S. Forest Service estimates 1,364 acres of riparian habitat, likely to include a significant amount of jurisdictional riparian wetlands, impacted by the proposed project.[2] The project will adversely affect three types of Special Aquatic Sites (wetlands, sanctuaries and refuges, and riffle and pool complexes, see 40 CFR 230.40-45) as well as Tier 3 "unique waters"; portions of Davidson Canyon Wash and Cienega Creek are designated by the State of Arizona as "Outstanding Arizona Waters" (section 303 of the CWA and 40 CFR 131.12). In addition, EPA identified these waters as "Aquatic Resources of National Importance" pursuant to the 404q MOA.

The proposed project is likely to have significant impacts to downstream reaches of Davidson Canyon, Empire Gulch and Cienega Creek, including:[3]

- Modification to the water balance along portions of Davidson Canyon, Cienega Creek and Empire Gulch Creek adversely impacting special aquatic sites;
- Secondary impacts from project-related groundwater drawdown disrupting breeding, spawning, rearing and migratory movements, or other critically life history requirements of fish and wildlife resources;
- Groundwater drawdown resulting in stress and mortality to riparian habitat, including wetlands;

[2] DEIS for the Rosemont Copper Project (December 11, 2011), Chapter 3, Table 98.
[3] Letters from EPA to Corps dated January 5, 2012 and February 13, 2012

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- Modification of sediment yield resulting in adverse impact to downstream water quality. Permanent surface water quality impacts to 2.5 miles of Barrel Canyon Wash and 14 miles of Davidson Canyon Wash through increased channel scour and aggradation. Other changes include bank erosion and loss of riparian habitat;
- Adverse effects on aquatic organisms due to elevated suspended sediments;
- Loss of 18 miles of stream channel resulting in significant reduction of groundwater recharge functions within Davidson.

Rosemont's Habitat Mitigation and Monitoring Plan

On October 11, 2011, Rosemont Copper submitted a CWA 404 permit to the Corps requesting a permit to discharge dredged or fill material into waters to construct the proposed Rosemont Copper Mine. On November 8, 2012, EPA received a copy of the Rosemont Copper Mine HMMP. Rosemont Copper proposes the HMMP as compensatory mitigation in compliance with the CWA 404 permit and the 2008 Mitigation Rule.

The 2008 Mitigation Rule states the fundamental objective of compensatory mitigation is to offset environmental losses resulting from unavoidable impacts to waters. Compensatory mitigation may be performed using the methods of restoration, enhancement, establishment, and in certain circumstances, preservation.

Preservation

As described in the HMMP, Rosemont proposes to record a conservation easement on 1774 acres of land containing 35.34 acres of aquatic resources and approximately 39.45 acres of riparian vegetation within the Santa Cruz River watershed on the following parcels:

State Route 83 Corridor Parcels - The State Route 83 parcels consist of 4 parcels totaling 545 acres. The size of each parcel is not described in the referenced documents. These parcels contain surface water features that occur within or drain into Davidson Canyon (SR83/Davidson p. 2). Waters located within these conservation parcels total 13.76 acres and range from 0.94 acre to 7.28 acres per parcel. There are no water rights associated with the SR 83 parcels.

Davidson Parcels - The Davidson parcels consist of 2 parcels totaling 29 acres. These parcels consist of two adjoining parcels of land encompassing both sides of Davidson Canyon. Waters located within these conservation parcels total 1.75 acres (SR83/Davidson p. 3). There are no water rights associated with the Davidson parcels.

Sonoita Creek Ranch Parcel – The Sonoita Creek Ranch parcel is 1200 acres consisting of ranching, open space and agriculture. Perennial Monkey Spring is located 0.8 mile north of the ranch and provides surface water to the ranch. There are 19.83 acres of aquatic resources on the Sonoita Creek Ranch consisting of: 1) 13.03 acres of ephemeral drainages; 2) 0.16 acre of perennial drainage; 3) 5.92 acres of wetlands; and 4) 0.72 acre of 5 seasonal ponds. A total of 52.01 acres of riparian vegetation was identified on the parcel (SCR p. 6).

Creation

Sonoita Creek Ranch Parcel - The HMMP is proposing 115.5 acres of habitat consisting of a drainage feature, wetland fringe and riparian buffer (p. 9 SCR). Based on the maps provided in the HMMP, Rosemont is proposing a 3,000' riverine corridor with a 5' channel (1' to 2' bottom width) and 20' riparian habitat on each side (HMMP p. 17). This would result in approximately 0.34 acre of wetted channel and 2.75 acre of adjacent riparian habitat. The remainder of the 112 acres proposed as mitigation on this parcel would be sown with native seed mix. The native seed mix is comprised of approximately 91% upland species (HMMP p. 22-23). The 112 acres would remain as uplands.

Rosemont would share certified water rights on Monkey Springs with an upstream property owner and flow would be based on a water delivery schedule agreed to with the other property owner (HMMP p. 8). The flow of water would be controlled through existing infrastructure. This water would be used to create a perennial compacted drainage feature and adjacent riparian. Waters within the proposed 3,000' riverine channel will eventually infiltrate due to the nature of the soils on the agricultural field. Therefore, this channel may not be considered a jurisdictional water as it would not have a surface water connection with Sonoita Creek.

MRA - Functional Analysis of Jurisdictional Impacts

According to the 2008 Mitigation Rule, compensatory mitigation must be, to the extent practicable, sufficient to replace lost aquatic resource functions. If a functional or conditional assessment, or other suitable metric is not used, a minimum one-to-one acreage or linear foot compensation ratio must be used. The Corps must require a ratio greater than one-to-one where necessary to account for the method of compensatory mitigation (*e.g.,* preservation), the likelihood of success, differences between the functions lost at the impact site and the functions expected to be produced by the compensatory mitigation project, temporal losses of aquatic resource functions, the difficulty of restoring or establishing the desired aquatic resource type and functions, and/or the distance between the affected aquatic resources and the compensation site (CFR 230.93(f)).

To assess the functional condition of aquatic resources on the proposed project site as well as the proposed mitigation lands, WestLands modified a Rapid Stream-Riparian Assessment[4] (RSRA) for their own use and called it the Modified RSA approach or "MRA." The original methodology involves a quantitative evaluation of between two to seven indicator variables in five different ecological categories: water quality, fluvial geomorphology, aquatic and fish habitat, vegetation composition and structure, and terrestrial wildlife habitat. Each variable is rated on a scale that ranges from "1," representing highly impacted and non-functional conditions, to "5," representing a healthy and completely functional system. Whenever possible, scores are scaled against what would be observed in control or reference sites that have similar ecological geophysical characteristics, but which have not been heavily impacted by human activities.

Although the RSRA was designed to assess the functional condition of perennial systems, WestLands modified the RSRA in order to apply it to ephemeral systems. In addition, they propose the MRA can also be used to compare functions between ephemeral, intermittent and perennial stream reaches on the

[4] Steven, L.E., Stacey, P.B., Jones, A.K., Duff, D., Gourley, C., and J.C. Catlin. 2005. A protocol for rapid assessment of southwestern stream-riparian ecosystems. Proceedings of the Seventh Biennial Conference of Research on the Colorado Plateau titled *The Colorado Plateau II, Biophysical, Socioeconomic, and Cultural Research.* Charles van Riper III and David J. Mattsen Ed.s. pp. 397-420. Tucson, AZ: University of Arizona Press.

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same scale. They used the MRA scores as an absolute assessment based upon the values and indicators in the RSRA Guidebook rather than as scores for comparison of stream reaches with similar biotic and abiotic characteristics (RCFA, p.4). The MRA averaged the indicators for each ecological category, and then calculated an overall score by averaging the five ecological categories. As a result, all ephemeral streams using the MRA scored "0" for water quality, fluvial geomorphology and fish/aquatic habitat. The overall MRA score of the Rosemont Project area was 1.17, indicating the aquatic resources are non-functioning or highly impacted (RCFA p. 11).

The MRA used by WestLands does not provide any meaningful assessment of the functions of ephemeral systems across the proposed project and mitigation sites. The MRA is not scientifically sound. Therefore, the MRA does not satisfy the requirements of a suitable assessment method to assess the loss of aquatic function (33 CFR 332.3 (f)(1)). Since 1993, the federal government has expressed the need for improvement of rapid assessment techniques to allow for better consideration of the functions of waters/wetlands in the context of the CWA Section 404 process. Fundamental to the development of a functional assessment is the recognition that waters/wetlands perform certain functions better than others, not because they are impacted in some way, but because waters are inherently different. Therefore, it is critical to accurately describe functions for each class of waters/wetlands that occur within a study area. It is not appropriate to strictly compare functions across classes of waters/wetlands. For example, comparison of the functions of 1st through 3rd order ephemeral riverine waters with those of perennial waters/wetlands for the purpose of computing MRA scores is not meaningful. Even though some functions overlap significantly between classes, which they often do, the functions are likely to be performed through the combination of slightly difference processes and at different levels or intensities.

Essential to the development of a functional assessment, is the use of reference systems. Reference sites are the observed and measured characteristics of a range of similar sites within a regional or study area. Development of a reference framework allows the use of a relative rather than an absolute scale, which provides for better resolution of expected functions and a regional standard for comparison. For example, within the context of a regional reference framework the 1st through 3rd order ephemeral streams on the Rosemont Project impact site likely would be scored as high functioning (*i.e.*, an overall functional rating or 4 or 5 within the RSRA framework).

The MRA also assigns a score of zero to RSRA categories that rely on the presence of water for proper functioning. The MRA assumes that "any variable within the five major RSRA categories that rely on the presence of surface water that cannot be assessed due to the lack of an appropriate water regime at the time of sampling will result in the overall major category receiving a score of zero, representing a lack of functionality" (p. 4). This fails to acknowledge that by definition ephemeral and intermittent streams are functioning aquatic ecosystems that periodically contain flowing water. Any scientifically valid functional assessment of ephemeral and intermittent streams must account for the seasonal nature of flows and either: 1) assess and score functions when water is present, or 2) assay the probable functions in the absence of flows. The MRA assumption that the ephemeral and intermittent streams have no function because there is no water present at the time of the assessment demonstrates a clear lack of understanding of how these aquatic ecosystems function. Ephemeral and intermittent streams on the Rosemont Project impact site perform important functions that were not properly assessed by the MRA. In this regard, there are several hydrogeomorphic (HGM) functional assessments available for modification and use in arid western systems similar to environmental conditions found at the Rosemont project site. The RSRA or other functional assessment methodologies could have been easily modified

to fully assess the functions of ephemeral and intermittent streams or other methodologies for the Rosemont Project.

The MRA does not assess the full range of functions that are performed by riverine waters at the Rosemont Project site. Several important functions not assessed by the MRA performed by ephemeral and intermittent riverine waters in the Arid West and that would be expected to occur in the Rosemont Project area include the following:

Hydrologic Functions

- *Surface and Subsurface Water Flow, Storage and Exchange* - The retention and/or circulation of surface and ground water within the floodprone area.
- *Sediment Mobilization, Transport, and Deposition/Storage* – The mobilization, transport, and deposition of sediment influences the channel pattern, dimension, and profile, channel bed materials, and vegetation of riverine waters/wetlands at the assessment site and in downstream waters.
- *Energy Dissipation* – Energy dissipation results in the allocation of potential energy to other forms of kinetic energy as water moves into, through, and out of a water/wetland.
- *Landscape Hydrologic Connections* – The hydrologic connectivity of contributing areas to riverine waters/wetlands and then, in turn, to other down-gradient waters/wetlands.

Biogeochemical Functions

- *Element and Compound Cycling* – Element and compound cycling includes the abiotic and biotic processes that convert compounds (e.g., nutrients and metals) from one form to another.
- *Organic Carbon Export* – The export of dissolved and particulate organic carbon through leaching, flushing, displacement, and erosion from waters/wetlands.
- *Detention, Retention, and Removal of Imported Elements, Compounds and Particulates* – The delay, transformation and removal of imported nutrients, contaminants, particulates, and other compounds into, through, and out of the riverine system.

Habitat/Faunal Support Functions

- *Maintenance of Spatial Structure of the Habitat* – The capacity of waters/wetlands to support animal populations and guilds by providing heterogeneous habitats.
- *Maintenance of Habitat Interpersion and Connectivity* – The capacity of a water/wetland to permit aquatic, semi-aquatic and terrestrial organisms to enter and leave a riverine system via permanent, intermittent, or ephemeral channels, floodprone areas, or unconfined hyporheic gravel aquifers, or other large contiguous habitat patches.
- *Distribution and abundance of Invertebrates and Vertebrates* – The capacity of the water/wetland to maintain the density and spatial distribution of characteristic aquatic, semi-aquatic and terrestrial invertebrates and vertebrates.

Several of the MRA sampling method indicators are not adequate to assess a particular function. For example, water quality is a societal value and not strictly a function. Hydrologic functions (*e.g.*, element and compound cycling, removal of compounds) are better measures of the ability of a water/wetland to affect "water quality." The MRA uses a single indicator (*e.g.*, channel shading, solar exposure) for water quality. Also, as noted above, it is not reasonable to assign a zero score to the functioning of a

water/wetland just because there is no water present at the time the assessment was conducted. Clearly, the waters that were assessed on the Rosemont Project impact site function in some capacity to improve the quality of downstream receiving water. The MRA is not designed to capture the performance of this function.

Other MRA sampling method indicators are inappropriate for the types to waters being assessed. For example, the logic for using variables 8 (riffle-pool distribution), 9 (underbank cover), and 10 (cobble embeddedness), to assess the functioning of fish/aquatic habitat in 1st and 2nd ephemeral streams is unclear. These variables are better suited for assessing fish and invertebrate habitat in perennial streams, not streams where one would not expect to find fish. If these variables are to be used, the logic for their use needs to be clearly justified and the scoring definitions need to be scaled within the context of a reference framework. In addition, there are 10 plant-related indicators for assessing riparian and vegetation and terrestrial wildlife habitat that are similar (sensu autocorrelated), which would tend to bias the combined scores.

The overall MRA water quality, hydrogeomorphology, and fish/aquatic habitat scores for the Rosemont Project area are zero (*e.g.*, Table 5), even though the scores for individual variables for these functions may not have scored zero. For example, if for the water quality function a site receives a score of "2" for channel shading from solar exposure in the absence of surface water, then why would it not receive the same score when surface water is present? Again, the assignment of a "zero" score in the absence of water at the time of the assessment unjustifiably lowers the overall MRA scores.

Calculating Mitigation Ratios

To assist in calculating a compensatory mitigation ratio, the functions and values of the mitigation sites were evaluated relative to the functions and values of the impact site prior to the occurrence of impacts. The functional scores of the impact and mitigation site informed the final mitigation ratio (RCFA p.13).

Using the MRA, WestLands calculated the overall functional score of the aquatic habitat: 1) Rosemont site scored 1.17; 2) Sonoita Creek Ranch scored 1.25; 3) and the SR 83 Corridor and Davidson Parcels scored 1.25. In order to determine compensatory mitigation ratios for the proposed Rosemont Copper Project, WestLands used the Mitigation Ratio Setting Checklist Attachment 12501.2 SPD. Using a qualitative impact mitigation comparison and ratio adjustment, WestLands concluded their proposed mitigation would provide 592% of the required mitigation credits. In other words, the compensatory mitigation package proposed by Rosemont Copper will provide nearly six times the required mitigation for unavoidable impacts to waters (HMMP p. 9).

Following our review of the HMMP and mitigation ratio calculations, we have identified several significant concerns:

- The MRA used in calculating the mitigation ratios is based on a flawed functional assessment methodology (see above) and, in all likelihood, significantly underestimates the function of the impacted waters.
- The Step Adjustment in the Mitigation Setting that relied, in part, on the MRI is therefore incorrect and skewed.
- The MRA functional analysis of Sonoita Creek Ranch scored nearly all (approaching 100%) of the drainage features, while the MRA for the impacted waters scored only 10% of the drainages, which would likely bias the overall scores.

- The proposed creation of 115.5 acres of habitat consisting of a drainage feature, wetland fringe, and riparian buffer proposed at Sonoita Creek Ranch (SCR, p. 9) may not result in the creation of jurisdictional waters of the U.S. Only 3.5 acres of the proposed 115.5 acres of habitat may qualify as a three-parameter jurisdictional wetland (SCR, p. 21).
- The proposed design would not be self-sustaining as it would largely rely on the release of regulated releases of irrigation water (see HMMP, pg. 19). Because of variable soil conditions that characterize the creation site, it is unclear whether the amount of water proposed for release is sufficient to maintain the proposed wetted channel and adjacent riparian wetlands.
- The aquatic habitat proposed at Sonoita Creek Ranch consists of 112 acres of uplands (91% of the proposed native seed mix consists of upland plants) and is not aquatic habitat.
- The preservation of wetlands at Sonoita Creek Ranch, formed from controlled water releases of irrigation water upstream may be isolated aquatic features that are not jurisdictional waters of the U.S. If so, they are unacceptable as mitigation.
- It is unclear why Rosemont did not propose a continuous corridor from the ponds through the agricultural field, hydrologically connecting to Sonoita Creek. Based on the information presented, we believe the proposed creation at Sonoita Creek Ranch is unlikely to be ecologically successful and sustainable, as required in the 2008 Mitigation Rule.
- It appears as though the mitigation proposal includes 101.3 acres of upland buffer as compensation for unavoidable impacts to waters (HMMP Table 7, p. 12). Any proposed upland buffer mitigation should be first applied toward the direct and indirect impacts to upland buffers on the project site. We do not believe Rosemont has conducted this analysis.
- The scoring of several mitigation ratio adjustments on the Mitigation Ratio Setting Checklist for the SCR and SR83/Davidson Canyon Parcels are unsupportable.
- The HMMP states that plants used for the Sonoita Creek Ranch habitat creation will "be obtained from the nearest local grower to take advantage of the local genotype to maximize success." (HMMP p. 21). All plant materials used for site restoration should come from within the Sonoita Creek Ranch or from within the Sonoita Creek watershed.
- Monitoring of all created habitat should be for a minimum 10-year period, not 5-years as implied in the HMMP.
- The success criteria presented in the HMMP do not adequately address invasive species control (p. 24).
- The SR 83 and Davidson Canyon mitigation parcels all lie downstream from the impacted drainages and yet the functional assessment used to determine compensatory mitigation does not factor in indirect effects from the proposed Rosemont copper mine to the proposed mitigation sites, thereby inflating the value of the site.
- Rosemont may convey the Sonoita Ranch property to another entity at any time (HMMP p. 25). Conveyance of the property should be pursuant to approval by the Corps.

On page 13 of the HMMP, Rosemont discusses conservation easements and notes, *"The implementation of mitigation activities described in this HMMP shall not limit or restrict Rosemont or it successors in interest from requesting and if approved securing additional compensatory mitigation credits from the mitigation sites for future 404 permits provided they are able to demonstrate functional capacity above currently proposed conditions of the function and values of the mitigation sites."*

The compensatory mitigation package proposed in the above referenced documents is grossly inadequate, fails to accurately assess the functional condition at the project site and mitigation sites, and

fails to provide compensation for proposed project impacts. Therefore, any future request by Rosemont for securing additional compensation is moot and contrary to mitigation guidelines.