THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
5000 W. CAREFREE HIGHWAY
PHOENIX, AZ 85086-5000
(602) 942-3000 • WWW.AZGFD.GOV

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March 26, 2013

Mr. Tony Davis
Arizona Daily Star
4850 South Park Avenue
Tucson, Arizona 85714
verdin@azstarnet.com

Re: Public Records Request for Rosemont Mine and jaguars

Dear Mr. Davis:

Pursuant to your request November 27, 2012 regarding "[documents related to] *the proposed Rosemont Mine and any of the jaguars seen, photographed or reported to have been seen or photographed in Southeast Arizona since Jan. 1, 2011. That would include the confirmed Nov. 19 siting in the Whetstone Mountains, the unconfirmed report from June 2, 2011 in the Santa Rita Mountains and the recent photo of a jaguar tail in the northern Santa Ritas about which we have written several articles now*". Your request further seeks "*copies of any records in the Department's possession about the potential or real effects on those jaguars of the proposed mine, or as to how those jaguars' presence affects the department, it's staff or other parties views of the mine*".

We have previously fulfilled a request on jaguar sightings in southeastern Arizona which include the sightings you specifically reference; those are publicly available http://www.azgfd.gov/w_c/es/jaguar_management.shtml. For documents relating to the Rosemont Mine, please find the information you requested at the same webpage.

Other than standard redactions (such as non-governmental email addresses and personal phone numbers), the Department has redacted the following information: 1) the reporting party's identity, and 2) any and all text referring to the specific location where the animal was sighted.

The Forest Service has placed three iterations of its Biological Assessment (initial, first and second supplement) for the proposed Rosemont Copper Mine on the Forest Service's Rosemont Mine EIS website:

- June 2012 initial BA: http://www.rosemonteis.us/documents/biological-assessment
- October 2012 supplemental BA: http://www.rosemonteis.us/documents/swca-biological-assessment-supplement1-201210
- February 2013 supplemental BA: http://www.rosemonteis.us/documents/cnf-biological-assessment-supplement2-201302

If you have any questions or require further assistance, please contact the Arizona Game and Fish Department at (602) 942-3000.

Sincerely,

Gary Hovatter
Deputy Director

cc: Bob Broscheid
Larry Riley
Jim Odenkirk
Linda Pollock
Jim Paxon
Annie Gregory
Jennifer Stewart
Celeste Cook

Joan Scott

From: Ron Thompson
Sent: Wednesday, March 19, 2008 3:52 PM
To: Joan Scott
Cc: Leonard Ordway; Brian Wakeling
Subject: RE: Update: B1 BLUESHEET DUE 4/2/2008 Rosemont Copper Project, Coronado NF
Attachments: lion Santa Ritas.pdf

Joan:
You indicated that we did not need to go into any depth at this point in the process relative a scoping response for the Rosemont Copper Project. Per our discussion today at the Phoenix office, I have attached a map of the 8-12 month movements of two radio-collared lions from the U of A urban study. The map displays the movements of both a male and female lion initially collared in Box Canyon. Their movements are an indication of the richness of prey in the project area available for large carnivores, with one of the smallest home range areas utilized by two lions in close proximity in the literature. Kerry Nicholson can provide you with a video movement format and additional data relative the lions. I am also aware of a USFS big game water development that I helped plan and build on the side of Mt. Fagan in the late 70s, which has since been redeveloped, that will become of little or no value. The entire north end of the Santa Ritas is some of the best small game, Couse white-tailed deer and javelina habitat represented in southern Arizona with a north to south aspect orientation within one hour's access, not found in many range-basin sky island ranges. I am also familiar with evidence of use of the area by black bears for hibernation. Connectivity concerns should also be raised in part from the solid documentation of the easterly movements of the collared male lion across the Sonita Highway, from project area lands. Development of private lands further south and adjacent to the Sonita Highway precludes crossings except at finite undeveloped locales on State and Federal lands that will be lost to the Rosemont Project. As you follow this important project's progress, we are available to assist your region with additional game management data and analysis. Thank you.

From: Leonard Ordway
Sent: Wednesday, March 19, 2008 8:26 AM
To: Ron Thompson
Cc: Brian Wakeling; 'Joan Scott'; Leonard Ordway
Subject: FW: Update: B1 BLUESHEET DUE 4/2/2008 Rosemont Copper Project, Coronado NF

Ron,
Minor change to previous direction. Once your comments have been coordinated with Brian please send them to Joan Scott. Thanks.
Leonard

From: Barbara Cook
Sent: Wednesday, March 19, 2008 7:44 AM
To: Eric Gardner; Leonard Ordway; Chantal OBrien; Daniel E. Nelson; Gloria Morales; Patti Morrical
Cc: Joan Scott; Laura Canaca
Subject: Update: B1 BLUESHEET DUE 4/2/2008 Rosemont Copper Project, Coronado NF

Joan Scott, R5, will be taking the lead on this project. Please coordinate any comments through her.

From: Barbara Cook
Sent: Thursday, March 13, 2008 8:55 AM
To: Joan Scott; John Windes; Eric Gardner; Leonard Ordway; Chantal OBrien; Daniel E. Nelson
Subject: B1 BLUESHEET DUE 4/2/2008 - Rosemont Copper Project, Coronado NF

Michelle Black

From: Joan Scott
Sent: Wednesday, May 27, 2009 10:01 AM
To: 'Teresa Ann Ciapusci'
Cc: John Windes; Leonard Ordway
Subject: possible properties for mitigation
Attachments: Triangle Bar Ranch_Sec 6_proposal - 08 09 19 (2).pdf; S6 Sonoita Creek Ranch proposal.doc; sf424-f Sonoita Creek Ranch.pdf; sonckranch1.JPG; Sonoita Creek Ranch brochure.pdf; birdlist.pdf; S6 Sonoita Creek Ranch proposal Appendices.doc

Teresa Ann:
Here are the proposals that we wrote trying to get money to purchase Sonoita Creek Ranch and the Triangle Bar Ranch. We have not secured money for these purchases yet (received $300,000 only on the Sonoita Creek Ranch property – not near enough). You will note that these proposals were only for partial funding (all we could apply for under that grant program). But, I am showing these to you so that you know some of the biological values of the properties. Sorry the Sonoita Creek Ranch proposal is in several files.

Additionally, ASARCO owns additional property along the San Pedro River near the confluence with Aravaipa Creek (near the Triangle Bar Ranch) that would be desirable to conserve under federal ownership. A very impressive package could be put together along the San Pedro near the Aravaipa Creek confluence with property owned by ASARCO and Triangle Bar. AGFD just received some property in this same area from ASARCO as a settlement, and The Nature Conservancy also holds property in this same area. All together, it might make a pretty impressive conservation area, if it could all be protected.

Joan E. Scott
Habitat Program Manager
Arizona Game and Fish Department
555 N. Greasewood
Tucson, AZ 85704
Phone: 520.388.4447
Email: jscott@azgfd.gov
Fax: 520.628.5080
WebPage: www.azgfd.gov

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From: Teresa Ann Ciapusci [mailto:tciapusci@fs.fed.us]
Sent: Wednesday, May 27, 2009 7:12 AM
To: Joan Scott
Subject: Re:

Joan -

Thanks to you, John, Brad, and Leonard for meeting with us yesterday. Here is the electronic copy you requested in our meeting - minus the item you asked me to remove.

Teresa Ann Ciapusci
Staff Officer
Ecosystem Management and Planning
Coronado National Forest
300 West Congress, FB42
Tucson, Arizona 85701
(520) 388-8350 office
(520) 237-0879 cellular
(520) 388-8305 fax

"Joan Scott" <JScott@azgfd.gov>

05/26/2009 10:22 AM

To "Teresa Ann Ciapusci" <tciapusci@fs.fed.us>
cc
Subject

Hi Teresa Ann. Please look over these minor changes. We can discuss them when you come over this afternoon.

Joan E. Scott
Habitat Program Manager
Arizona Game and Fish Department
555 N. Greasewood
Tucson, AZ 85704
Phone: 520.388.4447
Email: jscott@azgfd.gov
Fax: 520.628.5080
WebPage: www.azgfd.gov

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[attachment "050609 DRAFT (09-MU-11030514-026) AZ Dept of Game and Fish Cooperating Agency MOU (4).doc" deleted by Teresa Ann Ciapusci/R3/USDAFS]

APPLICATION FOR FEDERAL ASSISTANCE

Version 7/03

2. DATE SUBMITTED 09/19/2008	Applicant Identifier	
3. DATE RECEIVED BY STATE	State Application Identifier	
4. DATE RECEIVED BY FEDERAL AGENCY	Federal Identifier	

1. TYPE OF SUBMISSION:

Application	Pre-application
Construction	Construction
Non-Construction	Non-Construction

5. APPLICANT INFORMATION

Legal Name: Arizona Game and Fish Department

Organizational Unit:
Department: Nongame/Endangered Species Program
Division:

Organizational DUNS: 804745339

Address:
Street: 5000 W. Carefree Highway
City: Phoenix
County: Maricopa
State: Arizona
Zip Code: 85086-5000
Country: USA

Name and telephone number of person to be contacted on matters involving this application (give area code)
Prefix: Mr. First Name: Josh
Middle Name
Last Name: Avey
Suffix:
Email: javey@azgfd.gov
Phone Number (give area code): (623) 236-7605
Fax Number (give area code): (623) 236-7366

6. EMPLOYER IDENTIFICATION NUMBER *(EIN)*: 8 6 – 6 0 0 4 7 9 1

8. TYPE OF APPLICATION:
× New Continuation Revision
If Revision, enter appropriate letter(s) in box(es)
(See back of form for description of letters.)
Other (specify)

7. TYPE OF APPLICANT: (See back of form for Application Types)
A. State
Other (specify)

9. NAME OF FEDERAL AGENCY: U.S. Department of Interior, Fish and Wildlife Service

10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: 1 5 – 6 1 5
TITLE (Name of Program): Cooperative Endangered Species Fund

11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT:
Recovery Land Acquisition Grant for Sonoita Creek Ranch Acquisition to protect habitat of Gila topminnow and other TES

12. AREAS AFFECTED BY PROJECT *(Cities, Counties, States, etc.)*:
Santa Cruz County, State of Arizona

13. PROPOSED PROJECT
Start Date: 01/01/2009
Ending Date: 12/31/2011

14. CONGRESSIONAL DISTRICTS OF:
a. Applicant
b. Project

15. ESTIMATED FUNDING:

a. Federal	$	1,000,000.00
b. Applicant	$	
c. State	$	1,000,000.00
d. Local	$	
e. Other	$	1,500,000.00
f. Program Income	$	
g. TOTAL	$	3,500,000.00

16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?
a. Yes. THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON
DATE:
b. No. PROGRAM IS NOT COVERED BY E. O. 12372
OR PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW

17. IS THE APPLICANT DELINQUENT ON ANY FEDERAL DEBT?
Yes If "Yes" attach an explanation. × No

18. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION/PREAPPLICATION ARE TRUE AND CORRECT. THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED.

a. Authorized Representative
Prefix: Mr. First Name: Larry Middle Name: D.
Last Name: Voyles Suffix:
b. Title: Director c. Telephone Number (give area code): (623) 236-7278
d. Signature of Authorized Representative e. Date Signed

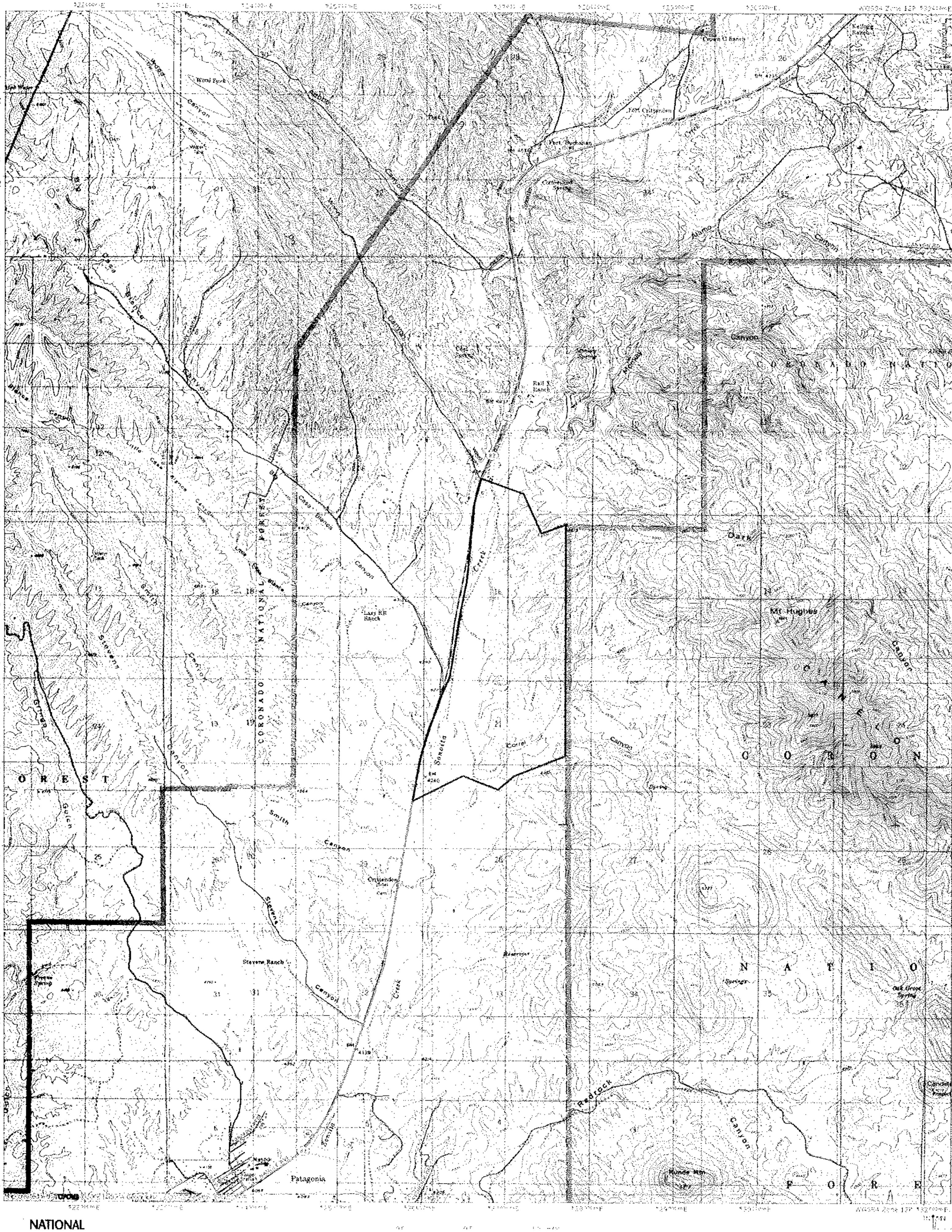
INSTRUCTIONS FOR THE SF-424

Public reporting burden for this collection of information is estimated to average 45 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0043), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

This is a standard form used by applicants as a required face sheet for pre-applications and applications submitted for Federal assistance. It will be used by Federal agencies to obtain applicant certification that States which have established a review and comment procedure in response to Executive Order 12372 and have selected the program to be included in their process have been given an opportunity to review the applicant's submission.

Item:	Entry:	Item:	Entry:
1.	Select Type of Submission.	11.	Enter a brief descriptive title of the project. If more than one program is involved, you should append an explanation on a separate sheet. If appropriate (e.g., construction or real property projects), attach a map showing project location. For preapplications, use a separate sheet to provide a summary description of this project.
2.	Date application submitted to Federal agency (or State if applicable) and applicant's control number (if applicable).	12.	List only the largest political entities affected (e.g., State, counties, cities).
3.	State use only (if applicable).	13	Enter the proposed start date and end date of the project.
4.	Enter Date Received by Federal Agency Federal identifier number: If this application is a continuation or revision to an existing award, enter the present Federal Identifier number. If for a new project, leave blank.	14.	List the applicant's Congressional District and any District(s) affected by the program or project
5.	Enter legal name of applicant, name of primary organizational unit (including division, if applicable), which will undertake the assistance activity, enter the organization's DUNS number (received from Dun and Bradstreet), enter the complete address of the applicant (including country), and name, telephone number, e-mail and fax of the person to contact on matters related to this application.	15	Amount requested or to be contributed during the first funding/budget period by each contributor. Value of in kind contributions should be included on appropriate lines as applicable. If the action will result in a dollar change to an existing award, indicate only the amount of the change. For decreases, enclose the amounts in parentheses. If both basic and supplemental amounts are included, show breakdown on an attached sheet. For multiple program funding, use totals and show breakdown using same categories as item 15.
6.	Enter Employer Identification Number (EIN) as assigned by the Internal Revenue Service.	16.	Applicants should contact the State Single Point of Contact (SPOC) for Federal Executive Order 12372 to determine whether the application is subject to the State intergovernmental review process.
7.	Select the appropriate letter in the space provided. A. State B. County C. Municipal D. Township E. Interstate F. Intermunicipal G. Special District H. Independent School District I. State Controlled Institution of Higher Learning J. Private University K. Indian Tribe L. Individual M. Profit Organization N. Other (Specify) O. Not for Profit Organization	17.	This question applies to the applicant organization, not the person who signs as the authorized representative. Categories of debt include delinquent audit disallowances, loans and taxes.
8.	Select the type from the following list: • "New" means a new assistance award. • "Continuation" means an extension for an additional funding/budget period for a project with a projected completion date. • "Revision" means any change in the Federal Government's financial obligation or contingent liability from an existing obligation. If a revision enter the appropriate letter: A. Increase Award B. Decrease Award C. Increase Duration D. Decrease Duration	18	To be signed by the authorized representative of the applicant. A copy of the governing body's authorization for you to sign this application as official representative must be on file in the applicant's office. (Certain Federal agencies may require that this authorization be submitted as part of the application.)
9.	Name of Federal agency from which assistance is being requested with this application.		
10.	Use the Catalog of Federal Domestic Assistance number and title of the program under which assistance is requested.		



Fort Crittenden
Fort Buchanan
Alamo
Canyon
CORONADO NATIO
Mt Hughes
Rail X Ranch
Lazy RR Ranch
CORONADO NATIONAL FOREST
Casa Blanca
Smith
Stevens
Sonoita Creek
Corral
O R E S T
Crittenden
Stevens Ranch
Reservoir
N A T I O
Oak Grove Spring
Redrock
Patagonia
F O R E

NATIONAL

Sonoita Creek Ranch
Santa Cruz County, Arizona

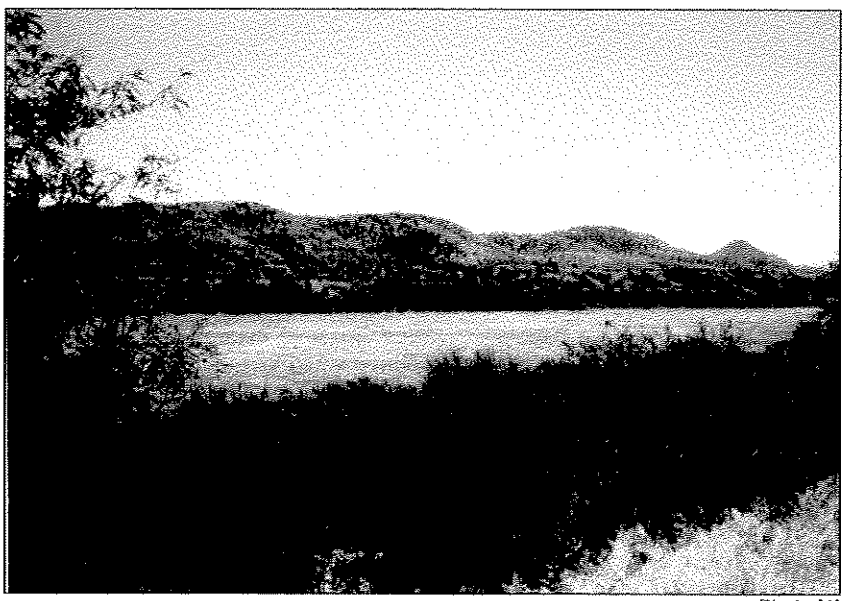


Photo [1]

Listed for sale exclusively by:

Sam Hubbell

Headquarters West Ltd.
PO BOX 1039
Sonoita, AZ 85637
Phone: (520) 455-5834 - Mobile: (520) 609-2546 - Fax: (520) 455-5018
info@headquarterswest.com
www.headquarterswest.com/sonoitacreek

Part of Historic Rail X Ranch

Acreage
+-1,126 Deeded

Location
The property is located in Eastern Santa Cruz County between the towns of Sonoita and Patagonia. State Hwy 82 borders the property on the west side, and the Coronado National Forest borders the property to the east.

Description
The Sonoita Creek Ranch was once part of the historic Rail X Ranch. It sits in the beautiful foothills of the Santa Rita Mountains. Elevation ranges from 4400 ft. to 5000 feet above sea level. There is a 150 acre irrigated field on the eastern side of the property with 588 acre feet of water rights. Sonoita Creek runs through the property, which makes a nice riparian area, and a home for a huge variety of wildlife, and two irrigation ponds that are stocked with fish. The views from the property are exceptional in every direction. This is truly an exceptionally beautiful property.

Weather
Summers and winters are comparatively mild; temperatures vary from a daily maximum mean of approximately 58 degrees during the month of January to a daily maximum mean of approximately 88 degrees during the month of July. Annual rain fall averages about 17 inches.

Wildlife
Wildlife includes mule deer, white tail deer, bobcat, mountain lion, javelina, coyote, fox, badger, and squirrels. Quail and a wide variety of birds and other small game reside here. The Sonoita-Patagonia area is widely recognized in Arizona for its natural beauty and world renowned bird watching.

Comments
The Picturesque town of Patagonia is a short five minute drive to the south, and the town of Sonoita is a short five minute drive to the north. Nogales international airport is about fifteen minutes from the property, and Tucson international airport is little under an hours drive.

Price
Reduced to $9,000,000 from $11,260,000

Pictures

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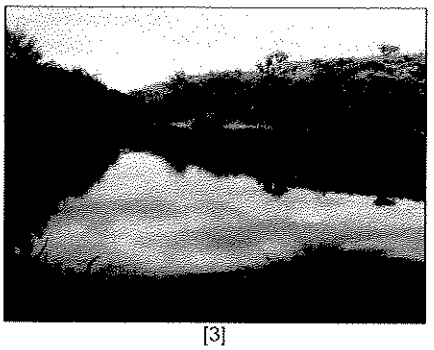
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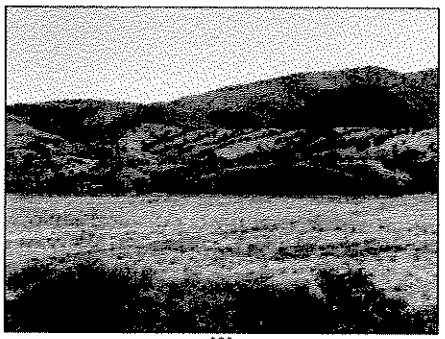
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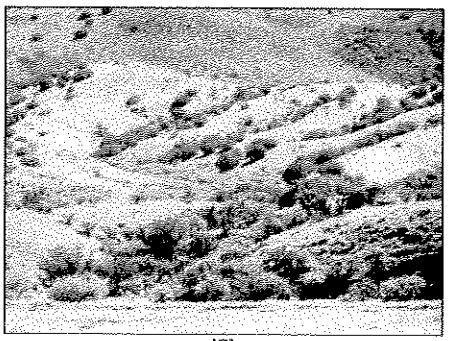
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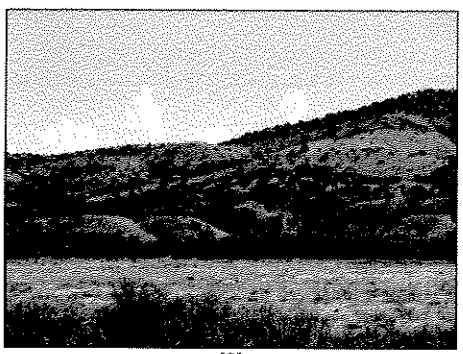
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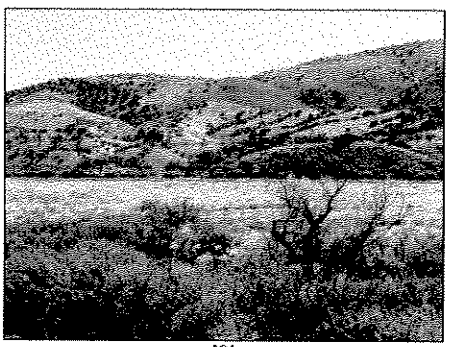
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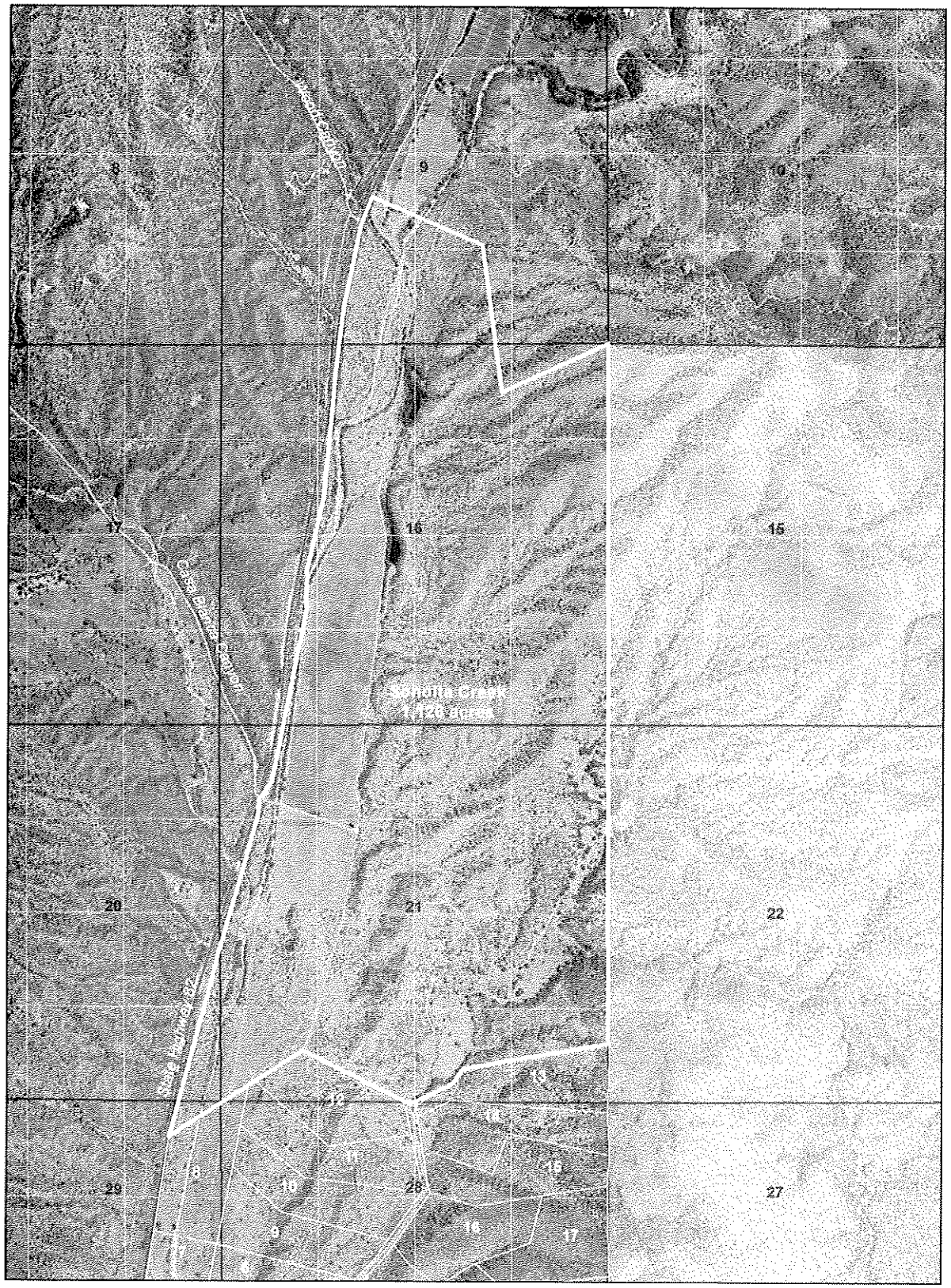
Location Map

Aerial Parcel Map



A Partial List of The Birds of Sonoita Creek Ranch
Patagonia, Arizona

This list includes birds seen in the Sonoita Creek Ranch area and recorded in a monitoring effort in collaboration with the Tucson Audubon Society's Upper Sonoita Creek Important Bird Area (IBA) program. The Sonoita Creek Valley is a very significant bird area with more than 300 species having been recorded here. La Semilla is partnering with the Tucson Audubon Society to support monitoring efforts in the upper watershed area. The * indicates "At Risk/Declining" Species List, NRCS 2006.

Black-bellied Whistling Duck*
American Wigeon
Mallard
Cinnamon teal
Green-winged teal
Lesser Scaup
Ruddy Duck
Wood duck
Gadwall
Wild Turkey
Gambel's Quail
Montezuma Quail
Great Blue Heron
Great Egret*
Snowy Egret*
Green Heron
Black Vulture
Turkey Vulture
White-tailed Kite
Northern Harier
Sharp-shinned Hawk
Cooper's Hawk
Northern Gray Hawk*
Zone-tailed Hawk
Common Black Hawk*
Red-tailed Hawk
Golden Eagle
American Kestel
Peregrine Falcon*
Prairie Falcon
American Coot
Killdeer
Band-tailed pigeon
White-winged dove
Mourning Dove
Inca DoveCommon Ground-dove
Yellow-billed cuckoo*
Greater Roadrunner
Barn Owl
Western Screech Owl
Whiskered Screech Owl
Great Horned Owl
Elf Owl
Lesser Nighthawk
Common Nighthawk
Common Poorwill
White-throated Swift
Broad-billed Hummingbird
Violet-crowned Hummingbird*
Magnificent Hummingbird
Black-chinned Hummingbird
Anna's Hummingbird
Costa's Hummingbird
Rufous Hummingbird
Green kingfisher*
Belted Kingfisher
Lewis' Woodpecker
Acorn Woodpecker
Gila Woodpecker
Red-naped Sapsucker
Ladderbacked Woodpecker
Northern Flicker
N. Beardless Tyrannulet
Western Wood Pewee
Hammond's Flycatcher
Gray Flycatcher
Dusky Flycatcher
Black Phoebe
Say's Phoebe
Vermilion Flycatcher
Ash-throated Flycatcher
Brown-crested flycatcher
Cassin's Kingbird
Thick-billed kingbird*

Western Kingbird
Loggerhead Shrike
Arizona Bell's Vireo*
Warbling Vireo
Mexican Jay
Common Raven
Violet-green Swallow
N. Rough-winged Swallow
Bridled Titmouse
Verdin
Bushtit
White-breasted Nuthatch
Bewick's Wren
Ruby-crowned Kinglet
Western Bluebird
Mountain Bluebird
Hermit Thrush
Northern Mockingbird
Curve-billed Thrasher
European Starling
Cedar Waxwing
Phainopepla
Orange-crowned Warbler
Lucy's Warbler
Yellow Warbler
Yellow-rumped Warbler
Common Yellowthroat
Wilson's warbler
Painted Redstart
Yellow-breasted Chat
Hepatic Tanager
Summer Tanager
Western Tanager
Green-tailed Towhee
Spotted Towhee
Canyon Towhee
Cassin's Sparrow
Fufous-crowned Sparrow
Chipping Sparrow
Black-throated Sparrow
Lincoln's Sparrow
White-crowned Sparrow
Northern Cardinal
Pyrrhuloxia
Rose-breasted Grosbeak
Black-headed Grosbeak
Blue Grosbeak
Lazuli Bunting
Eastern Meadowlark
Western Meadowlark
Brewer's Blackbird
Great-tailed Grackle
Brown-headed cowbird
Hooded Oriole
Bullock's Oriole
Scott's Oriole
House Finch
Pine Siskin
Lesser Goldfinch

4/07

Appendix A:

Sales Brochure
Offering the
Sonoita Creek Ranch

LANDS PROGRAM:
INSERT HERE
PDF FILE CALLED
SONOITA CREEK RANCH BROCHURE.PDF

Appendix B:
A Partial List of the Birds of Sonoita Creek Ranch

LANDS PROGRAM:
INSERT HERE
PDF FILE CALLED
BIRDLIST.PDF

Appendix C:
Topographic Map of
Sonoita Creek Ranch

Blue line in middle of page shows the property boundary.
The red lines show the boundaries of the two disjunct Ecosystem Management Areas of the Coronado National Forest.

LANDS PROGRAM:
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Appendix D:
Photos of
Sonoita Creek Ranch

Photo #1 – Upper Pond

Photo #2 – Upper Pond

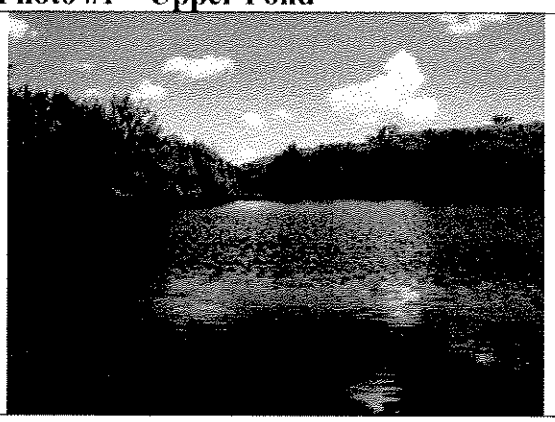

Photo #3 – Lower Pond

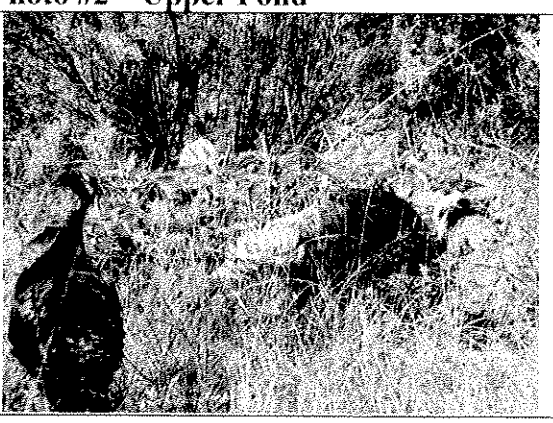

Photo #4 – Gould's turkeys on the property

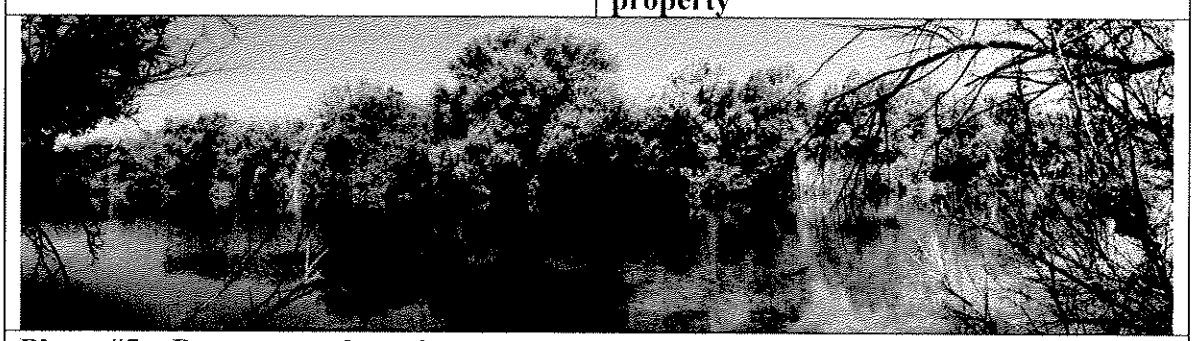

Photo #5 – Panorama of pond

Also see photos in Appendix A.

THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
5000 W. CAREFREE HIGHWAY
PHOENIX, AZ 85086-5000
(602) 942-3000 • WWW.AZGFD.GOV
REGION V, 555 N. GREASEWOOD ROAD, TUCSON, AZ 85745

GOVERNOR
JANICE K. BREWER
COMMISSIONERS
CHAIRMAN, BOB HERNBRODE, TUCSON
JENNIFER L. MARTIN, PHOENIX
ROBERT R. WOODHOUSE, ROLL
NORMAN W. FREEMAN, CHINO VALLEY
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July 31, 2009

Jeanine Derby, Forest Supervisor
Coronado National Forest
300 West Congress
Tucson, Arizona 85701

Re: Comments on Alternative Elements Table for Proposed Rosemont Mine

Dear Ms. Derby:

The Arizona Game and Fish Department (Department) has reviewed the Alternative Elements table shared with the cooperating agencies on July 16, 2009 and provides the following comments:

Spirit of Cooperation

It is our understanding that the Department must submit comments by July 31, 2009 for our comments to receive consideration before finalization of the alternatives for the Draft Environmental Impact Statement (DEIS). The Department does not find that two weeks is nearly enough time to consider the various alternative elements which the Forest has been studying for some months. The Department should have been allowed greater input into the evaluation of the elements and provided more time to comment.

Coronado National Forest (Forest) has assembled an internal Interdisciplinary Team (IDT) to review the alternatives to the Rosemont Plan of Operations as part of the DEIS. This IDT has been meeting for some months. Our Memorandum of Understanding (MOU) affirms both agencies' ability to request meetings and provides for open and timely communication. The Department has requested the opportunity to meet with Forest staff participating on the IDT to discuss potential alternative elements and alternatives. These requests have gone unanswered. It is our understanding that other cooperators have also requested greater access to Forest staff and have not been provided this opportunity. It is the Department's experience that direct interaction with agency staff, with the opportunity for back and forth discussion of alternatives, results in a much better product than limited, formal opportunities, filtered through an intermediary, as thus far has occurred. The Department is concerned that our staff are being kept at arm's length without the ability to provide meaningful input into the development of the alternatives in terms of real-time give and take with Forest staff. This limited access is a departure from our normal interaction and is not an adequate conduit for open and timely *exchange* of information as described in our MOU. The Department therefore requests that the deadline for Forest staff to present final alternatives to the DEIS be extended until such time as the Department has had the opportunity to meet face to face with Forest staff, especially Forest biologists assigned to the IDT, to discuss potential alternatives before any alternatives are finalized for the DEIS.

Purpose and Need Statement Appears to Violate Intent of NEPA

As we stated in our comments on the Notice of Intent (NOI) we have concerns with the Purpose and Need Statement presented at that time. We have not seen a revised Purpose and Need Statement. Has this been revised? The original Purpose and Need Statement appears to be inherently pre-decisional and therefore apparently violates the intent of the National Environmental Policy Act (NEPA). Surely the purpose of the proposed action *cannot* be to "grant permission to the Company [Rosemont Copper] to use NFS [National Forest Service] land". Per CEQ regulations (§1502.13) the Purpose and need statement shall specify the "underlying purpose and need to which the agency is *responding.*" This seems to indicate that the *response* cannot be included in the purpose or there would be no need to analyze any of the alternatives. Should not the purpose therefore be either to "*evaluate whether or not* to grant permission" or more appropriately shouldn't the purpose be clearly stated as the actual purpose that Rosemont is requesting, i.e. "to use (NFS) land for certain activities related to the operation of the Rosemont Mine". The latter clearly follows the standard for NEPA documents. Is not granting permission (or not) the final step of the process, not the purpose? Moreover, CEQ §1502.14 (Alternatives including the propose action) clearly states that "in this section agencies shall: (d) include the alternative of no action." Furthermore, all reasonable alternatives must be considered including "reasonable alternatives not within the jurisdiction of the lead agency" (CEQ 1502.14.d). Such alternatives may involve use of non-Forest lands. The Purpose and Need statement drives development of the alternatives. How can the Forest seriously consider the No Action Alternative, or alternatives using non-Forest lands when the purpose has been stated as to "grant permission?" The Department suggests revising this Purpose and Need Statement which appears to preclude all serious consideration of the No Action Alternative.

The Notes section of the table indicates that several alternative elements will be eliminated because they don't meet the Purpose and Need or because Rosemont has a legal right to access the minerals associated with their claims. The Department does not dispute Rosemont's legal right to pursue access to their claims. However, all reasonable alternatives must be rigorously explored and objectively evaluated (CEQ §1502.14.a) including alternatives outside the Forest's jurisdiction. Since the Department has not interfaced with the IDT evaluating the alternatives and since the alternatives have not been presented to the Department with opportunity for meaningful discussion, the Department is not satisfied that these alternatives are not feasible. Moreover, no evidence of rigorous exploration has been presented. It appears that any alternative that is outside the Forest's jurisdiction has been dismissed *for the very reason that it is outside their jurisdiction.* This seems to violate §1502.14. Finally, the Department questions the Forest's apparent decision to grant permission to access legal claims prior to completion of the final EIS which should evaluate the potential impact of such access. Surely there may be some impacts so great as to preclude such a decision.

Several alternative elements appear likely to be dismissed because they are "cost prohibitive" or because of "possible" right of way issues. Any alternative must be evaluated based on not only the cost to the project proponent but also the cost to the public. Why should the public be asked to pay the cost of the loss of their wildlife resources when another alternative would eliminate

this cost, requiring additional cost be borne by the project proponent? For example, the alternative of shipping waste off of public lands appears technically feasible but is "cost prohibitive". The savings realized by the project proponent of placing waste on public land is directly transferred to the American public who owns the land and wildlife resources which will be lost. The public could argue that this alternative, then, is "cost prohibitive" or not a feasible alternative. Both costs to the proponent and to the public should be quantified and compared.

Impacts of the Rosemont Mine to Wildlife Resources Held in Public Trust Under the Authority of the Department

Impacts of the Rosemont Mine will have direct, indirect, and cumulative impacts on to the entire northern portion of the Santa Rita Mountains managed by the Forest and additional lands on Bureau of Land Management land, Arizona State Trust Land, and private land. Regardless of ownership, all of this land supports diverse wildlife resources held in trust for the public and managed under the authority of the Arizona Game and Fish Department. In addition to direct mortality (which may result from various mining activities including, but not limited to, exposure to toxins and mechanical or vehicular contact), destruction, degradation, and disturbance of wildlife habitat indirectly causes mortality of wildlife supported by that habitat, and disrupts ecosystems that wildlife depend upon. Any preferred alternative should include elements which compensate the public for the loss of wildlife and wildlife-related recreation in-kind, in time. Habitat loss results in the loss of future generations of wildlife that would have otherwise been supported by that habitat. Any mitigation package which does not compensate the public for the loss of the public's wildlife resources held in trust by the Department is unacceptable to the Department. Arizona Game and Fish Commission Policy A2.16 requires that the Department seek compensation for actual or potential habitat losses resulting from land and water projects at a 100% level, where feasible. The Department, therefore, is advocating for said compensation in the preferred alternative.

Alternative Elements to be Included in the DEIS

The Department has previously provided input on alternative elements we believe should be included in the preferred alternative which will compensate the public for the loss of wildlife and habitat. The Department provides additional input here and requests the following alternative elements be included in the preferred alternative:

Compensation In-Kind, In-Time to the Public for Land Lost to Public Use
The Department has provided input on specific parcels which may be considered for purchase to compensate the public for the loss of multiple generations of wildlife resources to the public. The Forest need not identify specific parcels but should include in the preferred alternative an element which stipulates compensation to the public for the loss of their wildlife resources through purchase and transfer of land containing habitat of equal or greater value to the values lost for development of the mine. Such land must be available, to the greatest extent possible, to the public simultaneous to the loss of resources resulting from mine development (in-kind, in-

time). Compensation occurring after the fact is unacceptable to the Department. No compensation occurring at some time in the future can adequately compensate today's public, which may not live to see the results of such compensation.

Transport of Spoils and Tailings off of Forest Land
The Department would like to see a full quantification of the costs associated with transport of overburden and tailings off of public land compared to a full quantification of the costs associated with the impacts to wildlife and other resources resulting from the project. The public should be made aware of the costs they will be incurring.

Pit Backfilling
There appears to be dispute between experts regarding the feasibility, cost, and benefit of this option. The Department requests that this option be rigorously explored and objectively evaluated and that this evaluation be available to the cooperators before being eliminated from the alternatives. Backfilling has been identified as one of the few options that may significantly reduce the impacts of the project to water resources critical to wildlife in the watershed.

Watershed Integrity
The Department is concerned with the runoff "shadow" that will be created down slope of the pit and any other areas which will capture the natural rainfall runoff which waters the ecosystem. The preferred alternative should address this problem by ensuring there is a system in place for maintaining watershed integrity.

The Department appreciates the opportunity to comment on the Rosemont mining proposal and looks forward to cooperation with the Forest for the duration of the project.

Sincerely,

John Windes
Region V Habitat Program Manager

JDW:jw

cc: Laura Canaca, Project Evaluation Supervisor
Leonard Ordway, Region V Supervisor
Diane Tilton-Barajas, District Wildlife Manager
Teresa Ann Ciapusci, Cooperating Agency Liaison

WILDLIFE AND HABITAT

Wildlife and Habitat

Record ID	Comment Number	Commenter Type	Comment Text
1983	5	Individual	I'm concerned about loss of wildlife habitat.
2268	4	Individual	The wildlife habitat should not be destroyed just because a FORIEGN country wants to mine copper.
2294	3	Individual	Our birds and wildlife are being threatened from all sides in this wonderful Sky Island.
2593	109	Organization	Concerns regarding the vegetation in the area that should be addressed in the EIS include: -What are the short term direct impacts to the vegetation in the area? -What are the long term, indirect impacts to the vegetation in the area? -What are the important habitat types in the area? -What is the current productivity of important habitat types in the area?
6913	2	Individual	What would be done to minimize the effects on neighbors and wildlife of daily blasting at the proposed Rosemont mine?
7253	109	Organization	Concerns regarding the vegetation in the area that should be addressed in the EIS include: -What are the short term direct impacts to the vegetation in the area? -What are the long term, indirect impacts to the vegetation in the area? -What are the important habitat types in the area? -What is the current productivity of important habitat types in the area?

99 Cumulative Impact

Record ID	Comment Number	Commenter Type	Comment Text
43	13		What will the cumulative impacts be of this mine and other proposed mining operations in the vicinity on wildlife?
183	3		What will the cumulative impacts be from this mine and the other proposed mining operations in the vicinity on wildlife
1660	2	Individual	Cumulative Impacts of all new mining proposals in this BIOLOGICALLY SENSITIVE AREA. I request that this be considered in the EIS.
2122	3	Individual	Augusta Mining's short term economic boom can not possibly offset the disastrous long term impact on wildlife habitat that this proposed encroachment would have.
2199	16	Individual	What will be the cumulative impact on wildlife of the mining and transport operations?
2214	15	Individual	What will the cumulative impacts be of this mine and other proposed mining operations in the vicinity on wildlife?
2360	4	Individual	I am writing to oppose the Mine's approval for many reasons. Here are some: The destruction of pristine land that can never be restored, and as a result the loss of the homes of many animals.

Wildlife and Habitat

99 Cumulative Impact

Record ID	Comment Number	Commenter Type	Comment Text
2677	18	Government	There are so many demands on land in Arizona. Human population and urban and rural development are growing at such a rate that there will soon be a time when the only land left for the public to use for recreation, and the only land left for wildlife, will be the public land. The Forest Service should consider that the highest value of Arizona public land is for wildlife.
2677	63	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Impacts to wildlife habitat off-site
2713	24	Organization	The EIS for the proposed Rosemont Copper Mine must consider both the immediate and cumulative impacts fo the proposed action, as required by the National Environmental Policy Act. Specifically, the following types of resouces analyses must be included: An analysis of all of the hydrologic and geological formations in the area, entailing a thorough evaluation of how the proposed project/s will impact the entire region, including a detailed analysis of the projected exposure of wildlife (including pollinators such as bats, insects) to these impacts and potential hazards.
2723	5	Individual	The proposed Rosemont Mine is located adjacent to and partially overlapping an area designed by the Sonoran Desert Conservation Plan as biological core habitat The mine and associated traffic would put additional stress on wildlife already being impacted by rapid growth in the general area.
2745	14	Individual	The Tucson Active Management Area (TUMA) is a cmoprehensive system that is to large to quantify the critical impact that Rosemont Copper will directly and cumulatively indirectly impact the present and futures of these willife.
2760	38	Government	Identify direct, indirect and cumulative impacts to wildlife as a result of groundwater pumping assoicated with the proposed project.
6880	20	Government	Finally, all of these and other legitimate concerns that have been raised about this mine proposal should be analyzed for their cumulative impacts on surrounding communities, wildlife, water quality, water quantity, and air pollution.
6919	3	Individual	What will the cumulative impacts be from this mine and the other proposed mining operations in the vicinity on wildlife,
7083	9	Individual	Please take into consideration the cumulative impacts from this mine and the other proposed mining operations in the vicinity on wildlife, water quality, water quantity, and air quality.
7088	80	Organization	What will be the full and cumulative impacts of the Rosemont mining project on these endangered, candidate species, other priority vulnerable species or Wildlife of Special Concern, and other wildlife, flora and fauna?
7163	67	Organization	In addition to the economic and social concerns discussed above, these proposals raise significant environmental concerns. If the mines are developed, they would destroy extensive areas of habitat for imperiled wildlife and plants, including the endangered jaguar; degrade air quality; produce significant amounts of greenhouse gas emissions; drawdown aquifers, contaminate ground and surface water supplies; negatively impact scenic views; increase traffic on scenic and commuter highways; and eliminate current recreational use by a broad-cross section of local residents and visitors alike.

Comments by Resource Category

Wildlife and Habitat

99 - Cumulative Impact

Record ID	Comment Number	Commenter Type	Comment Text
7163	80	Organization	We suggest the environmental impacts of the proposed Rosemont Mine should not be analyzed in isolation. As noted above, numerous proposed hardrock mining proposals are on the table on the Colorado National Forest, all of which collectively impact wildlife habitat on a landscape to regional scale and potentially connected groundwater resources. Given the Forest Service's inclination to authorize numerous mining CEs within the span of only 1-2 years, this constitutes linked actions that have cumulative and synergistic environmental effects. As such, these consequences must be considered in an EIS.
7175	6	Individual	The Forest Service, and the U.S. Fish and Wildlife Services, must seriously consider the widespread loss of foraging habitat that is occurring and will continue to occur. Cumulative effects; agencies should be given the same weight and consideration as direct and indirect effects; agencies should no continue approving projects that destroy agave habitat without knowing how much total habitat has been destroyed, and how much is needed to ensure the persistence of the species. A detailed map of agave distribution throughout southeastern Arizona, overlaid with layers of land ownership, known roost-sites, and current and planned changes in land use, would give tremendous insight into the status of foraging habitat for lesser long-nosed bats. Decision makers must have this information to make well-informed, wise decisions.
7259	9	Individual	Urbanization What effects will a mine/employer like this have on the area in terms of increased commercial and residential development? Increased housing in the area will also tax ground water, add to pollution, increase vehicle traffic, increase recreation on the National Forest and create new habitat for invasive species of plants and animals. All of these impacts will have adverse effects on wildlife.
7427	7	Individual	Cumulative effects – How will the mine affect native wildlife of the area?
7456	18	Government	There are so many demands on land in Arizona. Human population and urban and rural development are growing at such a rate that there will soon be a time when the only land left for the public to use for wildlife, will be the public land. The Forest Service should consider that the highest value of Arizona public land is for and wildlife.
7456	63	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Impacts to wildlife habitat off-site
7462	3	Organization	We request that the upcoming environmental analysis for the proposed Rosemont Project fully examine its potential impact on jaguar recovery and on the conservation of other wild species at the greater landscape level, as well as locally in the project area. Analysis should include direct project impacts combined with cumulative impacts from the full range of human activities affecting wildlife habitat in the broader geographic area surrounding the project (e.g., the I-10 corridor, recreational activities on the national forest, road densities, urban and exurban sprawl). As you undertake your analysis, please contact us for further details on the importance of the project area and the Santa Rita Mountains for jaguar population recovery.
7499	9	Individual	due to the population growth the forest and the animals, natural habitants of the area is already rapidly dwindling

Wildlife and Habitat

99 Cumulative Impact

Record ID	Comment Number	Commenter Type	Comment Text
7504	156	7508	What will be the full and cumulative impacts of the Rosement mining project on these endangered, candidate species, other priority vulnerable species or Wildlife of Special Concern, and other wildlife, flora and fauna?
7558	10	Individual	The development that has taken place in Arizona has already stressed and isolated the species in the various "sky islands" near Tucson. I have seen no study of the impact of the mine on this exisiting problem. Is there one?
7812	11	Individual	Reduction in wildlife populations and/or habitats including threatened and endangered species;
8725	3	Individual	I just want to say that I'm against the open mining here in sahuarita because you guys have ruined Tucson as it is. And when is this going to stop. This just is getting bigger and bigger and the water, environment -- and the animals have no place to go. So I'm against open mining for copper in Sahuarita. That is ridiculous. So I am against it.

01 General

Record ID	Comment Number	Commenter Type	Comment Text
2	4	Individual	Our primary concern: Wildlife: There is abundant wildlife on our property (hawks, deer, pronghorn, etc) - will the Rosemont Mine development and operation affect local wildlife; how?
19	3	Individual	We lose already dwindling natural habitat.
24	9		The Sky Islands of the Coronado National Forest are a globally recognized biodiversity hotspot.
24	10		The Santa Rita Mountains and surrounding desert and grassland seas are globally recognized for the diversity of birds, reptiles, amphibians, bees and plants.
24	17		There is every likelihood that a mine -- a Rosemont Ranch as is being proposed -- would dewater wells currently in use (as has already been done by Augusta Resource Corporation test wells) and imperil important wildlife habitat.
24	22		Daily blasing is required to remove rock (or overburden) covering the ore body. The impact to nearby wildlife will be equivalent to daily sonic booms.
24	30		Intensive development of the site as an open pit mine will result in loss of a significant portion of the wildlife habitat and movement corridor on the eastern side of the Santa Ritas.
24	32		The Santa Ritas are recognized for the biological values and are an Important Birding Area (IBA).
24	33		The Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of the Biological Core.
27	2	Individual	Damaging acres and acres of habitat to wonderful flora and fauna. This will severely damage flora and fauna habitat which the FS should be a good custodian of.
30	2	Individual	I support it all unless the mine ruines the wildlifes habitats.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
43	5		How will natural habitat and wildlife corridors be affected by the mining proposal and a proposed pipeline, and how will these impacts be mitigated?
47	2	Individual	The road: will become disruptive, danger to wildlife.
51	5	Individual	[I]mportant wildlife areas would be disturbed.
52	5	Individual	Potential species effected are Chiricahua Leopard Frogs, lesser-long nosed Bats, Naïve fish, Protected migratory songbirds, and other native flora and fauna.
52	9	Individual	Effects of noise from mining and machinery on wildlife, including endangered species needs to be considered.
60	4	Individual	Lights, truck traffic, noise, dust could affect transit routes for mamals and smaller creature large and small.
134	6		The wildlife corridors would be adversely affected with danger to threatened species. There is important biodiversity in that area that must be protected.
156	4		Please save the Santa Ritas, our scenic, beneficial, ecological, way-of-life supporting local mountain range that is a part of our culture, our hertiage, and our local human ecology & economy.
159	1		Pima County is working to preserve critical habitat and other areas of biological significance through the Sonoran Desert Conservation Plan.
159	2		This property is located largely within the biological core management area of the Sonoran Desert Conservation Plan, and within a watershed that drains to the proposed Santa Rita Mountain Park and the Davidson Canyon Nature Preserve, both designations proposed in the Sonoran Desert Conservation Plan.
159	3		The lands being considered for mining are prime wildlife habitat, home to abundant game and non-game species such as deer, javelina, bats, mountain lion, quail, hawks, vultures, golden eagles and songbirds
159	5		This area is an important wildlife corridor.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
160	63		COMMENT 4: DESTRUCTION OF IRREPLACEABLE AND INVALUABLE WILDLIFE AND WILDLIFE HABITAT BY THE MINE IS CERTAIN. THESE ADVERSE REGIONAL EFFECTS ARE UNDERESTIMATED BY AUGUSTA AND MUST BE FURTHER AND INDEPENDENTLY STUDIED TO BE SUFFICIENTLY UNDERSTOOD AND AVOIDED OR FULLY MITIGATED. The Coronado National Forest Land and Resource Management Plan states the following: "The diversity of plants and animals found on the Coronado is unique in the National Forest. This uniqueness, coupled with a great deal of local and national interest in this resource, generates a complex management opportunity. Five issues involving wildlife management follow: 1 The amount of time and resources to be given between threatened, endangered, or unique species; and other flora and fauna. 2. Critical wildlife habitat must be identified, along with needed controls on other uses (mineral extraction, recreation, etc.). 3. Appropriateness of predator and rodent control, when and where. 4. Fishing lakes which will be maintained, and consideration of any new construction. 5. Maintenance and improvement of the wildlife habitat for future generations in conjunction with other Forest activities." Augusta plans to destroy a total of 4,415 acres of irreplaceable wildlife habitat for special-status, rare, and endangered plant and animal species. The Mine will significantly and detrimentally impact some of the most biologically important areas and wildlife habitat in Pima County as identified in the County's Sonoran Desert Conservation Plan.
160	65		Operation of the Mine will disrupt species reproduction within and beyond the Mine's physical footprint, and block established animal migration routes within a declared major bio-diversity corridor. The Rosemont area is part of or adjacent to three potential wildlife linkage zones identified in the Arizona Wildlife Linkages Assessment, completed by the Arizona Game and Fish Department and Arizona Department of Transportation in 2007. These wildlife linkage zones are defined by the Assessment as being "important to Arizona's wildlife and natural ecosystems." One of these zones was determined to be a "high priority" linkage zone, meaning it has both high biological value and high threat and opportunity value. In addition, one of the six "Critical Landscape Linkages" identified in Pima County's Sonoran Desert Conservation Plan lies just north of the project area across U.S. Interstate-10 and south into Cienega Creek.
160	67		Augusta underestimates the number of rare and endangered species of plants and animals present at or frequenting the proposed mine site, and overestimates the ability of its plan to protect such wildlife and such wildlife's habitat. It is imperative that impacts of the Mine on all plant and animal species be considered, especially those classified as endangered/threatened (Federal), a species of concern (State), or vulnerable (Pima County). The presence of species listed under the Endangered Species Act will require the preparation of a Biological Assessment and then a Biological Opinion (BO) by the listing agency (U.S. Fish and Wildlife Service). Until these are available, it is not possible to design the form or extent of the mitigation needed. Thus the scoping report should note the requirement, and list the BO requirements in the final environmental assessment.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
160	68		COMMENT 4A: THE MINE'S SULFURIC ACID SOLUTION LEACH PAD/COLLECTION PONDS AND THE PROCESS WATER TEMPORARY STORAGE POND POSE DEADLY THREATS TO WILDLIFE. Discussion: Two facilities of the Mine pose direct and immediate threats to wildlife: the sulfuric acid solution leach pad/collection ponds and the process water temporary storage pond. Sulfuric acid solution fumes are caustic and if inhaled will damage respiratory organs and potentially cause death. Sulfuric acid solution is caustic and if contacted will burn skin, eyes, and nasal and throat passages, and if swallowed will damage digestive organs and potentially cause death. Industrial process water and wastewater ponds that contain acid, oils, salts, or other toxic chemicals are dangerous to all wildlife, but are particularly dangerous to birds. Birds landing in these acidic ponds can ingest the polluted water, which causes severe trauma to their gastrointestinal tracts and eventual death. The acidic water removes natural oils from the birds' feathers causing death by drowning or hypothermia. Mitigation: All sulfuric acid solution collection ponds and process water and wastewater ponds must be covered. COMMENT 4B: DISRUPTION BY THE MINE OF WATER RUNOFF TO DAVIDSON CANYON WASH POSES DEADLY THREATS TO ENDANGERED WILDLIFE. Discussion: Disruption of the water runoff to Davidson Canyon Wash (see COMMENT 1A), lowering of the local groundwater table (see COMMENT 2A) will likely have an adverse impact on the surface water of the Cienega Creek. The U.S. Fish and Wildlife service has classified the Cienega Creek (upper and lower) as a critical habitat for the Gila Chub (Gila Intermedia) which is designated as endangered with critical habitat under the Endangered Species Act.
777	3	Individual	Even is the NEPA process concludes (incredibly) that an open pit mine more than a mile wide, together with its thousands of acres of tailings and maintenance facilities, will not destroy wildlife habitat, pollute ground water, and poison air quality, put an intolerable burden upon existing water supplies and destroy the natural beauty of that area of the Santa Ritas, it is a foregone conculsion that its steady stream of ore trucks will make Scenic Highway 83, a hellish obstacle course.
1538	4	Individual	A mine should not be allowed to destroy thousands of acres of wild animal habitat unless the public surrounding the area is in agreement.
1548	1	Individual	I am deeply concerned about the negative effect the proposed Rosemont project will have on the resident and migrating wildlife in the affected area.
1555	3	Individual	The biodiversity of this magnificent sky island is already under threat by climate change and drought. We must not hasten their destruction.
1558	1	Individual	Every development is a threat to the biodiversity of the Sonoran desert.
1564	1	Individual	Biological diversity is critical for short and long term human existance.
1566	9	Individual	healthy wildlife
1572	3	Individual	Immediate concerns: Disruption of wildlife habitat
1574	5	Individual	It will interfere with the wildlife corridor.
1580	1	Individual	Unique flora/fauna in area?

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
1585	4	Individual	The health consequences to all other species would be irreparable and unconscionable.
1590	1	Individual	The damage to the bird and animal habitat is enourmous!
1592	7	Individual	Important habitat,
1611	4	Individual	The Sky Islands of the Coronado National Forest are recognized all over the world as special areas for birds, mammals, reptiles, amphibians and insects.
1614	3	Individual	My biggest concern is distruction of the land and what it will do to the wild life.
1616	4	Individual	I live within 1 mile of the proposed mine. As such the following will severely affect me: Biological resources: The mule tail and white tail deer will be adversely affected.
1620	9	Individual	My primary concerns are: Loss of wildlife and eco systems.
1622	8	Individual	Destruction of wild life!!
1622	9	Individual	Destruction of plants/trees
1623	4	Individual	This is all in addition to plant and animal habitat destruction
1625	4	Organization	(2) an open pit mine in the area of the Santa Rita Mountains surrounding Rosemont Ranch would undermine the ecological health of the region resulting in permanent loss of a key area for wildlife habitat and migration;
1625	6	Organization	(3) the mine would irretrievably impact prime wildlife land used extensively by ranchers, trail riders, hikers, birders, hunters, and nature lovers from throughout Southern Arizona and beyond;
1631	2	Individual	I feel the Rosemont mine project will be a horrible detriment to the environment and destroy the beauty, natural resources and majesty of the Santa Rita mountains.
1631	4	Individual	Animal habitat destruction are also high concerns.
1641	7	Individual	The proposed Rosemont Copper mine will not only disturb archeological and historic sites, it will also disrupt sensitive bird and wildlife areas.
1641	8	Individual	This mine will disrupt nesting, breeding and migratory areas
1642	5	Individual	The Rosemont mine will destroy precious wildlife habitats.
1645	2	Individual	I am concerned about the following with regard to increased mining in the Rosemont copper project: Water-use increase; Effect on wildlife in Davidson Canyon and surrounding areas; Increased traffic and construction on wildlife. All of the above seem to be detrimental if the proposal is allowed to go through.
1647	4	Individual	The filling in of Barrel, Wasp, McCleary and Scholfield Canyons by the mine wastes (tailings and rock) will destroy valuable/irreplaceable wildlife habitat.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
1660	7	Individual	Destruction of wildlife habitat.
1680	2	Individual	With as much growth as we experience, wildlife is losing it's havens for refuge. This proposal leaves irreversible damage to our fragile ecosystem.
1696	5	Individual	500 jobs means nothing when destroying habitat.
1701	3	Individual	Please do not allow this operation to begin if the wildlife and water use of current residents is impacted negatively.
1703	4	Individual	Deleterious and dangerous reasults to grownd water, traffic safety, and travel times, wild life habitat, soil and water pollution and permanent damage to the tourism-based economy of South Pima and Santa Cruz counties.
1731	4	Organization	I am concerned fot the fragile desert environment, the flora, the fauna, those species unique to our desert climes.
1746	3	Organization	The Board of the Cienega Watershed Partnership (CWP) is deeply concerned about the potential devastating environmental impacts of the open pit mine proposed for Rosemont Ranch. In particular, the Board believes that: an open pit mine in the area of the Santa Rita Mountains surrounding Rosemont Ranch would undermine the ecological health of the region, resulting in permanent loss of a key area for wildlife habitat and migration
1746	5	Organization	The Board of the Cienega Watershed Partnership (CWP) is deeply concerned about the potential devastating environmental impacts of the open pit mine proposed for Rosemont Ranch. In particular, the Board believes that: the mine would irretrievably impact prime wildlife land used extensively by ranchers, trail riders, hikers, birders, hunters, and nature lovers from throughout Southern Arizona and beyond
1748	7	Organization	The Mine's operation will deleteriously affect: Wildlife
1755	1	Individual	What will be the impact of the amount of groundwater used by mining operations over the life of the mine and beyond its current and future availability of groundwater to the Area (Tucson, Vail, Corona de Tucson, Sonoita, Patagonia and Green Valley) residents as it pertains to sustainablity of wildlife.
1760	4	Individual	How is this mine going to affect the ecosystem?
1760	5	Individual	How is this mine going to affect wildlife?
1761	3	Individual	I am concerned about the impact on wildlife in the adjacent canyons both activity and geochemical impact.
1762	2	Individual	The biological resources of Rosemont Ranch should be preserved.
1763	2	Individual	I greatly fear the proposed mining will adversely affect water availability for the large cats, deer, javelina and many other animals and birds that call the Santa Rita Mountains home, which will upset the ecological balance.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
1770	6	Individual	I am concerned about the impact of heavy truck Traffic widening of Hwy 83, the toxic leaching from the tailings into our groundwater supplies, the pumping of Groundwater from the Sahuarita area, the noise pollution, effect on the wildlife, the scenic beauty of our Forest.
1817	1	Individual	The Rosemont Mine will have an unmiticable and strongly negative impact on a large biologic area. The lower slopes of the greatest sky island in the region. Air, Noise, and Habitat destruction will necessarily adversely impact animal and vegetative communities now part of a viable conservation program.
1828	1	Individual	How will the proposed mine operations affect wildlife and vegetation in the area?
1833	1	Individual	Will the proposed mine have any predictable impacts to wildlife and specifically birds from the exposure to toxins?
1841	1	Individual	As you well know, the history of mining in the southwest over the past hundred or more years has been notoriously destructive of flora and fauna.
1845	8	Individual	No pup fish no wildlife ruined nature.
1853	3	Individual	The whole ecosytem is dependent on the water which the mine will suck up. Without water the ecosystem and the native species in it will be exterminated.
1854	5	Individual	The so-called "profits" of this mine would cost loss of the auquifer, destruction of the " sky islands" and area desert and grasslands; upset the diversity and habitat of wildlife and birds, create traffic, waste, and damage to the forest.
1855	2	Individual	I would severely compromise a critical wildlife corridor - one essential for the movement of animals from the Santa Ritas and places south of there to the Rincons/Catalinas etc. The proposed site is also part of unique habitat. As such it is an important part of Pima County's planned conservation area - and holds an important relationship to the La Cienega Conservation area.
1857	9	Individual	The habitat will have been destroyed and the wildlife will be gone. Desert environments are very fragile systems and cannot be disturbed and then replicated; it doesn't work that way.
1864	2	Individual	If allowed to mine, Rosemont Copper will be gone in 19 years. In the mean time, they will have ruined the ecology in the area, raped the land, and killed God-knows how many animals with the chemicals they use.
1874	2	Organization	The water table in the aquifers is critical to this Sonoran Desert area not only for the human residents here but also for the abundant but fragile plant life. Singing Valley North, and the valley that surround it are full of century oak trees that survive from the same aquifers that will be drained to meet the requirements of the Rosemont Copper Mine. These unique desert trees will die out along with the grasslands surrounding them as well as the raptors, songbirds, reptiles and mammals that call this area home.
1876	4	Individual	Concerns: Migratory mammal habitat loss "Sonora Desert Conservation Plan"
1879	4	Individual	The projected open pit mine will have negative, in some cases disastrous impacts in critical areas of the Coronado National Forest, upon wild life and birds.

Wildlife and Habitat

01 - General

Record ID	Comment Number	Commenter Type	Comment Text
1885	4	Individual	The Santa Rita Mountain area is unique in biodiversity in plants, animals, birds, reptiles and even bees and insects. This act is appreciated globally.
1889	2	Individual	This land is crucial "Sky Island" habitat and provides havens for a diverse and unique wildlife some species that are only found on the "Sky Islands". If a copper mine were to be open not only would it negatively affect wildlife in the area but it would destroy a part of America's natural heritage.
1891	21	Individual	Arizona is globally known for the diversity of birds, reptiles, amphibians, bees and plants in the Sonoita/Rosemont/Patagonia region. For example, it has unique species that burrow underground in watersheds during drought and dry seasons. The effects of mining on this wildlife needs to be understood before such impact is brought down upon them.
1891	27	Individual	Filling in of the proposed canyons will destroy wildlife movement corridors.
1892	4	Organization	The project as proposed will impact water resources and riparian areas both within and outside the project area. This includes impacts to washes, creeks, springs, and riparian habitat, including Davidson Canyon and Cienega Creek. Both Davidson Canyon and Cienega Creek are within Pima County's Cienega Creek Natural Preserve, while Cienega Creek has been recognized as a national treasure and is protected within the Las Cienegas National Conservation Area. Both areas provide crucial habitat to numerous wildlife species
1892	13	Organization	CAP water is notorious for compiling the contaminants from agricultural and industrial processes throughout the Colorado River Basin, as well as for spreading invasive aquatic species and diseases. Bringing these contaminants into such a relatively pristine basin poses obvious threats to the area's human and wildlife populations.

Wildlife and Habitat

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Record ID	Comment Number	Commenter Type	Comment Text
1892	18	Organization	Impacts to important wildlfe linkages: This project will have significant impacts to wildlife linkage zones present in and adjacent to the project area. A recent important study should be especially considered when evaluating these impacts. The Arizona Wildlife Linkages Workgroup completed the Arizona Wildlife Linkages Assessment (Arizona Wildlife Linkages Workgroup 2007). This statewide assessment identified 152 potential linkage zones in Arizona, three of which are in or adjacent to the project area. Furthermore, the assessment identified important habitat blocks; the project area lies almost completely within one of these blocks. Of particular note is that one of these potential linkage zones (San Xavier to Sierrita - Santa Rita, Zone 92) was classified as one of 28 "high priority" linkage zones. The workgroup assessed both the biological value and threat and opportunity value of each zone and those that fell in the top quarter of both values were designated as "high priority." The biological imprtance score was dependent on the "size and habitat quality of habitat blocks and the ability of the zone to support special status species, aquatic ecosystems, and seasonal migrations." The threat and opportunity score was dependent on the "barrier effect of canals, roads, urbanization, and railroads" (threat) and "ongoing and proposed conservation efforts [along with] whether impending major road projects provide the opportunity to increase permeability of roads" (opportunity). Given the presence of multiple critical wildlife linkage zones in or adjacent to the project area, it is essential that the full range of impacts to these linkage zones be considered in the EIS. Impacts include habitat fragmentation from the open-pit mine and associated tailings piles and waste facilities; excessive noise; road construction; and an increase in large truck traffic on I-10 and SR 83 and related impacts to wildlife crossing areas.
1894	11	Individual	What effect will the mine have on wildlife and migration patterns? And if there is an effect, how will that effect ecotourism?
1895	4	Individual	The copper company will make money and leave and the rest of us will be stuck with the scars on the land, the pollution of the air and water, the ruined water shed, the vanishing wild life and the loss of one more wild and beautiful place in Southern Arizona.
1900	2	Individual	Millions of tons of waste rock and tailings from the Rosemont Mine will f... Barrel Canyon, one of the main tributaries to Davidson Canyon, mercury, arsenic... other solvents will be the risk for unintended leaks and spills, on surface and gro... water and our aquifers will be at risk from contamination. What will be done to pro... wild life from contamination?
1900	7	Individual	All wildlife will be at risk in the Santa Rita Mountains for 20 square... Public land. What will be done to protect our wildlife?
1901	2	Individual	I am particularly concerned about the impact of mining on wildlife.
1902	6	Individual	The Santa Ritas are very special to me and my family, I go to Mt. Hopkins once a week. I enjoy the peace. Please don't take the home to the animals away.
1903	4	Individual	After my return home in 1946 (WWII Navy Vet) I used to hunt with bow & arrow in this part of our country. Hunted deer & javalina. The mines ruined the natural habitat for this wild game, by preventing access to game & hunter!!

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Record ID	Comment Number	Commenter Type	Comment Text
1904	10	Individual	It is likely that a mine at Rosemont Ranch as is being proposed would imperil wildlife habitat.
1908	4	Individual	The Coronado Forest is known internationally as one of the finest birding sanctuaries anywhere not to mention the stunning beauty of the Santa Rita Mountains.
1911	9	Individual	Wild life habitat is at risk. Mining is noisy and will drive away wildlife that makes its habitat there. Where do we expect these animals to go? They are forever being displaced.
1917	8	Individual	I am concerned about the following environmental & health issues: Impact on wild life/habitat.
1920	4	Individual	I am concerned about the negative aspect the operation of mine will bring to bear on: Animal life and century oaks in an eco sensitive area recognized globally.
1924	5	Individual	Destruction of wildlife habitat, wildlife movement corridors, native plants and ecosystems.
1927	5	Individual	There will be permanent destruction of thousands of acres of national forest land including wildlife habitats by the dumping of tailing on national forest land.
1930	5	Individual	Destruction of wildlife habitat, wildlife movement corridors, native plants and ecosystems.
1931	7	Individual	Hazardous dust from existing mining operations in the area already create significant public health issues for wildlife. Mine operators choose to pay the minimal fines levied rather than attempt to resolve the problem. How does Rosemont plan to address the problem?
1931	8	Individual	The valley running from Nogalas to Tucson is rapidly and aggressively being developed. This significantly impacts wildlife habitats. How is this loss to be mitigated?
1932	5	Individual	Wild life will dissapear
1935	3	Individual	An open pit mining operation in the pristine and unspoiled Santa Rita Mountains and the Coronado Forest will disturb wild life and the internationally famous Sky Island bio-diversity.
1937	2	Individual	It will negatively impact wildlife
1938	2	Individual	It will negatively impact wildlife
1942	7	Individual	Wildlife + natural beauty of the area will be destroyed forever.
1948	1	Individual	I am concerned about the displacement of wildlife in the mine area.
1949	2	Individual	much of the wildlife that now lives in the Rosemont area will disappear
1951	1	Individual	Foremost in my concerns is the potential & certain damage to the land,
1953	4	Individual	The biodiversity of the animals, plants, reptiles is what makes it so special.
1955	3	Individual	and harm wildlife habitats,

Wildlife and Habitat

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Record ID	Comment Number	Commenter Type	Comment Text
1956	9	Individual	The Sky Islands of the Coronado National Forest are a globally recognized biodiversity hotspot.
1956	10	Individual	The Santa Rita Mountains and surrounding desert and grassland seas are globally recognized for diversity of birds, reptiles, amphibians, bees and plants.
1956	19	Individual	Destruction of wildlife habitat, wildlife movement corridors, native plants and ecosystems
1958	3	Individual	both short and long term.
1965	4	Individual	The area Rosemont Copper plans for their mine is extraordinarily scenic and the home of abundant wildlife. The Views from State Highway 86 are famous and the road is designated as a scenic route in every road atlas I have encountered. Development of this mine will permanently destroy the area's scenic beauty, negatively affect the entire surrounding area, and deprive us all of an irreplaceable natural resource.
1966	2	Individual	...our sky-islands constitute a large part of the charm and beauty of this area, and these islands are vitally important to the wildlife that uses them. A mine would constitute an unacceptable disturbance to both people and wildlife.
1967	4	Individual	and abundant plant and animal life.
1968	4	Individual	the negative impact on wildlife in and around the national forest
1971	2	Individual	Also as an avid hiker and environmentalist, destruction to this sensitive habitat would be a travesty.
1974	6	Individual	Stress on wildlife
1976	3	Individual	The mine would damage the habitat for wildlife.
1982	4	Individual	Most of the mine pit is planned to be on "private" land. The us public owns the Forest System lands which you manage for the citizens of the US. Do NOT allow the mine to destroy the natural plants and animal habitiats by covering large area of OUR land with tailings and waste rock.
1984	2	Individual	I am opposed to this operation for many reasons; such as effect on the environment, wildlife decimation, scenic route on Hwy 83.
2065	2	Individual	Animal rights must be considered. Our natural habitat need protecting consider future generations.
2076	6	Individual	I am very oppose to the existence of an open-pit mine in the Santa Rita Mountains for these reasons: There is every likelihood that the mine at Rosemont Ranch that is being proposed would imperil important wildlife habitat.
2076	11	Individual	Intensive development of the site as an open pit mine will result in loss of a significant portion of the wildlife habitat and movement corridor on the eastern side of the Santa Ritas. This would potentially impact endanged, threatened, and candidate species, in addition to priority vulnerable species or species of special concern.

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Record ID	Comment Number	Commenter Type	Comment Text
2077	1	Individual	The foot-print of the Rosemont Mine is stated to come with in 4 miles of Madera Canyon; a world known birding area that harbors several rare species of birds; some endangered.
2077	7	Individual	Has Rosemont contracted biological population studies on all spices of endangered wildlife; and, can they say with certitude that their mine will not endanger the wildlife?
2084	2	Individual	The Sky Islands of the Coronado National Forest are a globally recognized biodiversity hotspot.
2084	9	Individual	Destruction of wildlife and plant habitat would quite likely be the consequence of this project.
2085	2	Individual	The Sky Islands of the Coronado National Forest are a globally recognized biodiversity hotspot.
2085	3	Individual	The Santa Rita Mountains and surrounding desert and grassland seas are globally recognized for the diversity of birds, reptiles, amphibians, bees and plants.
2090	10	Individual	We feel that there are many valid reasons to not approving this project: 1. The negative effect on the fragile fauna of the area.
2091	5	Individual	The Sky Islands of the Coronado National Forest are a globally recognized biodiversity hotspot.
2091	6	Individual	The Santa Rita Mountains and surrounding desert and grassland seas are globally recognized for the diversity of birds, reptiles, amphibians, bees and plants.
2091	11	Individual	Destruction of wildlife habitat, wildlife movement corridors, native plants, and ecosystems.
2094	4	Individual	The Sky Islands of the Santa Rita Mountains.....a magnificent place for so many species. How can any project be considered that will jeopardize this amazing place?
2108	1	Individual	This area still contains many pristine locations of beautiful Sonoran desert habitat that would be very adversely affected by mining in this area.
2142	2	Individual	I write to you as a veteran of the Rosemont battle of 1995 or 1996 whe we thought that our efforts had been successful only to learn that greed has once again raised its ugly head, this time in the form of a local real estate mogul who wished not the best for our beautiful Santa Rita Mopuntains but rather how much money he could get out of a deal on the land he owned there. Instead of taking Pima County's offer for much more than he paid for the land, he held out to sell It to the highest bidder, a foreign copper mining company which is determined to undo all of the hard work that citizens a decade ago did to protect those mountains on our public land.It is clearly a truly unpopular project that will scar forever a beautiful and important wildlife habitat.
2143	12	Individual	The animals in our area, including many endangered, threatened or vulnerable species, should be protected. The habitat in this area, mountains surrounded by desert, is very delicate. It is irreplaceable.

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Record ID	Comment Number	Commenter Type	Comment Text
2144	16	Individual	I am opposed to the mine because that particular part of the US is a deser so beautiful and incredible with unique plants that it shouldn't be ruined for any reason! It is amazing with animal life.
2144	26	Individual	Also, The Santa Rita Mountains are recognized for the biological values and are an Important Birding Area (IBA). In addition, the Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of the Biological Core.
2147	3	Individual	Even if the NEPA process concludes (incredibly) that an open pit mine more than a mile wide, together with its thousands of acres of tailings and maintenance facilities, will not destroy wildlife habitat, it is a foregone conclusion that its steady stream of ore trucks will make Scenic Highway 83 a hellish obstacle course.
2148	8	Individual	The Sky Islands of the Coronado National Forest are a globally recognized biodiversity hotspot.
2148	9	Individual	The Santa Rita Mountains and surrounding desert and grassland seas are globally recognized for the diversity of birds, reptiles, amphibians, bees and plants.
2148	19	Individual	Destruction of wildlife habitat, wildlife movement corridors, native plants, and ecosystems.
2149	6	Individual	We are concerned that we are compromising the continuing diversity of animal life in the region for an enterprise that cannot return to use the quality of life that it will take away with the ore it finds.
2152	3	Individual	The unintended consequences to the environment and the flyway will cause harm to animals.
2153	3	Individual	I do not believe the NFS should be amending its current forest plan to accommodate a mining project which when all told, will contribute to the decline in the health of the wildlife and ecosystems in the Rosemont valley area.
2153	4	Individual	The Sky Islands of the Coronado National Forest are world reknown for the biodiversity within their region. Mining does nothing to benefit the ecological health of the region.
2156	10	Individual	The Sky Islands of the Coronado National Forest are a globally recognized biodiversity hotspot. The Santa Rita Mountains and surrounding desert and grassland seas are globally recognized for the diversity of birds, reptiles, amphibians, bees and plants.
2156	20	Individual	destruction of wildlife habitat, wildlife movement corridors, native plants and ecosystems.
2158	1	Individual	The copper mine you are proposing is too close to Ramsey Canyon-a prime bird habitat. -Please reconsider what you are doing!
2170	5	Individual	The Sky Islands of the Coronado National Forest are a globally recognized biodiversity hotspot.
2170	6	Individual	The Santa Rita Mountains and surrounding desert and grassland seas are globally recognized for the diversity of birds, reptiles, amphibians, bees and plants, and this diversity will be significantly reduced nd endangered by the mine.

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Record ID	Comment Number	Commenter Type	Comment Text
2170	16	Individual	There will be destruction of wildlife habitat, wildlife movement corridors, native plants, and ecosystems.
2171	5	Individual	Not only the substantial likelihood of wildlife habitat DIRECTLY DUE TO THE MINE!
2174	9	Individual	The Sky Islands of the Coronado National Forest are a globally recognized biodiversity hotspot.
2174	10	Individual	The Santa Rita Mountains and surrounding desert and grassland seas are globally recognized for the diversity of birds, reptiles, amphibians, bees and plants.
2174	20	Individual	Destruction of wildlife habitat, wildlife movement corridors, native plants, and ecosystems.
2177	2	Individual	We are hikers and concerned about the damage to the wildlife being displaced.
2187	3	Individual	The destruction of habitat for wildlife would be very damaging to the Coronado Forest and to the Santa Rita Mountains.
2188	4	Individual	the wildlife of the area belong to all of us as citizens, not to a foreign company.
2196	2	Individual	Throughout the region, there are serval watering holes that I presume ranchers built years ago. I haven't seen any cattle, but I have seen deer, crane, coyotes and a variety of other birds and wildlife drinking from these holes.
2199	12	Individual	What wildlife will be affected by the mining operations?
2199	14	Individual	How will habitat be protected and wildlife corridors be maintained as functional?
2200	2	Individual	The process also releases acid, sulfur dioxide, mercury, and lead into the environment.
2201	6	Individual	Not only would these affect the human population, but the wildlife as well, not to mention cattle and other livestock for ranchers.
2208	4	Individual	This mine will destroy wildlife.
2208	8	Individual	It is a unique and important bird and wildlife habitat area.
2209	11	Individual	The quality of human and other life in the area is threatened by the destruction of wildlife habitat, loss of wildlife movement corridors.
2209	20	Individual	The Sky Islands of the Coronado National Forest are a globally recognized biodiversity hotspot. The Santa Rita Mountains and surrounding desert and grassland seas are globally recognized for the diversity of birds, reptiles, amphibians, bees and plants.
2213	2	Individual	The area being considered for mining is prime wildlife habitat for many animals- an open pit mine would forever destroy this habitat to include the great recreational attributes it has today
2214	7	Individual	How will natural habitat and wildlife corridors be affected by the mining proposal and a proposed pipeline and how will these impacts be mitigated?

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Record ID	Comment Number	Commenter Type	Comment Text
2242	2	Individual	The Santa Rita mountain range is very small in size compare to other mountain ranges. The wildlife is concentrated in this small area (with a very limited water supply in the summer months) which is extremely affected by development.
2242	4	Individual	The open pit mine would destroy the local wildlife habitat (which is already very limited & surviving on the edge.
2244	5	Individual	What is their positive impact to the local environment ot the animals that inhabit their land and properties that surround their property?
2244	11	Individual	I say their conduct so far shows their inherent distain for the animals that inhabit their land. What about the old growth trees!
2260	5	Individual	The Rosemont mine will be bad for animals.
2262	10	Individual	To add to the argument this is such a particularly beautiful place to pollute, it is not destined for horrendous strip mining complemented with irreplacable wildlife.
2265	17	Individual	Please deatil the effects on animal life especially birds.
2265	20	Individual	Madera Canyon an internationally famous birding area in the Santa Rita Mountains may be directly affected by any distrubance. Will an impact study be completed and published?
2266	7	Individual	Don't let our precious Santa Rita Mountains and desert be destroyed: Protect the wildlife
2272	3	Individual	WATER: There is a great potentiality that toxic heavy metals and other chemicals leach into ground and surface waters draining into Tucson area water supplies, and impacting nearby riparian areas such as Davidson Canyon. This would also imperil wildlife habitat
2272	12	Individual	WILDLIFE AND WILDLIFE HABITAT: The Santa Ritas are recognized for the biological values and are an Important Birding Area (IBA). In addition, the Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of the Biological Core.
2274	2	Individual	The proposed mine is right in one of the most important international flyways for birds and butter flies. Madera Canyon is to the SW, Ramsey Canyon is to the SE, and the grasslands and hills north of Sonoita are important stopovers in the flyway.
2290	5	Individual	Reasons for opposing this mine: The Madera Canyon area is heavily supported by bird watchers every weekend, what will the impact be when blasting and heavy trucks enter the area? My guess is, there will be a negative impact to birds, not to mention the noise and dust.
2291	2	Individual	WATER: There is a great potentiality that toxic heavy metals and other chemicals into ground and surface waters draining into Tucson area water supplies, and impacting nearby riparian areas such as Davidson Canyon. This would also imperil important wildlife habitat and future drinking water sources for residential use. More health issues here also...for us all!

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Record ID	Comment Number	Commenter Type	Comment Text
2291	13	Individual	WILDLIFE AND WILDLIFE HABITAT: The Santa Ritas are recognized for the biological values and are an Important Birding Area (IBA). In addition, the Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of the Biological Core.
2291	36	Individual	Wildlife: Davidson Canyon is a wildlife corridor connecting the Empire Mountains in the south to the Rincon Mountains in the North. And with it's perennial water flow this riparian is vital to native wildlife along with the needle-spined Pinapple Cactus and Whiptail Lizard.
2292	8	Individual	Last but not least, I would like to bring up the area's precious wildlife. Already with the unfortunate urban sprawl the wildlife has been forced to survive on a fraction of the land that they need to survive. With this mine, they will be forced to forage in populated areas. Again, this increases the risk to residents as well as the risk of injury or death to the animals.
2292	10	Individual	Last but not least, I would like to bring up the area's precious wildlife. With the tainted water supply that is sure to follow the impact upon their environment they will be the hardest hit.
2296	2	Individual	I hope you will consider the wildlife habitat in the decision to open an open pit copper mine.
2303	5	Individual	The impact to the wildlife would be catastrophic.
2305	4	Individual	Nancy Freeman of the groundwater Awareness League, Inc. has commented as follows: Impacts on Water: Maintaining supplies of clean water and protecting watersheds were major reasons why public domain forests and rangelands were reserved. As regions have become more populated and States have failed to protect the valuable resource of water, the imperative for the Federal Government through the Forest Service and other agencies to protect these watersheds for their original intended use. The public can no longer dole out large quantities of water to industry, especially heavy water users such as mining and electro-power plants. If we are going to save the many species of animals that Federal Government has to take on this project to protect the water in the national forests, wildlife refuges, and designated conservation areas.
2318	9	Individual	There are surely other mining locations that do not closely border populated areas and are not located in sensitive habitat.
2323	2	Individual	A present there is an active mine on the Western slopes of the Santa Ritas and the dust generated by the trucks hauling material in and out of the mine area is visible for mines... the entire area around the mine and the road leading out as well as the Santa Rita road area is covered with a sheet of dust. Talk about unhealthy, that is an understatement and no one is doing to reduce the dust, not are there any plans to minimize or eliminate this problem. Allowing another mining operation on the Eastern slopes would only compound the dust situation and all roads in and out MUST be paved and well maintained to reduce habitat problems.
2326	3	Individual	The destruction of wild life habitat will be devastating.

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Record ID	Comment Number	Commenter Type	Comment Text
2331	5	Individual	The proposed Rosemont Copper Proejct should be stopped for many reasons that include but are not limited to: Destruction of portions of the Santa Rita Mountains and surrounding desert and grasslands that are globally recognized for biodiversity.
2335	2	Individual	I am concerned with the health and safety of the wildlife of the Santa Cruz Valley and Santa Rita Mountains.
2337	8	Individual	The Santa Rita Mountains and surrounding desert and grassland seas ae globally recognized for the diversity of birds, reptiles, amphibians, bees and plants. The Forest Service should not allow Augusta to destroy this unique and sky island habitat.
2338	9	Individual	The Santa Rita Mountains and surrounding desert and grassland seas are globally recognized for the diversity of birds, reptiles, amphibians, bees, and plants. The Forest Service should not allow Augusta to destroy this habitat.
2339	7	Individual	Might the mine's ongoing operation obliterate and/or severly damage habitat fo wildlife and birds?
2340	2	Individual	The desecration of this pristine land is akin to drilling for oil in Yellowstone Park. It is unthinkable to allow massive destruction of this natural habitat to occur in this day and age.
2348	15	Individual	The Santa Ritas are recognized by for the biological values and are an Important Birding Area (IBA). In addition, the Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of the Biological Core.
2352	1	Individual	I became concerned when I was told that a huge mining project had been proposed for this area. I have seen other mining operations in Arizona over the years that I have been out there. I even worked for Magma Copper when I lived out there in the 70's. I know that these large operations have large impcts on everything in the area where they are placed. Not just impacts on wildlife, but also roads, water tables, air quality, increased noise levels from operations, and light pollution. All of these things have direct impacts on quality of life for all creatures both human and otherwise.
2354	3	Individual	The habitat everywhere is Arizona is fragile and supports wildlife of all kinds. We prize every square inch of wilderness that we have.
2362	2	Individual	My overarching reason is the loss of habitat as we know it.
2368	4	Individual	The biodiversity that is characteristic of the sky islands in the National Forest deserves special notice. My research indicates that Augusta is untried in the mining industry. But the record of mining in Arizona and elsewhere should guide our expectations; we can expect the loss of biodiversity.
2380	8	Individual	We live in a Wildlife corridor, the kinds of wildlife we have seen in the almost 10 years of living here is extraordinary. We have seen bobcats, coatimundis, fox, deer, javelinas, rattlesnakes, kingsnkes, roadrunners, gila monsters, lizards, bats... the list just goes on and on. As for the birds, we have seen all kinds and species. In the spring and fall, we have the hummingbirds coming through here in the hundreds. We put out seven (7) feeders and go through 300 ounces of food a day during the peak season. We have hummingbirds three plus deep waiting their turn to eat (see attached pictures). The tree next to the feeders are filled with hummingbirds waiting their turn.

Wildlife and Habitat

01 - General

Record ID	Comment Number	Commenter Type	Comment Text
2380	9	Individual	We fear for the wildlife and for our lives while we live and play here. This mine would endanger us, our grandchildren, neighbors and the tourist that come here to play. Where will all the wildlife go when they run for their lives when the mine starts operating? They will exit to our backyard and endanger our pets, children and ourselves.
2383	10	Individual	Fifth, mine operations will destroy wildlife habitat and further endanger a number of sensitive species in the area.
2420	3	Individual	The sky island ecosystems of the Santa Ritas are beautiful and unique. They are an important asset to our state, and are significant to animals & humans. They must be cherished, preserved and protected.
2427	4	Individual	It would: disrupt wildlife corridors
2429	5	Individual	My concerns are: 4. interference with wildlife- meaning cutting of their pathways from Sky Island to Sky Island. Reducing a large natural habitat
2440	7	Individual	The area is also a significant corridor for migrating birds from the northern to southern hemispheres. Brightly colored species, familiar to us prior only from pictures in natural geographic, landed frequently, fed and watered at our residence which was adjacent and south of the mine site for the many years we lived there. We also experienced that the area provides a vital corridor for many large (bear and mountain lion) and small mammals, the former needing to cross between the Santa Rita and Empire and Whetstone mountain ranges to encompass sufficient habitat for successful breeding and sustenance(Sky Mountain Alliance, Ray McBride, Wayne Pruett, Joe Orchides, Bob Bowman(ranchers and cowboys from the area)).
2446	3	Individual	This would also imperil important wildlife habitat
2446	12	Individual	WILDLIFE AND WILDLIFE HABITAT: The Santa Ritas are recognized for the biological values and are an Important Birding Area (IBA). In addition, the Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of the Biological Core.
2449	4	Individual	Damage To: would be devastating a. wildlife habitats
2461	2	Individual	Wild and open spaces are swiftly being obliterated by development and sprawl. I urge you to protect these last bastions of wildlands and the wildlife they sustain.
2468	16	Individual	Impact on wildlife ... habitat, moving corridors, food/water sources!
2470	8	Individual	2] This proposed mine site is home to the endangered lesser longnose bat and pineapple cactus, six species of "special concern", and some threatened. It is also a movement and habitat corridor to the northeast. What impact will the mine and accompanying roads and power lines have? What are the current bat populations? How many reptiles will be lost to road kill? How will whitetail and mule deer populations be affected by loss of habitat and movement corridors? Will the seismic activity harm bat populations?

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Record ID	Comment Number	Commenter Type	Comment Text
2470	10	Individual	2] This proposed mine site is home to the endangered lesser longnose bat and pineapple cactus, six species of "special concern", and some threatened. It is also a movement and habitat corridor to the northeast. What impact will the mine and accompanying roads and power lines have? What are the current bat populations? How many reptiles will be lost to road kill? How will whitetail and mule deer populations be affected by loss of habitat and movement corridors? Will the seismic activity harm bat populations?
2470	26	Individual	How much forest will will be lost for the roadways this project will require? How safe will they be for wildlife? Hwy. 83 is not equipped to handle explosives, hazardous materials, large equipment, and constant truck traffic. It will need to be made into a four lane highway, with what impact to wildlife movement and mortality rates?
2470	28	Individual	How much forest will will be lost for the roadways this project will require? How safe will they be for wildlife? Hwy. 83 is not equipped to handle explosives, hazardous materials, large equipment, and constant truck traffic. It will need to be made into a four lane highway, with what impact to wildlife movement and mortality rates?
2473	5	Individual	Please record my opposition to Rosemont Mining for the following reasons: Ruin habitat (look at cananea & Green Valley, Mission mine etc on Google Earth)
2473	10	Individual	Please record my opposition to Rosemont Mining for the following reasons: National land is not intended for tailings & mining, it is your job to protect the habitat & animals not mining interests
2483	7	Individual	What about the destruction of habitat for the desert dwellers?
2484	6	Individual	My opposition is based on the following objections: Permanent destruction of a very special and important natural area that now provides a home to a large population of native animal species.
2489	4	Organization	In particular, the Board believes that: an open pit mine in the area of the Santa Rita Mountains surrounding Rosemont Ranch would undermine the ecological health of the region, resulting in permanent loss of a key area for wildlife habitat and migration
2489	6	Organization	In particular, the Board believes that: the mine would irretrievably impact prime wildlife land used extensively by ranchers, trail riders, hikers, birders, hunters, and nature lovers from throughout Southern Arizona and beyond
2492	7	Individual	What about the destruction of habitat for the desert dwellers?
2500	3	Government	Thank you for the opportunity to comment on the Coronado National Forest's Rosemont Copper Project. This project would occur some 20 miles south of Saguaro National Park's Rincon Mountain District, and has the potential to impact to park resources, including regional wildlife movements and habitat.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
2500	4	Government	The mandate of the National Park Service is to preserve and protect natural and cultural resources for public enjoyment. Saguaro National Park was set aside specifically to protect the plants of the region and animals of the Sonoran desert, riparian corridors, and cultural resources of the region. As urbanization and development expand in southeastern Arizona, it is increasing difficult to manage the park as part of an intact ecosystem. The Santa Rita Mountains are crucial links in both the Sonoran desert and Madrean/"Sky Island" ecosystems encompassed by the Park. They are also an important part of the larger context of the Conservation Land System of the Sonoran Desert Conservation Plan. Thus was have concerns about impacts to wildlife, particularly from direct and indirect loss of habitat, changes to surface and ground water, traffic on new and existing roads, and noise and other impacts associated with mining activities..
2510	7	Individual	Why I am opposed to mining in the Santa Ritas 4. Loss of wildlife habitat
2512	7	Individual	I come from the hollistic health community- am well vensed in helping people detoxify their bodies from contaminates. I am also a certified Equine Specialist and work with vets. We are seeing more & more tumors, immune system disorders-allergies in our animals.
2519	7	Individual	What alternatives can be put forth for the following other than denying Augusta's mining plans: destroying wildlife habitat for untold number of years after mining operations cease - reclamation does not take place overnight.
2520	15	Individual	The Santa Ritas are recognized by for the biological values and are an Important Birding Area (IBA). In addition, the Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of the Biological Core.
2524	6	Individual	Also consider: Valuable wildlife habitat destroyed forever.
2530	2	Individual	The habitat will forever be affected for the breif extraction and cash related value of ounces of ore for tons of waste rock.
2541	1	Individual	Please detail your plans requarding NEOTROPICAL MIGTANTS (birds) who migrate from the Neotropics to nest or land adjacent to this very destructive mining operation (Botteris and Cassins Sparrows, etc etc) These migrants are extremely sensitive to environmental pollution.
2542	8	Individual	An open pit mine would adversely affect (even destroy) the natural environment and wildlife.
2544	4	Individual	Wild life habit destroyed
2560	6	Individual	Wildlife impacts.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
2564	7	Individual	We live in a Wildlife corridor, the kinds of wildlife we have seen in the almost 10 years of living here is extraordinary. We have seen bobcats, coatimundis, fox, deer, javelinas, rattlesnakes, king snakes, roadrunners, gila monsters, lizards, bats... the list just goes on and o . As for the birds, we have seen all kinds and species. In the spring and fall, we have the hummingbirds coming through here in the hundreds. We put out seven (7) feeders and go through 300 ounces of food a day during the peak season. We have hummingbirds three plus deep waiting their turn to eat. The tree next to the feeders are filled with hummingbirds waiting their turn . We fear for the wildlife and for our lives while we live and play here. This mine would endanger us, our grandchildren, neighbors and the tourist that come here to play. Where will all the wildlife go when they run for their lives when the mine starts operating? They will exit to our backyard and endanger our pets, children and ourselves.
2565	4	Individual	For example night lights and blasting one foot holes are thought to have no impact on wildlife (the Wilderness Area starts next to the proposed mine site).
2584	3	Organization	The mine project site ranges in elevation from 4,400 to 6,300 ft above mean sea level and supports a variety of upland habitat with vegetation characteristics of Madrean Evergreen Woodlands and Semi-desert Grassland. We see the development of this mine seriously and permanently affecting the northern portion of the Santa Rita Mountain (north of Box Canyon), and degrading the habitat of woodland and grassland dependent bird species. Some of these species find their prime habitat in Arizona in this region and habitat within the elevation range the project.
2584	12	Organization	In conclusion, we are against the permitting of this mine. We believe it degrades the overall wildlife value of the Santa Rita Mountain ecosystem and would degrade this scientifically reviewed and independently indentified Santa Rita Mountains Important Bird Area. Given the rapid and widespread human growth in southern Arizona, our public lands are key to the survival of most of our Arizona wildlife legacy in southern Arizona, our public lands are key to the survival of most of our Arizona wildlife legacy in southern and southeastern Arizona, it is thus absolutely critical to manage that the Coronado National Forest within the Santa Catalina, Nogales, Sierra Vista, and Douglas Ranger Districts for wildlife and recreational values as of highest priority within the multiple use mandate of the National Forest. Mine operations of this type would be a single use to the detriment of all other uses, and would significantly impact the wildlife resources and their habitat the Coronado National Forest Management Plan seeks to protect. Arizona citizens would thus be severely negatively affected in their opportunities to enjoy wildlife and benefit from natural ecosystem values.
2591	32	Individual	How would the explosions, noise, dust, light disturbance and ground disturbance affect wildlife and wildlife behavior in being able to use habitat, in wildlife corridors, in breeding, in sleep habits, in ability to thrive, in ability to survive?
2592	83	Individual	The EIS should consider mitigation alternatives to compensate the USFS and surrounding communites for the loss of habitat, species, and tourism that will attend the proposed project.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
2592	86	Individual	The Coronado National Forest is the only National Forest that borders Mexico. Specifically, the Santa Rita Mountain, Canelo Hils, Patagonia Mountains, and Huachuca Mountains are a continuous ecosystem that borders Sonora. The EIS should evaluate what special biological systems or species are associated with the unique position of the Coronado National Forest and what impacts the proposed project could have to migratory species with a range that spans the border region. Any interrelationships between the biological systems and the economic opportunities for the region, such as tourism related to being a destination for bird watching, should be explored to evaluate the potential impacts due to the proposed project.
2592	88	Individual	The proposed project area is identified as a biological core management area and a wildlife corridor critical to the integrated regional planning of the Sonoran Desert Conservation Plan (Figures 3 and 4). The EIS should evaluate the impact of the proposed project on the species that use the area as habitat. The evaluation should incorporate site-specifics attritbutes of the area as a link between the Santa Cruz and Rincon Mountains and identify at stressors and potential effects to wildlife and habitat in the larger context of the regional ecosystem.
2593	8	Organization	The Rosemont Valley provides unique habitat for wildlife, recreational opportunities such as hunting, hiking, off-road vehicle riding, horse back riding, bicycle riding, camping and bird watching.
2593	12	Organization	The EIS should also consider what other nearby areas of the Coronado National Forest provide these same features and opportunities for the wildlife and people of Southern Arizona.
2593	14	Organization	The EIS should also consider what other nearby areas of the Coronado National Forest provide these same features and opportunities for the wildlife and people of Southern Arizona. How would Augusta/Rosemont Copper replace the habitat and recreational opportunities that would be lost during the life of the mine and after? The amount and types of land disturbance that would result from this proposal must be considered.
2593	27	Organization	Important considerations are the impact of air and dust pollution on the health of both employees and area residents, region- wide visual impact on scenery and view sheds and the impact on plant and animal life. The effect on recreational and property values should be established. Furthermore, the consequences of mine operation for ongoing efforts by the City of Tucson and Pima County to meet EPA air quality standards must be considered. The EIS should also consider the following questions and concerns: -What is the current air quality of the area, and how would the mine affect it? -What are the wind velocities (minimum, maximum and average) at the mine site throughout the year? -What is the prevailing wind direction throughout the year? -How far would windblown materials travel from the site and in what directions? -What would be the composition of the windblown materials and what are the associated health risks? -How does this compare to air quality standards? -Does the project meet the State and County air quality control regulations?

Wildlife and Habitat

01 - General

Record ID	Comment Number	Commenter Type	Comment Text
2593	36	Organization	- What species currently occur in or depend on the springs and perennial waters in this watershed an in what abundance?
2593	38	Organization	- What are the potentials for damage to the aquatic communities and ecosystems from this project. - Do present biological communities show any evidence of natural or man-made contamination caused by historic mining operations? - If any aquatic species are harmed by this project how would their demise affect the food chain in the area? - What is the potential for water catchments or storage ponds at the mine site to host invasive aquatic species that could harm the native species? - What are the possible impacts to the aquatic resources that could be affected by this project, and how would these impacts be mitigated? - How would the aquatic life and habitat be monitored during the entire project from start of construction to end of reclamation?
2593	51	Organization	Since the mine would require additional electrical power equivalent to the demand from a medium sized city of 130,000 people, several impacts need to be investigated: -Damage to animal and plant life, scenery and property values from the increased infrastructure (transmission lines, substations, etc.) that would be required. -Impacts on planning for future growth in the area. Would sufficient power be available, short term and long term, to accommodate regional growth of homes and businesses? -Environmental effects generated at the power plant site due to the increased power demand from the mine.
2593	62	Organization	HEALTH IMPACTS A number of questions need to be answered with respect to the health risks associated with the proposed mine: -What are the types of chemicals that would be used at the mine, and how would they affect people and animals if they were released into the environment?
2593	64	Organization	HEALTH IMPACTS A number of questions need to be answered with respect to the health risks associated with the proposed mine: -What are the types of chemicals that would be used at the mine, and how would they affect people and animals if they were released into the environment? -What are the concentrations proposed for use at the mine and at what concentrations do they become harmful to people or animals?
2593	69	Organization	The mine would cause many land disturbances, including loss of recreational land, loss of wildlife habitat and corridors, loss of open space, and viewsheds.
2593	74	Organization	-Where is the nearest similar location that the displaced wildlife can use for habitat, foraging, breeding or migration?
2593	88	Organization	-How much would the aquifer be drawn down as a result of pit dewatering? -How far from the pit would the effects of dewatering occur? -How would this impact Davidson Canyon and the springs in the area? -How would the dewatering of these local resources be mitigated by Augusta? -How would Augusta compensate the public for the loss of wildlife watering locations, impacts to vegetation from lowering of the water table, and the general loss of riparian areas from pit dewatering?

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Record ID	Comment Number	Commenter Type	Comment Text
2593	94	Organization	RECREATIONAL USES The major concern is that elimination of this part of the Forest for recreational purposes will shift activities to already overcrowded places elsewhere in the Forest. -What additional facilities will be made available? -Who will pay for them, taxpayers or the applicant? -What will be the effect on wildlife of this shift?
2593	131	Organization	An additional water consideration should be the effect on plant and animal life of any pipelines that are built to transmit water from well sites to the mine site. The impact from the pipe line construction must also be evaluated and a mitigation plan should be in place.
2593	135	Organization	WILDLIFE According to Kurt Bahti (Arizona Game & Fish) many species of wildlife in the Santa Rita Mountains would be "devastated" by any level of open pit mining in the Rosemont Valley because of loss of habitat, boundary effects of industrialization, loss of corridors and fragmentation of forage and prey opportunities. -What are the wildlife species that are found in the area, or likely to be found, that may be affected by this proposal? -Which ones are threatened, endangered, species of concern, candidates for listing, or have other special status? -What is the current condition and extent of the wildlife habitat in the project area, and the affected watershed? -How would the project affect the wildlife and habitat? -What physical and/or chemical agents would have the potential to cause harm to wildlife directly or indirectly? -Which species were surveyed for and when were the surveys conducted? -Were these surveys conducted over multiple years and seasons to get a true idea of what is there, due to the highly variable rainfall in this area that strongly impacts how species reproduce, and how easily they'll be found? -Will new biological surveys should be conducted over several years to account for population variability from variable rainfall, new listings, etc.
2593	137	Organization	What is the projected wildlife mortality rate from the mine-related increase in traffic on highway 83? Which species are most likely to be impacted by the increased traffic? How would the company mitigate this impact?
2597	3	Individual	There are several reasons why we feel that this is not an appropriate use of forest service land. The noise pollution from the blasting, which will have an effect on neighbors near and far, as well as its effect on wildlife.

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Record ID	Comment Number	Commenter Type	Comment Text
2599	3	Individual	It is my position that extensive biological surveys of the animals resident to and migrating through the areas affected by Rosemont mining activities, including the length of Arizona Highway 83 that will be traversed by mine-related vehicles, should be conducted as part of the NEPA process, and that thorough, impartial analysis of the data acquired be made prior to the completion of the draft EIS for this project. Questions: Which animal species will be affected by the noise, dust, human and traffic movements, vehicular exhaust, light, toxic air and water emissions, physical barriers, water consumption, and seismic disturbances caused by the mine? What will the likely effects be on the behavior, migration patterns, viability and population sizes of each of these species? If any of these species were to be negatively impacted by the mine activities, would they be likely to return to the area and /or recover to pre-mine levels of health and viability after the mine shuts down? If so, how long would it take for their pre-mine conditions to be re-established?
2601	2	Individual	We are deeply concerned about putting in the Rosemont mine for the following reasons: 1. Destruction of the headwaters into Davidson Canyon which would affect the wildlife living in the mountains.
2610	11	Individual	How will the mine operations affect wildlife?
2610	49	Individual	What is the impact on the water flow and quality regarding wildlife in the Cienega creek area due to the infill of mine waste in the Barrel, Wasp, McCleary, and Scholefield canyons?
2617	5	Individual	We own and live on 34 acres just a few miles north of the proposed Rosemont mine and are deeply concerned with the devestating effect that this project would have on: the endangered animal and plant habitat
2617	21	Individual	How will you guarantee that the chemicals used by the mine or the many toxic metals and minerals that would be released from the soil or rock by the mining operation (for example but not limited to: uranium, asbestos, mercury, lead etc.) are not released into the environment causing animal health damage?
2617	41	Individual	We are not the only species on this planet. Every day, the planet looses more species of plants and animals. Are we to add to this list?
2620	8	Business	The Freeport McMoran/Phelps Dodge project at Safford as well as the BHP/RTZ project at Superior are judged as being in the right place at the right time. The Rosemont Copper project is, on the other hand, the wrong place at the wrong time. It is in a pristine area which provides habitat to sensitive flora
2625	6	Individual	If the Federal Government actually carried out the policies spelled out in NEPA it would have to reject this proposed mining plan. These plans need to be upheld. They are: attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences
2625	16	Individual	Other concerns I have are those affecting the wildlife

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Record ID	Comment Number	Commenter Type	Comment Text
2625	22	Individual	The mine would likely be operating around the clock. The lights, the noise, the explosive shocks, the dust, the size of the project-all would affect wildlife in the area. Wildlife movement cooridors would be disrupted by this massive enbroachment on their territories; feeding and mating habits would likely be disrupted.
2628	1	Individual	I am concerned about our beautiful natural environment and the desert animals living areas that will be destroyed in the process of building the mine
2629	3	Individual	We want to express our opposition to the Rosemont Mine based on the following considerations: This mine would severely impact the Santa Rita Mountains and could lead to the destruction of the bird habitat for which the mountains are world famous.
2630	2	Individual	I strongly object to the use of forest lands for any purpose supporting mining operations. It is environmentaly degrading
2639	6	Individual	Do we have a detailed, comprehensive impact study on flora and fauna
2640	4	Individual	My personal concerns encompass land that is dear to my heart, and the numerous wildlife gifts that is has given to those of us who live here
2640	13	Individual	The avialability of water affects all living creatures
2641	8	Individual	Please no species degredation, no raping our beautiful Coronado National Forest
2646	6	Individual	Bad planning for the health of non-human animals
2648	12	Individual	Given all the other active likely potential mining activity in Southern Pima County, what will be the cummulative effect on people & the environment. In particular, wildlife
2648	14	Individual	What effect will the use of chemical dust suppressants on the mine roads have on wildlife
2651	3	Individual	We are against the proposed development of Rosemont Copper Mine because it will significantly and detrimentally impact some of the most biologically important areas and wildlife habitat in Pima County
2651	5	Individual	The project area is part of or adjacent to three potential wildlife linkage zone identified in the Arizona Wildlife Linkages Assessment, completed by the Arizona Game and Fish Department and Arizona Department of Transportation in 2007. These wildlife and natural ecosystems." One of these zones was determined to be a "high priority" linkage zone, meaning it has both high biological value and high threat and opportunity value.
2651	11	Individual	We believe that it would adversely impact: 4. wildlife
2655	6	Individual	However, I also realize that an open pit mine couses desecration of the landscape by totally altering the ecology in the vicinity of the mine.
2658	9	Individual	Consequences direct and indirect may include the following: Displacement or reduction in overall numbers of huntable game within Unit 34A, including but not limited to white-tailed deer, mule deer, javelina, cottontail rabbit, gambel's quail, scaled quail, mourning dove, and white-winged dove.

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Record ID	Comment Number	Commenter Type	Comment Text
2658	11	Individual	Adverse impacts to game populations in areas affected by mine operations beyond the limits of the actual footprint and traffic corridors of the proposed project.
2658	18	Individual	Given that the proposed Rosemont Copper Project will permanently destroy habitat in the northern section of the Arizona Game and Fish Department (AZGFD) Hunt Unit 34A the effects of the proposed Rosemont Copper Project need to be mitigated.
2662	3	Individual	First, there are quite a few of us who frequent the Forest on our ATVs, motorcycles, bicycles and foot. We make sure not to disturb the trails that nature has already provided, or the habitat around those trails. The extra truck traffic along these lanes has already impact the wildlife in that it has widened the trails for trucks and equipment.
2662	10	Individual	Four thousand acres of dump, seems awfully large. That's a huge habitat disturbance that will never be recovered if Augusta is not required to remove the debris and bring the area back to its natural state. And to to not have this area as habitat for amlost 20 years is not an acceptable solution to mining.
2663	3	Individual	When will someone have the courage to stand up for the animals, the environment, and most of all the people who live in this fragile desert and stop cramming big business with their deep pockets down our thoughts?
2666	9	Organization	The Memorandum of Understanding requires various experts for the consulting staff. We suggest that a lighting engineer or designer be added to the list. This consultant would help assess the impacts of artificial nighttime lighting on animals as well as the night sky.
2668	14	Individual	No doubt you have plant surveys (you are the FOREST Service after all), animal surveys to calibrate the loss of habitat. So you know what will be lost. The animals will (maybe) find new territories. Displace somebody else. How timely that the Jaguar was just de-listed.
2671	21	Individual	The Cienegas valley is a unique environment to all southern AZ with its high altitude grasslands and wildlife. It is quiet, peaceful and beautiful.
2671	25	Individual	Please provide an analysis and any related studies on the impact of species distribution due to the effects of blasting. Will the local species such as owls, hawks and antelope currently ranging in the Northeast section of the Cienegas Reserve be displaced? If they are displaces, can it be estimated by how much and how far?
2671	30	Individual	I am concerned about the immediate and long term effects on habitat.
2673	9	Individual	All of the flora associated with the buried Barrel Canyon drainage area will be eliminated or changed forever.
2673	11	Individual	All of the wild life associated with the buried Barrel Canyon drainage area will be eliminated or changed forever.
2675	40	Individual	Further attention should be paid to ensure all appropriate species are included.
2675	41	Individual	Considerable disturbance will be produced by proposed activity on the west side of the Santa Rita Mountains. Analysis of the issues concerning endangered and sensitive species should be undertaken for this area as well.

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Record ID	Comment Number	Commenter Type	Comment Text
2677	2	Government	Our preliminary review indicates that despite any and all mitigation measures, this project will result in significant adverse impacts to wildlife, wildlife habitat, and wildlife recreation. We believe that the project will render the northern portion of the Santa Rita Mountains virtually worthless as wildlife habitat and as a functioning ecosystem, and thus also worthless for wildlife recreation. Furthermore, the project has great potential to impact wildlife and habitat off the forest.
2677	4	Government	The mine plan of opertations (Section 3.3.3) states, "is is anticipated that disruption to wildlife habitat and use will be minimal." Further, the mine plan of operations (Section3.5.2.1.2) states, "loss of hunting ground is not expected to have significant impact on hunting in the area." The Department completely disagrees with both of these statements. The amount of land disturbance, traffic, noise, light, and general mining activity will completely disrupt wildlife in the area. Wildlife and hunting impacts will be much greater than the footprint of the active mine area.
2677	26	Government	We understand that Rosemont Copper Company plans to replace their ground water withdrawl with CAP water, but at least for now that replacement water is being provided into the aquifer at Avra Valley, 36 miles away from the withdrawl site. Depositing water into the Avra Valley will do nothing for the water table that supports the wildlife habitats around the Santa Cruz River and the Santa Rita Mountains.
2677	27	Government	If the water table is lowered around the Santa Cruz River or in the Santa Rita Mountains, the impacts to vegetation will adversely impact wildlife (which in turn impacts wildlife recreation).
2677	31	Government	The only way to insure that the mine does not impact wildlife habitat in the Santa Cruz basin is for the mine to use only CAP water and be prohibited from using ground water.
2677	34	Government	This will decrease the ground water and surface water that should flow down Barrel Canyon and into Davidson Canyon and Cienega Creek. Davidson Canyon and Cienega Creek and very important habitats for wildlife, and decreases in water flow to these habitats will adversely impact wildlife. This effect will be occurring off of Forest lands. The Forest should identify how you will insure that this impact does not occur.
2677	37	Government	There is a great concern about spills from the mine polluting the ground water and surface water down-canyon from the mine. Although Rosemont Copper Company states that they will use state-of-the-art technologies to prevents spills and contamination, virtually all mines have had spills. The Forest should identify how you will insure that water is not polluted from the Rosemont Mine. Any pollution of waters into Davidson Canyon and Cienega Creek will have significant adverse impacts to wildlife
2677	40	Government	We also have a concern about failure of reclamation to occur or to be adequte for the needs of wildlife. When this happens, the wildlife are always the losers. One of the problems is the difficulty of establishing vegetation (at the level of a functioning ecosystem) in dry climates.

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01 General

Record ID	Comment Number	Commenter Type	Comment Text
2677	44	Government	As we stated above, we believe that this mine will impact wildlife, wildlife habitat, and wildlife recreation in an area that is much larger than the footprint of the mine. If this mine is permitted, the entire northern portion of the Santa Rita Mountains will be virtually lost of wildlife values.
2677	50	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Loss of game and non-game habitat
2677	52	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Impacts to wildlife corridors that allow wildlife movement from blocks of habitat
2677	57	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Monitoring of wildlife impacts.
2677	59	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Impacts to wildlife from increased vehicular traffic, both on the Forest and off the Forest
2677	60	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Impacts to wildlife from dust and air pollution during construction, during mining operations, and after mining has stopped, both on the Forest and off the Forest
2677	64	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Best Management Practices that protect wildlife, including birds and bats, from being killed by the toxic solutions on the site
2677	65	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Habitat fragmentation
2680	6	Individual	What affect will they have on my animals? How will we even know if we are affected until it is tóo late?
2683	14	Individual	State Road 83 shows an ecosystem quite different from that of nearby Tucson.
2683	27	Individual	And what effect will this operation have on the wildlife in the area?
2683	30	Individual	If the pollution from tailings would be harmful to people, it would have an even greater effect on wildlife.
2683	31	Individual	Blasting and wildlife are unlikely to be able to coexist
2683	44	Individual	This mine would be far too detrimental to the wildlife of Southern Arizona to allow it to happen without considering every one of the points listed and insisting on solutions that will protect us from all the probable adverse effects.
2685	3	Individual	We are greatly opposed to any activity that has such a high probability of unrepairable damage to wildlife habitat

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01 General

Record ID	Comment Number	Commenter Type	Comment Text
2687	6	Individual	It seems that the Forest Service is rushing into the Rosemont Copper Project without better studies on how the chemicals from the mines would impact the wildlife in the area.
2688	19	Organization	We are concerned for the fragile flora species unique to our desert climates.
2688	25	Organization	What happens to our wildlife, our birds, our creatures big and small that inhabit the now quiet places that would resound with a din so foreign to their environment.
2689	7	Individual	All the major local and regional political entities (including Pima County, Santa Cruz County, City of Tucson, Patagoina, Vail, Sahuarita and congress people Grijalwa and Giffords) oppose the mine due to negative impacts on wildlife
2698	46	Business	Clearly, all animal life on the mine site will be destroyed. Over a much larger surrounding area, the biome will be largely depleted as the various type of pollution take their toll.
2698	49	Business	Even with the best of reclamation efforts, which are rarely attempted and even more rarely achieved, the resulting biome will have much less diversity, as only certain plants and animals specifically adapted to mine tailings with steep slopes, high acid content, and poor soil survive.
2713	25	Organization	The EIS for the proposed Rosemont Copper Mine must consider both the immediate and cumulative impacts fo the proposed action, as required by the National Environmental Policy Act. Specifically, the following types of resouces analyses must be included: A careful consideration of the "big picture" when evaluating cumulative effects of all these activities, including impacts to surrounding biological communities, corridors for wildlife and downstream effects on places such as Las Cienegas, Davidson Canyon, as well as the human communites of Sahuarita, Vail, and Tucson
2719	6	Individual	The effect of the mine on wildlife & wildlife corridors must be addressed.
2721	5	Individual	Animal/Plant -- From my observations the greatest impact on animal life in the greater Tucson area has been the ever increasing housing and commercial development. A case in point: the big horn sheep no longer inhabit Pusch Ridge but still exist in the Silver Bell mine area. In fact a picture exists of big horn sheep drinking at the bottom of the Oxide pit. Before the present housing downturn the developers were denuding over 5,000 acres per year while the Rosemont mine will impact less than that over the life of the mine with much of it being reclaimed.
2722	2	Individual	The area proposed for mining is a major wildlife corridor
2723	4	Individual	The proposed Rosemont Mine is located adjacent to and partially overlapping an area designed by the Sonoran Desert Conservation Plan as biological core habitat The mine and associated traffic would put additional stress on wildlife already being impacted by rapid growth in the general area.
2724	8	Individual	Wherever Augusta would get water, an aquifer will be depleted, springs would dry up and people and wildlife would be deprived of H2O resources.
2724	25	Individual	Wildlife corridors and ecosystems that are unique to this area would be affected adversely.

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Record ID	Comment Number	Commenter Type	Comment Text
2724	27	Individual	Disturbances of the areas would leave long-lasting impacts on the public land - for example - a mile wide hole in the ground and loss of habitat for sensitive species - for example - 32 sensitive animal species.
2724	56	Individual	I have 14 acres in Vali, 4 1/2 miles South from I-10 and Sonoita Hwy 83. I have a vwell, however there is every liklihood that a mine at Rosemont Ranch as is being proposed would dewater wells currently in use (as has already been done by Augusta Resource Corporation tet wells) and imperil important wildlife habitat
2726	46	Business	Clearly, all animal life on the mine site will be destroyed. Over a much larger surrounding area, the biome will be largely depleted as the various type of pollution take their toll.
2726	49	Business	Even with the best of reclamation efforts, which are rarely attempted and even more rarely achieved, the resulting biome will have much less diversity, as only certain animals specifically adapted to mine tailings with steep slopes, high acid content, and poor soil survive.
2729	19	Organization	We are concerned for the fragile desert fauna, those species unique to our desert climates.
2729	25	Organization	We dread the noise of the blasting, the explosions, the sounds of the heavy equipment, the pervasive clamor that pervades the surroundings when heavy industry encroaches on a bucolic haven. What happens to our wildlife, our birds, our creatures big and small that inhabit the now quiet places that would resound with a din so foreign to their environment.
2735	2	Individual	This land is in the Pima County Conservation plan as sensitive wildlife areas.
2736	11	Government	How will the fauna be impacted by the use of surface and groundwater for mining operations?
2736	19	Government	Where are the pipelines from the wells to the mine going to be located? How will they impact future development? How will it impact the fauna of the area?
2736	44	Government	What impact will electrical lines have on the Sahuarita/Green Valley area aesthetically? How will it impact the fauna?
2736	47	Government	What impact will the stand alone proposed wastewater treatment plant have on the fauna?
2742	10	Individual	This brings me to the other point that one doesn't hear much about. We came to this area from all over the states and why did we choose to live here, we should ask. Wasn't the the animals we see of high importance?
2745	11	Individual	The change in water impacts on wildlife need definintion.
2750	9	Individual	The other concerns are: the negative impact on the destruction of wildlife habitats and wildlife
2752	3	Individual	Every year I visit and enjoy the birds.
2752	6	Individual	A copper mine near it would have disastrous consequences for the wildlife
2754	8	Individual	It will disrupt interrupt wildlife corridors in the Cienega Creek

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
2756	4	Individual	The area projected to be mined and covered with tailings has been prime habitat for wildlife including some endangered and threatened species – lesser long-nosed bats, Mexican long-tongued bats, Bell's vireos amount others – and the size of the impacted area will surely have a large negative effect on the wildlife populations.
2758	3	Individual	Arsenic used in the refining process is injurious to domestic and wild animals.
2760	36	Government	Identify direct, indirect impacts to wildlife as a result of groundwater pumping assoicated with the proposed project.
2760	50	Government	The EIS should also describe the potential impacts to wildlife from open pits, backfilled pits, and partially backfilled pits after closure, as well as the measures that will be taken to prevent these impacts.
2760	62	Government	Poisoning of animals attracted to heap leach and tailings ponds can be a serious problem. The EIS should discuss the mitigation measures that would be taken to prevent exposure of migratory waterfowl and other wildlife to all toxic waters used in or resulting from processing the ore. Identify measures that would be used to prevent poisonings at solution impoundments, including maintenance requirements and monitoring to ensure their effectiveness.
2760	63	Government	the EIS should identify non-jurisdictional wetland and riparian habitat as well as other unique or important habitat areas that could be affected by the project. The EIS should discuss avoidance, minimization, and mitigation of losses or modification of habitat and plant and animal species composition. We recommend that the EIS include a detailed mitigation plan for replacement of important habitat adversely affected by the proposed project.
2761	4	Individual	Damage to riparian areas and other biologically sensitive land, to wildlife corridors - each of these injuries is sufficient ground to reject the proposed Rosemont Copper Project
4474	15	Individual	We are dealing with a forest habitat. Regular dust from mining operations will cover plant foliage that animals have to consume for their survival. This gritty forage could apply to stock animals as well as wildlife.
5012	1	Organization	WHY MINE HERE? -These lands have greater value as wildlife habitat than as an open pit mine,
5012	19	Organization	HOW ARE ENVIRONMENTAL CONCERNS BEING ADDRESSED? -Wildlife corridors and ecosystems that are unique to this area would be affected adversely.
5280	10	Individual	Environmental impacts not adequately addressed: Effects on fauna & flora, wildlife corridors
5284	12	Individual	As a resident of Elgin, Arizona we are concerned about the following things. Noise: Has anyone done any studies on how this will affect residents and wildlife?

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Record ID	Comment Number	Commenter Type	Comment Text
5284	15	Individual	As a resident of Elgin, Arizona we are concerned about the following things. Environment: How will the habitats of the many animals, birds and plants be restored?
5285	7	Individual	Like most citizens my primary concerns center on quantity and quality of water, regional economy, including tourism, and vegetation and wildlife.
6715	3	Individual	Make no mistake about it, I can see only destruction of plant, animal, and people's communities here.
6726	8	Individual	The Cienegas Valley is a unique environment to all Southern Arizona, with its high altitude, grasslands, and wildlife. It is quiet, peaceful, and beautiful. Scenic Highway 83 is the gateway to this environment, which will be impacted forever if this project goes forward. Regular blasting, with the sonic and seismic effects could likely impact local species and their distributions. I know it will affect myself and my neighbors.
6734	2	Individual	Uranium is in the bedrock throughout Arizona, which presents a uiniqe challenge to mining here. The danger is so significant, that when the Washington, D.C., office of EPA published a report in 1999 on the health hazards of Technologically Enhanced Naturally Occuring Radioactive Materials, TENORM, they used only Arizona mines as their examples. All three that are here in Pima County, Cyprus Sierrita, Twin Buttes, and Cyprus Tohono, are under Superfund actions at this time for having polluted the groundwater heavy metals and are radioactive chemicals produced in mining operations. Freeport-McMoran has recently submitted to Department of Environmental Quality a 540-page work plan regarding the mandated cleanup of heavy metals and radioactive materials all in the Cyprus Sierrita Mine. The EPA TENORM report references 14 assessments of uranium levels in Pima County and Santa Cruz Counties. Uranium is practically inert in its natural state. However, when it is ground into powder, and treated with chemicals in copper processing, it is converted into gross alpha, gross beta, Radon, and other components that are regulated by EPA as they are known to be carcinogens. We do not know the effects on our bird and animal population that we should be protected in our National Forest. Even so, it is easy to surmise the consequences of their ingesting chemicals that cause cancer in humans. The Federal Department of Justice cited Morenci, Arizona, Copper Mine for bird deaths on that premises.
6735	4	Individual	This proposed open-pit mine would do irreparable damage in a beautiful mountain, and it would do irreparable damage to its clean air, water, and abundant plant and animal life.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
6741	2	Individual	I want to talk about water briefly, but I'm going to emphasize another aspect of the water, and that's the toxin contamination. The toxin runoff help impact -- how will that affect our residential wells, how will that affect our wildlife, and will it affect the health of the wildlife, the reproduction of the wildlife, the birth defect, how will it affect birth defects?
6741	5	Individual	Wildlife, there was -- I'd like to mention wildlife briefly. I have 30 seconds. There's an immediate impact to the footprint wildlife. And also, there's long-term -- and I touched on that about the possible birth defects.
6744	4	Individual	Second, we were concerned about the effect on the delicate ecological systems in the foothils of the Santa Ritas.
6765	4	Individual	We're in the wrong place; sticking another mine on this valley. We have got water issues. With have got habitat issues.
6770	5	Individual	No doubt the environment will be destroyed. The mine, milled tailings, roads, pipelines, overhead lines, all of the other support that goes with this mine are going to change things or destroy things relative to wildlife,
6775	5	Individual	Air quality is also an issue. I don't know about the rest of you, but withing the last month I have had to call the EPA on dust from existing mines. It's suppose to be wet on top of those tailings. If it's wet how come we have dust? Guess what? The new mine is suppose to be a dry tailing. It's not going to be wet at all. Think about the dust, the air quality. What about the impact on the plants, the animals in that environment, in that ecosystem. What's going to happen to those?
6781	7	Individual	The noise of the heavy mining equipment, daily blasting seven days a week, air pollution from windblown dust, and sulfuric acid, and diesel fumes,and unlimited pumping of ground water at Rosemont, and destruction of wildlife habitat on the west side, is totally incompatible with the peace and serenity and conservation of the east side.
6781	9	Individual	There will be no peace for anyone in the Sonoita Valley or surrounding communities, nor for the wildlife if this mine is approved by the Forest Service.
6811	4	Individual	Under the guise of mining, Rosemont Company proposes to invade a pristine ecologically and sensitive area, a portion of the Coronado National Forest, and thereby destroy and displace all of the flora, fauna, squander groundwater, cut off all public general recreation use.
6824	7	Individual	what about all the animals that are going to be there? Are they planning on protecting these animals? What are they going to do to stop those beautiful animals from being buried with tons of dirt? They're making it - - turn our forest into a dirt dump.
6834	8	Individual	What are the basic pros and cons of the Rosemont mine? There would be a devastating impact on wildlife; the Santa Ritas are an important corridor between the Sonoran Desert and the surrounding areas.
6834	14	Individual	And think about this, in the entire mining history of Arizona, what percentages of the promises made by mining companies have been kept? How many smoking holes in the ground have not been cleaned up because money ran out? How much habitat has been destroyed?

Wildlife and Habitat

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Record ID	Comment Number	Commenter Type	Comment Text
6853	4	Individual	For the price of 20 years of development, we lost this valley, the wildlife, and the natural springs. There will be a huge hole and many square miles of flat, uninhabitable land. You might call it a landscape pinata: Once you break it, you can't put it back together.
6857	3	Business	The proposed Rosemont mine will have dramatic and irreversible impact; impacts on our water, our wildlife, culture, and archaeology.
6865	2	Organization	Many other things obviously should be talked about. There is wildlife issues. It's near an urban area. There are sensitive areas that are just downstream that need to be protected. All that needs to be carefully talked about at length in the draft EIS.
6867	6	Individual	Health and safety impacts from explosions, excavations, noise, lighting, and tons of dust with particulates, many with contaminates carried by wind unknown numbers of miles affecting the astronomical skies with our world class observatories, affecting -- impacts on wildlife behavior and breeding and ability to survive there or threatened species, affecting possibility of health of humans with increase in respiratory problems, asthma, allergies, emphysema, valley fever, and many more possibilities, valley fever with spores that are stirred up.
6869	3	Individual	Here are some of the endangered who I think in the future, if this mine comes, will be called the disappeared. The archaeological sites in the area, the American Indian graves -- they're supposed to be protected by the American Indian Graves and Protection Act -- Indian holy sites, all the birds, animals, fish and plants. The tourists, they will be endangered too, you know, they won't come. The observatory, which will be endangered by the light and the dust. And the humans, we are all endangered, and the water and the land, and the air.
6870	2	Individual	In order to mine, you must extract much more rock than copper. What this means is the there are huge areas of ground and wildlife habitat destroyed during the mining for copper. The excess rock that has no value to the mine is tossed into a pile called tailings. In these tailings, harmful minerals such as asbestos, even radioactive minerals can be found. When rain fails on the tailings, the water reaches the waste material from the copper sulfide mineral, chalcopyrite, to produce sulfuric acid, which then runs into the streams, contaminating the water and harming the fish and life and humans, and this information is from the United States Environmental Protection Agency.
6880	14	Government	In addition, it is quite possible a mining operation would want, or need, to carve new roads or rail lines through the area to service this mine. The environmental impacts of such developments on wildlife habitat and water courses would be very significant.
6882	2	Individual	If the Pit mine goes in, what happens to the wildlife corridor that runs through the Santa Rita Mountains? What will happen to the natural habitat if they begin drilling? What will happen to all the animals and the vegetation?
6884	1	Individual	What prevents the migrating birds and other wildlife from drinking the solutions used from the wastewater ponds?
6884	3	Individual	I propose a study be completed and recommended measures be taken to prevent birds and other wildlife from accessing the contaminated water.

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Record ID	Comment Number	Commenter Type	Comment Text
6886	5	Individual	Currently the state of Arizona is in the process of classifying the Davidson wash as as OAW (outstanding Arizona Water) due to its importance in providing vital links for wildlife migration. Will this be considered in the Forest Services final decision?
6892	5	Individual	Experience with Tenorm in Arizona has been these minerals have contaminated the aquifer; and, have been potentially dangerous to man and wildlife.
6899	11	Individual	We need to protect habitat areas for wildlife
6901	2	Organization	In summary, the Coalition requests that the EIS address the following issues: - The proposed activities for the Rosemont Copper Project will significantly and detrimentally impact some of the most biologically important areas and wildlife habitat in Pima County as identified in the County's Sonoran Desert Consevation Plan.
6901	14	Organization	The project area is part of or adjacent to three potential wildlife zones identified in the Arizona Wildlife Linkages Assessment, a collaborative effort of the Arizona Wildlife Linkages Workgroup in 2007. These wildlife linkage zones are defined by the assessment as being "important to Arizona's wildlife and natural ecosystems." One of these zones was determined to be a "high priority" linkage zone, meaning it has both high biological value and high threat and opportunity value. In addition, one of the six "Critical Landscape Linkages" identified in Pima County's SDCP lies just north of the project area (across I-10 and south into Cienega Creek).
6901	27	Organization	Given the presence of multiple critical wildlife linkage zones in or adjacent to the project area, it is essential that the full range of impacts to these linkage zones be considered in the EIS. Possible impacts include: -major habitat fragmentation from the open-pit mine and associated tailings piles and waste facilities;
6901	31	Organization	Given the presence of multiple critical wildlife linkage zones in or adjacent to the project area, it is essential that the full range of impacts to these linkage zones be considered in the EIS. Possible impacts include: -and loss of downstream surface water resources from new dams.
6905	1	Individual	What would be the effect on the native birds and animals and migrator birds on the disruption of their habitat by the proposed mine. An impact study should be done to determine this.
6906	2	Individual	What would be the effect of the proposed Rosemont mine on Cienega Creek and the fish living there? A study is needed to determine this.
6918	1	Individual	How will the natural habitats and wildlife corridors be affected by the mining proposal and how will these impacts be mitigated?
6918	3	Individual	The use of 5,000 to 8,000 acre feet of water per year is what Rosemont Mining expects to utilize each year. The use of over 1 billion gallons of water per year from this desert area is going to dry up all the aquifers in the area, springs will also dry up, and wildlife will be deprived of water resources..

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Record ID	Comment Number	Commenter Type	Comment Text
6923	7	Individual	What will be the affect on the critical wildlife corridors between the Santa Rita Mountains and Rincon Mountains? If this corridor is shrunken or cut off, how will the health of game species in both ranges be affected?
6924	2	Individual	This area is also home to many plants, animals, birds and reptiles that have already had most of their habitat encroached upon by development. Mining in the Santa Ritas would definitely endanger this desert life even further.
6935	2	Individual	For one, that would disrupt hordes of wildlife, and also greatly impact those who use the area for recreation, such as the airsofters with TAC that have a permit to use the land, and the dirtbikers, quaders and hunters.
6936	1	Organization	IMPACTS TO BIOLOGICALLY-IMPORTANT LANDS: The proposed activities for the Rosemont Copper Project will significantly and detrimentally impact some of the most biologically important areas and wildlife habitat in Pima County as identified in the County's Sonoran Desert Conservation Plan.
6936	6	Organization	IMPACTS TO IMPORTANT WILDLIFE LINKAGES: The project area is part of or adjacent to three potential wildlife linkage zones identified in the Arizona Wildlife Linkages Assessment, completed by the Arizona Game and Fish Department and Arizona Department of Transportation in 2007. These wildlife linkage zones are defined by the assessment as being "important to Arizona's wildlife and natural ecosystems." One of these zones was determined to be a "high priority" linkage zone, meaning it has both high biological value and hugh threat and opportunity value. In addition, one of the six "Critical Landscape Linkages" identified in Pima County's SDCP lies just north of the project area (across I-10 and south into Cienega Creek).
6938	2	Individual	For a governmental agency to knowingly subject the humans and wildlife surrounding the Coronado National Forest to such contamination and thereby jeopardizing the health of all concerned would be unconscionable.
6939	2	Individual	Although the impacts are many: ranging from wildlife habitat destruction to multi-use recreational area destruction to tremendous highway damage to noise and dust generation for local residents, the issue concerning us mostly is water.
6944	9	Individual	I urge you to completely stop this operation from starting up. Let's think of our environment, the animals who inhabit this area and the people who live there and not about the "money".
6955	3	Individual	Wildlife will be displaced, stressed or destroyed.
6956	3	Individual	Wildlife will be displaced, stressed or destroyed.
6957	3	Individual	What will be the costs to wildlife and vegetation?
6957	11	Individual	5. How would Rosemont insure that migrations routes for birds and other wildlife on and over Forest Service lands will not be adversely impacted?
6965	7	Individual	We have great concerns about the Rosemont Copper Project and ask that the following be addressed in great depth by a variety of experts: Impact Upon Wildlife and Wildlife Habitat

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
6966	3	Individual	The mine tailings can have profound health and environmental consequences especially for children in nearby communities or for sensitive riparian or wildlife refuge areas due to the metal content amoung other contaminants of the tailings piles that contain from as little as 0.1 percent to as much as 5 percent lead, arsenic, copper and zinc.
6971	3	Individual	Are there homes or/ sensitive habitat at risk by these airborne contaminants?
6982	3	Individual	The unrecoverable destruction of the scenic Santa Ritas, the draining of our water resources, the obliteration of wildlife, the damage to our highways and the myriad of health and safety issues will be the effects felt by hundreds of thousands of southeastern Arizona residents.
6996	2	Individual	2. The Santa Rita's are home to many Beautiful Animals, such as Bear, Deer, Mountain Lions and a host of other smaller animals; where will they relocate?.
6998	3	Individual	The destruction of the area will be destroyed along with nature and wildlife.
7002	3	Individual	The unrecoverable destruction of the scenic Santa Ritas, the obliteration of wildlife, will be the effects felt by hundreds of thousands of southeastern Arizona residents.
7011	1	Individual	Mining not only destroys habitats,
7019	1	Individual	Please do not allow development of the copper mine in the Santa Rita Mountains. It is too close to urban Tucson suburbs.. It will hurt wildlife
7020	3	Individual	There are many animals that live out there that would suffer too.
7021	1	Individual	I believe it would be an absolute disgrace to tear up the natural beauty of our Santa Rita Mountain region. The area hosts an abundance of wildlife, for families who once lived in the area or explore the region for their love of the outdoors.
7021	6	Individual	Arizona needs all the ecological support it can get to keep its indigenous species and sustain human life here as well.
7021	8	Individual	The amount of real estate that has come up in even just the last few years has taken away area for wildlife to thrive in; taking away even more for copper mine seems a huge waste.
7030	9	Individual	*Not acceptable to kill our wildlife,
7031	11	Individual	Increased number of wildlife kills and displaced wildlife-will effect livestock and domestic animals.
7033	3	Individual	What animal corridors will be impacted by the above mentioned pipelines, roads and equipment accesses?
7041	3	Individual	We wonder what will happen to the habitat that will lose their homes and probably their lives.
7042	4	Individual	What about damage to habitat for endangered species?

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01 General

Record ID	Comment Number	Commenter Type	Comment Text
7048	9	Individual	How will natural habitat and wildlife corridors be affected by the mining proposal (and a proposed pipeline) and how will these impacts be mitigated?
7052	1	Individual	I am opposed to the mine for several reasons: It would destroy natural habitat It would be a drain on water supplies It would adversely affect tourism The dust caused would be a health hazard throughout the Tucson area The increase in truck traffic would not only be a health hazard because of emitted pollutants, but also because it would cause dangerous traffic conditions on a narrow, scenic route.
7058	3	Individual	It is your duty to protect national forest areas for flora, fauna, recreation use.
7058	6	Individual	Also, service roads to acces the mining area will ruin habitat for many plants and animals.
7062	3	Individual	I don't have statistics to show how mining has contributed to Southern Arizona's economy. I don't have statistics to show what damage nmining has brought about to Southern Arizona. What I do have is two eyes that see the wide scale and wholesale destruction of mountains, plant life, animal life, and scenic veiws for the sake of raping the land for precious metals in order for the mine owners to get rich.
7063	4	Individual	This may explain why next to zero earthly plants and animals are capable of living or growing in or near a mining waste streams, tailing piles and stacks.
7069	3	Individual	I would like to make a couple comments about the proposed Rosemont mine. First of all, mining damages the environment. In a localized area, where there was once vegetation and animals, there will be a hole in the ground and piels of broken rock.
7079	5	Individual	What about the animals that will be displaced by all this change to their environment. They are already having a hard time with the development of the land for housing, that is destroying their habitat.
7082	2	Individual	I believe that the mining would damage ecosystem including flora and fauna in the immediate and adjoining areas, impact our water, and destroy a beautiful scenic area.
7083	7	Individual	How will the mining affect the plants and animals in the region? What about the wildlife corridors?
7087	2	Individual	Secondly, what will the massive influx of man and machinery have on the predator prey relationship in the area? Coyote and other predator population are already having difficulty maintain their numbers because of the increase in the human population. Rabbits and other small game have flourished in the predator decline. If the predator population declines further, due to the mine, how will the surrounding areas hold up to a rise in rabbit and small game populations?

Wildlife and Habitat

01 - General

Record ID	Comment Number	Commenter Type	Comment Text
7088	25	Organization	The effects of all this heavy metal contamination on the local; desert flora and fauna must be examined,
7088	50	Organization	How will natural habitat and wildlife corridors be affected by the mining proposal and a proposed pipeline, and how will these impacts be mitigated?
7088	52	Organization	Pits become toxic lakes that are harmful to wild life and not consistent with a recreational area:
7088	68	Organization	What will be done to protect nearby residents, wildlife, and recreational users in the Coronado National Forest from the deleterious impacts of daily blasting? What will be the cumulative environmental, ecomomic, and cultural impacts of this blasting on nearby wildlife?
7088	72	Organization	Daily blasting is required to remove rock (or overburden) covering the ore body. The impact to wildlife in the National Forest will be equilavent to daily sonic booms and the cumulative effects need to be examined.
7088	78	Organization	Intensive development of the site as an open pit mine will result in loss of a significant portion of the wildlife habitat and movement corridor on the eastern side of the Santa Ritas, potentially impacting endangered, threatened, and candidate species, in addition to priority vulnerable species or species of special concern. The Santa Ritas are recognized for the biological values and are an Important Birding Area (IBA). In addition, the Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of the Biological Core.
7088	81	Organization	The foot-print of the Rosemont Mine is stated to come wihtin four miles of Madera Canyon; a world known birding area that harbors several rare species of birds, some endangered. The wetlands within Madera canyon are spring fed possibly sharing the same source as the springs within the proposed Rosemont Mine area. Since these spring fed wetlands share the same water source will Madera canyon's wetlands suffer from the Rosemont mine; and, what will be the effect of the Rosemont mining project on endangered wildlife and these birds? Has Rosemont contracted biological population studies on all species of endangered wildlife; and, can they say with certitude that their mine will not endanger the wildlife and International tourism to the Santa Cruz valley?
7092	2	Individual	Problem- local flora and fauna and the effects this proposed mine will have on it. The proposed mine is located within 10 miles from the protected Mount Whrightson wilderness area immediately to the South of this proposed project in the same mountain range. What studies have been done to demonstrate that the mining activities will not have an adverse affect on the wildlife habitat in this unique area as is my understanding ther are several threatened and endangered species (jaguar, pineapple cactus, southwestern willow flycatcher, Chiricahua leopard frog, and lesser long-nosed bat) and desirable big game species (pronghorn, mule deer, white-tailed deer, and javelina). These species generate revenue from eco-tourism and hunting.

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01 General

Record ID	Comment Number	Commenter Type	Comment Text
7095	3	Individual	Problem - The water flow from a changed Barrel Basin has yet to be determined. Per the MPO Summary approximately 75,000 tpd of ore and between 195,000-267,000 tpd of waste rock will be mined each day for 24 hours 365 days a year, the waste rock will be dumped and large berms will be made to "hide" the operations. Those sheer numbers will inexplicably alter the course of the water flow, animal habitat and flora forever.
7102	8	Individual	Prior to reading the Shareholders document, I had the same concerns as others: 1) Use of groundwater, 2) Potential for groundwater contamination / containment dam / etc, 3) Safety concerns for heavy commercial truck use of State Highway 83, (wide load, bus stops, Undersized road, mine traffic, etc 4) Containment of tailings, especially due to the heavy winds that are in this area in Spring, Fall, and Winter, 5) Cumulative impact of Proposed Mine since there are other Proposed Mines in the area (Cal-Port, Seel, and Andrada), 6) Loss of Tourism, 7) Wildfire corridor issues / contradiction of the Sonoran Desert Conservation Plan,
7110	2	Individual	The Las Cienegas conservation area, managed by the BLM, is close to the proposed mining site. The 24/7 activity on such a mine would negatively impact wildlife and visitors to LCCA, with its noise, air pollution, possible withdrawal of ground water (affecting the Cienega watershed and wildlife).
7117	5	Organization	We have a significant interest in the proposed mine and strongly object to its development due to the significant negative and unmitigable impacts it will have on the air, land, wildlife, and water of the area.
7117	20	Organization	The Forest Service must also carefully and thoroughly evaluate the impacts on wildlife and wildlife habitat. As the comments from the Arizona Game and Fish Department indicate, the impacts of this mine on the wildlife and the habitat of the area are absolutely unmitigable. Per the agency's comments: "Our preliminary review indicates that despite any and all mitigation measures, this project will result in significant adverse impacts on wildlife, wildlife habitat, and wildlife recreation. We believe that wildlife habitat and as a functioning ecosystem, and thus also worthless for wildlife recreation. Furthermore, the project has great potential to impact wildlife and habitat off the forests. We therefore do not support the development of the Rosemont Mine." The proposed Rosemont Copper Mine Project will also significantly and negatively affect wildlife habitat identified in Pima County's Sonoran Desert Conservation Plan, as indicated by the Coalition for Sonoran Desert Protection in comments dated June 2, 2008. We support and incorporate by reference those comments.
7117	21	Organization	The project area includes Important Riparian Area, Biological Core Management Area, and Multiple Use Management Area per the County's Conservation Lands System, plus it is part of or next to potential wildlife linkages identified in the Arizona Wildlife Linkages Assessment, a collaborative effort of the Arizona Wildlife Linkages Workgroup in 2007.

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01 General

Record ID	Comment Number	Commenter Type	Comment Text
7117	23	Organization	The sulfuric acid solution leach pad and collection ponds and the process water temporary storage pond also present a direct threat to wildlife, especially birds that might come in contact with them. The sulfuric acid solution fumes are caustic and if inhaled damage lungs. When birds land on these acidic ponds they can directly ingest the polluted water often resulting in their death, plus it 3.removes natural oils from the birds' feathers making it impossible for them to fly resulting in their death via drowning or hypothermia.
7117	31	Organization	The proposed mine with a footprint of approximately 4,415 acres will create significant eyesore and will detrimentally affect the scenic resources of the area, will likely affect many species of wildlife and as stated above significantly and detrimentally affect wildlife habitat in the area.
7117	41	Organization	There are significant negative and unmitigable impacts of this proposed copper mine on the resources of the Coronado National Forest. They include impacts to water quality and quantity, impacts to wildlife, and impacts to recreation, among many others.
7121	1	Individual	The Santa Rita Mountains is a critical area of potential prey base for the jaguar according to a Smithsonian Magazine article of November 2007. It is also home to rare birds such as the spotted owl and the Apache Goshawk. If Rosemont Copper Project is approved over 4,000 acres of land is ruined for the wildlife. What studies have been conducted to determine the affects of blasting on wildlike throughout the Santa Rita Range and the jaguar if it's prey base is affected?
7122	3	Individual	I totally OPPOSE the Rosemont Mine for I believe it will have a negative impact on the envirement, the air quality and the wild live. I certainly don't think it has any long term positive impact on the economy either.
7125	2	Individual	WATER: There is a great potentiality that toxic heavy metals and other chemicals into ground and surface waters draining into Tucson area water supplies, and impacting nearby riparian areas such as Davidson Canyon. This would also imperil important wildlife habitat and future drinking water sources for residential use. More health issues here also…for us all!
7125	13	Individual	WILDLIFE AND WILDLIFE HABITAT: The Santa Ritas are recognized for the biological values and are an Important Birding Area (IBA). In addition, the Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of the Biological Core.
7125	36	Individual	Wildlife: Davidson Canyon is a wildlife corridor connecting the Empire Mountains in the south to the Rincon Mountains in the North. And with it's perennial water flow this riparian is vital to native wildlife along with the needle-spined Pinapple Cactus and Whiptail Lizard.
7126	8	Individual	This is an extremely fragile ecosystem and I believe the threats of such a large scale open pit mining operation to plant life and wildlife in this important natural habitat and wildlife corridor cannot be mitigated.

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Record ID	Comment Number	Commenter Type	Comment Text
7130	1	Individual	I have read through the information posted on Rosemont's web-site, and admit I am impressed with the fact that they plan to voluntarily take steps to minimize their impact on the environment. However, there are several areas I did not see addressed: -The Santa Rita mountains provide habitat for a variety of wild life, some of whom are endangered or threatened. Development of such a large area of the Santa Ritas will further threaten these native creatures by reducing their habitat. While I did see info on Rosemont's site concerning re-establishing plant life, what protections are there for the animals that will be displaced as a result of their operation. Will the EPS address this issue?
7134	46	Business	The Forest Service correctly identified the effects on vegitation and wildlife, including special-status wildlife, as a type of impact that needs evaluation in the EIS. It will, of cource, need to consult with the U.S. Fish and Wildlife Service on a variety of wildlife issues.
7140	1	Individual	Sirs: I am very much concerned about the wonderful birdwatching place - those, about 200 birds, will fly away, scared with the blasting of the mine and never come back.
7143	5	Organization	The proposed Rosemont mine will have significant, detrimental and irreversible impacts on our regional water quality and quantity, our wildlife, cultural and historic resources.
7145	5	Individual	The proposed mine would obstruct a major wildlife corridor and if undertaken would create a permanent scar on the landscape.
7151	5	Organization	It contains a unique ecosystem (mid-elevation oak grassland) that provides habitat for wildlife, valuable watershed features (headwaters of Davidson Canyon/Cienega Creek), critical water supply for Tucson, and important recreational opportunities (hunting, hiking, off-road vehicle riding, horse back riding, bicycle riding, camping, bird watching, etc) for the citizens of Southern Arizona.
7151	16	Organization	Other questions that should be answered by the EIS are: What is the current habitat condition and trend for riparian habitat, benthic, macroinvertibrate, and fish communities in the affected watershed? What species currently occur in or depend on the springs and perennial waters in this watershed and in what abundance?

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Record ID	Comment Number	Commenter Type	Comment Text
7151	18	Organization	Other questions that should be answered by the EIS are: What is the current habitat condition and trend for riparian habitat, benthic, macroinvertibrate, and fish communities in the affected watershed? What species currently occur in or depend on the springs and perennial waters in this watershed and in what abundance? Are any of these species listed as threatened, endangered, sensitive, or any other special status? What is their sensitivity to water quality degradation? What level of water quality do they require for survival? What are the potentials for damage to the aquatic communities and ecosystems from this project? Do present biological communities show any evidence of natural or man-made contamination caused by historic mining operations? If any aquatic species are harmed by this project how would their demise affect the food chain in the area? What is the potential for water catchments or storage ponds at the mine site to host invasive aquatic species that could harm native species? What are the possible impacts to the aquatic resources that could be affected by this project, and how would these impacts be mitigated? How would the aquatic life and habitat be monitored during the entire project from start of construction to end of reclamation?
7151	35	Organization	Recreational Uses The major concern is that elimination of this part of the Forest for recreational purposes will shift activities to already overcrowded places elsewhere in the Forest. What additional facilities will be made available to replace existing facilities that could be lost? Who will pay for them, taxpayers or the applicant? What will be the effect on wildlife of this shift?
7151	42	Organization	Concerns regarding the vegetation in the area that should be addressed in the EIS include: What are the short term direct impacts to the vegetation in the area? What are the long term, indirect impacts to the vegetation in the area? What are the important habitat types in the area? What is the current productivity of important habitat types in the area?
7151	53	Organization	Wildlife According to the Arizona Game & Fish, many species of wildlife in the Santa Rita Mountains would be "devastated" by any level of open pit mining in the Rosemont Valley because of loss of habitat, boundary effects of industrialization, loss of corridors and fragmentation of forage and prey opportunities. What are the wildlife species that are found in the area, or likely to be found, that may be affected by this proposal?

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Record ID	Comment Number	Commenter Type	Comment Text
7151	55	Organization	Wildlife According to the Arizona Game & Fish, many species of wildlife in the Santa Rita Mountains would be "devastated" by any level of open pit mining in the Rosemont Valley because of loss of habitat, boundary effects of industrialization, loss of corridors and fragmentation of forage and prey opportunities. What are the wildlife species that are found in the area, or likely to be found, that may be affected by this proposal? Which ones are threatened, endangered, species of concern, candidates for listing, or have other special status? What is the current condition and extent of the wildlife habitat in the project area, and the affected watershed? How would the project affect the wildlife and habitat? What physical and/or chemical agents would have the potential to cause harm to wildlife directly or indirectly? Which species were surveyed for and when were the surveys conducted? Were these surveys conducted over multiple years and seasons to get a true idea of what is there, due to the highly valuable rainfall in this area that strongly impacts how species reproduce, and how easily they'll be found? Will new biological surveys should be conducted over several years to account for population variability from variable rainfall, new listings, etc.
7151	57	Organization	New surveys for reptiles should be conducted over several seasons to account for variations in climate that make them more or less abundant. What is the projected wildlife mortality rate from the mine-related increase in traffic on Highway 83? Which species are most likely to be impacted by the increased traffic? How would the company mitigate this impact?
7152	7	Individual	According to Rosemont's own website, "Rosemont will be one of the largest copper mines in the United States." How can this NOT impact the environment, the water supply and its quality, the scenic beauty and recreational values, and the wildlife? Breathing, air quality, light pollution for Mt. Hopkins Observatory must be given high priority.
7153	7	Individual	WILDLIFE AND WILDLIFE HABITAT (1) What sensitive, threatened and endangered species might be affected by the mining proposal, and how will impacts on these species be mitigated? (2) How will natural habitat and wildlife corridors be affected by the mining proposal and a proposed pipeline? How will these impacts be mitigated?
7155	14	Organization	Transportation issues involved with this proposal appear to be overwhelming. There is no way that Scenic Highway 83, in its current condition, an handle the projected volume of traffic that will be generated by an operating mine in the area. Also, the scenic values of the highway will be compromised to the point of irrelevance should the mine be put into operation, and the exponential increase in traffic will have dangerous and far-reaching consequences for both humans and wildlife attempting to travel or cross the highway.

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Record ID	Comment Number	Commenter Type	Comment Text
7156	6	Individual	I support withdrawal of my federal lands from mining and, as mentioned above, am opposed to new mining in southeastern Arizona. I love birding and hiking and camping in the Santa Rita and Patagonia Mountains. and believe that the noise, water, and air pollution will detrimentally affect my public lands experience, as well as imperil the habitat of endangered species, increased truck traffic on local roads and highways, negatively affect the wildlife movement corridors and native plants and ecosystems.
7156	8	Individual	I support withdrawal of my federal lands from mining and, as mentioned above, am opposed to new mining in southeastern Arizona. I love birding and hiking and camping in the Santa Rita and Patagonia Mountains. and believe that the noise, water, and air pollution will detrimentally affect my public lands experience, as well as imperil the habitat of endangered species, increased truck traffic on local roads and highways, negatively affect the wildlife movement corridors and native plants and ecosystems.
7163	7	Organization	If the mines are developed, they have the potential to destroy extensive areas of habitat for imperiled wildlife and plants, including the endangered jaguar; degrade air quality; contaminate ground and surface water supplies; negatively impact scenic views; and eliminate current recreational use by a broad cross-section of local residents and visitors alike.
7163	16	Organization	Conservation and Research The proposed activities for the Rosemont Copper Project have the potential to significantly and detrimentally impact some of the most biologically important areas and wildlife habitat in Pima County as identified in the County's Sonoran Desert Conservation Plan. The Project area occurs entirely within the County's Conservation Lands System, including the specific designations of Important Riparian Area, Biological Core Management Area, and Multiple Use Management Area. In Addition, the affected lands contain numerous "Special Elements" Pima County has committed to conserve, including springs, limestone outcrops, intermittent streams, oak/ grass ecotone, mesquite, and un-incised floodplain. It is paramount that impacts to these ecologically sensitive and important lands be fully considered in the EIS.
7163	19	Organization	How will the project impact the native flora and fauna of the area for generations to come?
7163	38	Organization	Questions to be answered in the EIS: What are the potential ecosystem and health-risk effects of contamination and point and nonpoint source pollutions resulting from mine operations, especially with regard to uranium, lead, arsenic, thorium and other hazardous materials used and generated during and after the life of the mine's operations? Which pollutants pose the greatest human and ecosystem health risks, and how much of these will be emitted into the environment? What would be the human and wildlife-health related impacts of increased pollution due to mining operations?

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Record ID	Comment Number	Commenter Type	Comment Text
7163	40	Organization	Water pollution Questions to be answered in the EIS: What are the potential risks of surface and groundwater pollution from mining operations? What water contamination prevention measures are proposed, and are they sufficient to safeguard sources of water vital to the health of human and natural communities? Is there a risk that wildlife will drink contaminated water on-site, bringing contaminants off site and into the greater ecosystem?
7163	41	Organization	Light Pollution Questions to be answered in the EIS: How will light pollution from the mining operations impact the surrounding environment, including avoidance of the area by nocturnal wildlife species, and/or impacts upon foraging behavior and mitigation of birds and bats?
7163	56	Organization	Threatened, Endangered, Vulnerable, Sensitive Species & Habitat The Santa Rita Mountains have long been recognized as an ecologically diverse and sensitive mountain range. The mountains, surrounding grasslands and desert are a globally-important biodiversity hotspot, providing important habitat for many species of birds, reptiles, amphibians, bees and plants. The Santa Rita Mountains are a designated area of biological concern and a wildlife corridor that connects isolated habitats from central Arizona into northern Mexico at a regional scale.

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7163	59	Organization	In addition to the proposed Rosemont Mine, there are currently several proposed large new hardrock mines in close proximity to one another on the Coronado National Forest land: the Hardshell mine; the Four Metals mine; the Providencia Project; Humbolt Canyon; and the Margarita Mine. In each of the decision memorandums approving the mining CEs, the Forest Service states that the "District Wildlife Biologist determined that the proposed action would have no effect on Federally listed threatened and endangered species known to occur in the project area." From the information provided, it appears that the Forest Service did not consult with FWS, but instead summarily reached its "no effect" determination. The Forest Service's no effect determination is contradicted by the best scientific data available. The Patagonia Mountains, Santa Rita Mountains and surrounding areas (including the California Gulch area where the proposed Margarita Mine is located) have been identified by leading biologists as "ideal habitat" for the jaguar, and the Arizona Game and Fish Department in 2003 identified the Patagonia Mountains as a "hotspot" for jaguar distribution, noting that it was part of an area where 55% of all historic jaguar sightings had occurred (Hatten 2003). The Patagonia and Santa Rita Mountains were both included within a zone identified as "the most suitable conservation area" for jaguars within the state of Arizona. In addition to the wide-ranging jaguar, additional species listed under the ESA are known to occur in the region and thus may be directly or indirectly affected by concurrent mining projects, including: Chiricahua leopard frog, Gila chub, Gila topminnow, Longfin dace, Lowland leopard frog, Arizona shrew, Swainson's hawk, rufous-winged sparrow, Giant spotted whiptail, Pima pineapple cactus, western red bat, Mexican long-tailed bat, pale Townsend's big-eared bat, Lesser long-nosed bat, Mexican spotted owl and the Sonoran desert bald eagle. Because the road construction, vegetation clearing, habitat destruction and increased traffic resulting from numerous mine exploration and development projects would adversely affect habitat for these species, the Forest Service's failure to initiate section 7 consultations, and its previous determinations that the mining projects would have no effect on listed species, is arbitrary and capricious and unlawful under the ESA.
7163	62	Organization	To comply with Endangered Species Act section 7(a)(2) safeguards, the federal agency taking action and FWS must initiate a cooperative analysis of potential impacts to listed species and their designated critical habitat known as a consultation process. Federal agencies must consult with FWS when their actions "may affect" a listed species or designated critical habitat. 50 C.F.R. ss 402.14(a). Federal agency actions include those projects "authorized, funded, or carried out by such agency." Id. "Action area" is defined broadly under the ESA implementing regulations to include "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." 50 C.F.R. ss 402.02. It is imperative that the EIS consider negative impacts to all species, including species of concern (state), or vulnerable (Pima County). In addition to these "listed species", we anticipate negative impacts to more common species such as white-tailed deer, black bear, mountain lion, bobcat, javelina, northern gray hawk, ornate box turtle, Sonoran desert tortoise, among many others.

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Record ID	Comment Number	Commenter Type	Comment Text
7163	63	Organization	The proposed mine operations are projected to significantly increase truck traffic along State Scenic Route 83. This presents another wildlife-related concerns: negative impacts to landscape-level habitat connectivity and wildlife/ vehicle collisions. State Route 83 bisects portions of the "Rincons-Santa Ritas-Whetsons" wildlife linkage indentified in the ADOT-sponsored Arizona Wildlife Linkages Assessment (Nordhaugen et al. 2007). A detailed linkage design and report has been developed in conjunction with Northern Arizona University for this area (Beier et al.2007). This report states: "State Route 83 (Sonoita Highway) lies between the Santa Rita Wildland block and other two Wildland blocks. Only moderate traffic now occurs on this 2-lane road, so it is not a major barrier today. However, if the road is widened or traffic increases significantly, it could become less permeable to wildlife". The EIS must address the potential impact to landscape-level habitat connectivity.
7163	65	Organization	Questions to be answered in the EIS: What direct and indirect impacts to threatened, endangered and sensitive species and their occupied and potential habitats will likely result from numerous proposed hardrock mining operations on the Coronado National Forest? How will mining operations impact core habitat and wildlife linkages in the affected area? Will increased truck traffic on State Route 83 result in increased vehicle-animal accidents, and if so, what is the projected number of increased roadkills per year, and how will vehicle-animal accidents impact wildlife populations, genetic exchange, human safety and economic damages incurred from wildlife-related accidents?
7166	2	Individual	I am writing with concerns I have about the proposed Rosemont Mine. I am a child welfare social worker in Pima County and my elderly parents live in Green Valley near and open pit copper mine. My objections to this mine are based on the following areas of concern. WATER: It's well documented that the Rosemont mine's operations will require a large quantity of precious groundwater. This groundwater pumping will lower the water table and could affect the viability of wells in the surrounding area, as well as creating potential environmental impacts to wildlife corridors and plant life. Will this concern be addressed in the environmental impact study? Also, how can Pima County citizens be sure that Rosemont mine's use of groundwater is a wise choice if our state encounters a long-term, serious drought and this water is needed by people and wildlife?
7166	7	Individual	HEALTH: The environmental hazards of open pit mining are well documented. How will the Augusta Corporation protect the public, wildlife and any threatened animal species, and surrounding natural ecosystem from potential water and air pollution?
7166	20	Individual	QUALITY OF LIFE: I have heard that the blasting and mining operations will go on 24 hours daily at this time. How will the noise, vibration, and lighting from the mine affect people living in the area and what will be the effect on wildlife? I would be very concerned that nearby residents' ability to sleep would be impacted. Will the environmental impact study address such issues?

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Record ID	Comment Number	Commenter Type	Comment Text
7167	3	Individual	The billions of gallons of water required for development and operation of the mine, in any configuration, will be delivered at the expense of the environment, including water tables near and far, impacting habitat far beyond the mine's proposed boundaries, including Cienega Creek and even the Babocomari and San Pedro Rivers. The consumption of water and lowering of water tables is certain to greatly impact nearby residents and communities, also, and this impact must be examined. A complete study of the effects of water consumption must be conducted, and conducted comprehensively, realistically, and independently.
7171	3	Individual	The billions of gallons of water required for development and operation of the mine, in any configuration, will be delivered at the expense of the environment, including water tables near and far, impacting habitat far beyond the mine's proposed boundaries, including Cienega Creek and even the Babocomari and San Pedro Rivers. The consumption of water and lowering of water tables is certain to greatly impact nearby residents and communities, also, and this impact must be examined. A complete study of the effects of water consumption must be conducted, and conducted comprehensively, realistically, and independently.
7175	1	Individual	I am writing to identify and discuss an issue that should be addressed in the Environmental Impact Statement (EIS) for the Rosemont Copper Project: the effects of the project on roosts and foraging habitat for bats. In the Notice of Intent, this topic is part of an issue listed in the "Preliminary Identification of Issues:" effects on vegetation and wildlife, including those having special-status designations by the U.S. Fish and Wildlife Service (USFWS), Arizona Game and Fish Department, Forest Service, Region 3 Regional Forester, and Forest Plan.
7175	3	Individual	Most people do not think about bats when considering the effects of a project on wildlife. However, bats are an integral part of the ecosystems in which they live. Unfortunately, many species of bats in the U.S. are declining, primarily from human disturbance to their roost sites and loss of foraging habitats. The Rosemont Copper Project may destroy roost sites, and will certainly destroy foraging habitat. It may also negatively affect reproductive success and drinking water quality. These issues must be addressed in the EIS.

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7175	8	Individual	One cannot determine the significance of a roost site by the number of bats or guano present. Surveys for all species of bats should be conducted throughout the action area. The standard accepted protocol for surveying caves and mines, written by Scott Altenbach, is to conduct multiple internal surveys at the same site in different seasons to look for bats or bat sign. External surveys (sitting outside the entrance of a cave or mine waiting for bats to emerge) are safer than internal surveys but can only determine presence, not absence. The recommendation for a site where external surveys have yielded only negative data must be to preserve and protect the site. Many people think that if bats lose one roost site, they can just fly to another one nearby. In fact, the characteristics of what makes a particular mine or cave suitable for bats is complex, and varies not just among species, but between the sexes of the same species and the time of the year. Most abandoned mines and caves are not used by bats. If roosts are found in the action area and plans are to destroy the area, careful decisions must be made based on knowledge of the species' ecology. The use of roost sites by bats must be looked at from a landscape level, and decisions on closing a particular site must be made with the knowledge of how that species uses all the sites in an area. Closing one particular, even when there are other occupied sites in the area, can cause the bats to abandon the area. A colleague of mine working with Townsend's big-eared bats witnessed this unfortunate situation in Nevada. Foraging areas for insectivorous bats are lost when natural vegetation (harboring insects or being eaten by them) is altered or destroyed. Different species of bats forage on different insects and have different maximum commuting ranges from their day-roosts. The Forest Service should know which species of bats forage in areas where vegetation will be destroyed by mine operations, and how far these foraging areas are from the roost site. The loss of foraging areas close to roosts, particularly maternity roosts, will have a greater negative effect on the bats than those areas farther away. The diversity of bats in the Santa Ritas, the diversity of foraging habitats, and the changing foraging patterns of the bats throughout the year makes it difficult to describe how special-status species and others will be affected by mine operations. However, a determination of effect cannot be made without this information.

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Record ID	Comment Number	Commenter Type	Comment Text
7175	9	Individual	Other issues concerning bats Reliable water sources for drinking are important to bats in arid climates, particularly during the dry months and when mothers are lactating. It is generally thought that roosts need to be close to water source (Adams 2003). This is particularly true for maternity colonies where mothers must fly out to drink and eat, and then return to nurse their young. Altering or removing water sources could affect the reproduction of local bat populations and possibly their survival. There is some evidence that females and young select water sources that contain the highest amount of dissolved calcium (Adams 2003). Because most bats produce only one young per year, a decline in reproductive success will affect population dynamics, and recovery from a severe decline is slow. Surface water sources ma be affected by mining operations by being buried, contaminated, or through groundwater removal. A simple action such as removing or not maintaining a cattle tank may negatively affect a colony, particularly if there are not other similar sources of water nearby. Altering the size of a water source, or access to it, affects which species can use it; a smaller water-surface area prevents less agile species from drinking. The Forest Service must determine how the project will affect surface water quantity and quality within the project footprint, and throughout the action area. If the mine becomes operative, all water sources must be monitored for quantity and quality throughout the life of the mine, and negative effects corrected promptly and adequately. Bats are sensitive to light and noise. The mine will produce large amounts of both. The effect of artificial light on bats is a complex issue, varies with species, and is not fully understood. However, if the mine operates as planned, 24 hours a day, those bats sensitive to light may avoid former foraging places near lighted areas. Increased traffic on roads and noise from the mine will likely have a negative effect on gleaning bats, such as pallid bats. In a controlled experiment, gleaning bats, which listen for sounds made by their prey, avoided foraging under continous broadband noise, and to some extent, under transient traffic noise. Traffic noise had a negative effect on the foreging success of gleaning bats up to distances of 50 meters (Schaub 2008). Heavy metals associated with mining operations can accumulate in bats; arsenic, copper, lead, mercury, and zinc are among the metals ingested by bats and found in their carcasses (Adams 2003). Insects that feed on plants contaminated by mine operations are ingested by bats. A study of bats living five miles from a copper smelter neat Morenci, Arizona found that the bats had taken up atmospheric mercury accumulated through the terrestrial food chain (Adams 2003).
7175	20	Individual	I have spent considerable time in writing these comments because I think most people are not aware of how difficult it is to obtain information on bats in the field, how different species are in their roosting and foraging requirements, and how vulnerable they are to changes in their environment. Bats as a group, and particularly the endangered and special-status species, must be given the same consideration as other species of wildlife in determining the effects that the proposed project will have on them.

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Record ID	Comment Number	Commenter Type	Comment Text
7184	2	Individual	Manganese, selenium, thallium. lead, copper, zinc, cadmium, aluminum, iron, and arsenic are all potential products of acid mine drainage. These toxic substances, together with sulfuric acid which can be 20-300 times more acidic that acid rain, can impact mammals, riparian vegetation, and most importantly, human health. Acid mine drainage can last for thousand of years and cost millions of dollars to manage.
7188	5	Individual	Humans and wildlife would suffer illness and death.
7192	4	Organization	The project as proposed will impact water resources and riparian areas both within and outside the project area. This includes impacts to washes, creeks, springs, and riparian habitat, including Davidson Canyon and Cienega Creek. Both Davidson Canyon and Cienega Creek are within Pima County's Cienega Creek Natural Preserve, while Cienega Creek has been recognized as a national treasure and is protected within the Las Cienegas National Conservation Area. Both areas provide crucial habitat to numerous wildlife species
7192	13	Organization	CAP water is notorious for compiling the contaminants from agricultural and industrial processes throughout the Colorado River Basin, as well as for spreading invasive aquatic species and diseases. Bringing these contaminants into such a relatively pristine basin poses obvious threats to the area's human and wildlife populations.
7192	18	Organization	Impacts to important wildlfe linkages: This project will have significant impacts to wildlife linkage zones present in and adjacent to the project area. A recent important study should be especially considered when evaluating these impacts. The Arizona Wildlife Linkages Workgroup completed the Arizona Wildlife Linkages Assessment (Arizona Wildlife Linkages Workgroup 2007). This statewide assessment identified 152 potential linkage zones in Arizona, three of which are in or adjacent to the project area. Furthermore, the assessment identified important habitat blocks; the project area lies almost completely within one of these blocks. Of particular note is that one of these potential linkage zones (San Xavier to Sierrita - Santa Rita, Zone 92) was classified as one of 28 "high priority" linkage zones. The workgroup assessed both the biological value and threat and opportunity value of each zone and those that fell in the top quarter of both values were designated as "high priority." The biological imprtance score was dependent on the "size and habitat quality of habitat blocks and the ability of the zone to support special status species, aquatic ecosystems, and seasonal migrations." The threat and opportunity score was dependent on the "barrier effect of canals, roads, urbanization, and railroads" (threat) and "ongoing and proposed conservation efforts [along with] whether impending major road projects provide the opportunity to increase permeability of roads" (opportunity). Given the presence of multiple critical wildlife linkage zones in or adjacent to the project area, it is essential that the full range of impacts to these linkage zones be considered in the EIS. Impacts include habitat fragmentation from the open-pit mine and associated tailings piles and waste facilities; excessive noise; road construction; and an increase in large truck traffic on I-10 and SR 83 and related impacts to wildlife crossing areas.
7197	2	Individual	In addition to providing a safe haven for wildlife in their evershrinking frontier, this area is a critical anchor for the humanity of Tucson

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Record ID	Comment Number	Commenter Type	Comment Text
7197	6	Individual	The inadequacy of water resources has been eloquently stated by many others - suffice it to say - I am intimately familiar with the fragile balance of water in this watershed from having designed the commemorative poster for the Las Cienegas National Conservation Area, across the highway and in direct path of the impact of the mine, which hosts the best remaining intact populations of native desert fish in the state, such as the longfin dace and the Gila topminnow. For more information on this, you can read the description in that poster on my website at: <http://home.mindspring.com/~matilda/lcncafront.htm>.
7197	11	Individual	From the tailings dust to the road traffic to the sound and light pollutiont to the habitat fragmentation, this mine would destroy the beauty of this valley, and in doing so, the lives and incomes of many who have investing years into building their homes and careers around it.
7198	7	Organization	The company also has committed to create a 25 million dollar endowment to be managed by Arizonans to benefit local communities. In addition, $500,000 will be donated by the company annually during mine operations to be used for the preservation of open space, mitigation of wildlife habitat and to meet other community needs.
7200	5	Organization	For the Rosemont Copper EIS, the Environmental Baseline includes a complete list of currently threatened and endangered species of both plants and animals and the current status of each, including whether they are stable, declining or improving. It must also include a full description of the wildlife habitat found in the area and current condition of that habitat, including current fragmentation, presence of invasive species, and other ongoing activities, even those conducted by other agencies that are currently impacting the habitat. It must also include current status of formal species and habitat protections that exist on in the area, most notably the designations under Pima County's Sonoran Desert Conservation Plan (SDCP) Conservation Land System (CLS).
7200	12	Organization	Impacts to Species The EIS must fully outline the impacts to all species present in the project area

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Record ID	Comment Number	Commenter Type	Comment Text
7200	14	Organization	Impacts ot Wildlife Linkages The EIS must consider impacts to wildlife linkage zones present in and adjacent to the project area. There are two previous efforts that should be especially considered when evaluating impacts to wildlife linkages. First, Pima County's Sonoran Desert Conservation Plan identified six "Critical Landscape Connections" in Pima County. One of these critical landscape connections, across the I-10 corridor along Cienega Creek, lies due north and adjacent to the project area. Critical landscape connections are defined in section (1) above. Second, in 2007, the Arizona Wildlife Linkages Workgroup completed the Arizona Wildlife Linkages Assessment (Arizona Wildlife Linkages Workgroup 2007). This statewide assessment identified 152 potential linkage zones in Arizona, three of which are in or adjacent to the project area. Furthermore, the assessment identified important habitat blocks; the project area lied almost completely within one of these blocks. Of particular note is that one of these potential linkage zones (San Xavier to Sierrita - Santa Rita, Zone 92) was classified as one of 28 "high priority" linkage zones. The workgroup assessed both the biological value and threat and opportunity value of each zone and those that fell in the top quarter of both values were designated as "high priority." The biological importance score was dependent on the "size and habitat quality of habitat blocks and the ability of the zone to support special status species, aquatic ecosystems, and seasonal migrations." The threat and opportunity score was dependent on the "barrier effect of canals, roads, urbanization, and railroads" (threat) and "ongoing and proposed conservation efforts [along with] whether impending major road projects provide the opportunity to increase permeability of roads" (opportunity). Given the presence of multiple critical wildlife linkage zones in or adjacent to the project area, it is essential that the full range of impacts to these linkage zones be considered in the EIS. Possible impacts include: major habitat fragmentation from the open-pit mine and associated talings piles and waste facilities; excessive noise; construction of new roads; an increase in large truck traffic on SR 83 and related impacts to wildlife crossing areas; and loss of downstream surface water resources from new dams.
7201	9	Organization	It is our position that the United States Forest Service should insist on and participate in an extensive study to reveal the entire spectrum of negative impacts of open-pit mining on the following areas: Water quantity Water quality Depletion of the water table affecting agriculture on the west side of the Santa Rita Mountains Road access, highway safety and highway maintenance Impact on "Scenic Byway" Highway 83 Habitat fragmentation

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Record ID	Comment Number	Commenter Type	Comment Text
7202	13	Individual	6. Regarding Davidson Canyon; what is the impact of the decision by the U.S. Army Corps of Engineers to suspend the designation of the Santa Cruz River and its tributaries as a navigable river? Will the resulting ease of the discharge of waste increase the amount of groundwater contamination by Rosemont via Davidson Canyon? How will this decision impact the Davidson Canyon? How will contamination be controlled and who will be responsible for such control? What is the impact on the water flow and quality of water, vegetation, and wildlife in the Cienega Creek area?
7211	7	Individual	Another aspect of pumping ground water for mine use is that it could damage caves in the area (and there are many) by draining water that keeps the caves environments humid. Caves in the region of the proposed Rosemont project have known archaeological sites as well as unique biological communities, and these would be irreparably impacted if water pumping were done to close to the caves, and because of the nature of the caves and the locations in which they occur, localized recharge would not be a viable means of protecting them.
7212	7	Individual	Another aspect of pumping ground water for mine use is that it could damage caves in the area (and there are many) by draining water that keeps the caves environments humid. Caves in the region of the proposed Rosemont project have known archaeological sites as well as unique biological communities, and these would be irreparably impacted if water pumping were done to close to the caves, and because of the nature of the caves and the locations in which they occur, localized recharge would not be a viable means of protecting them.
7222	2	Individual	The proposed mine site is situated in a critical area for wildlife habitat, recreation, and perhaps most importantly, the watershed for Pima County's Davidson Canyon Natural Preserve.
7222	8	Individual	There will be inevitable degradation of air quality, destruction of scenic views , negative impacts on tourism-related business, adverse impact on wildlife and wildlife habitat, and a slap in the face of our Sonoran Desert Conservation Plan.
7223	2	Individual	I am lodging a complaint regarding the proposed Rosemont Mine Project. I have frequently visited Sonoita area from my home is Seattle, Washington, and I have co-facilitated workshops at the Epona Center at the Apache Springs Ranch. I am disturbed to hear that a mine is even being considered in this beautiful historic area, which would be forever marred by the irreparable damage a mine would cause to the landscape, the wildlife, and the environment, much less the rare peace and quiet I have experienced there, which is so unique and such a contrast to the now urbanized desert cities of Phoenix and Tucson.
7228	2	Individual	The problems that will be caused by mining in the Rosemont Ranch area are many, including damage to wildlife and wildlife habitat, increased truck traffic in an area that is a scenic byway and not meant for heavy use by mining equipment.
7230	3	Individual	It is worrying to think of the impact it will have on the wildlife, trees and vegetation that will be destroyed and the pollution that will do doubt affect the surrounding area.
7253	8	Organization	The Rosemont Valley provides unique habitat for wildlife, recreational opportunities such as hunting, hiking, off-road vehicle riding, horse back riding, bicycle riding, camping and bird watching.

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Record ID	Comment Number	Commenter Type	Comment Text
7253	12	Organization	The EIS should also consider what other nearby areas of the Coronado National Forest provide these same features and opportunities for the wildlife and people of Southern Arizona.
7253	14	Organization	The EIS should also consider what other nearby areas of the Coronado National Forest provide these same features and opportunities for the wildlife and people of Southern Arizona. How would Augusta/Rosemont Copper replace the habitat and recreational opportunities that would be lost during the life of the mine and after? The amount and types of land disturbance that would result from this proposal must be considered.
7253	27	Organization	Important considerations are the impact of air and dust pollution on the health of both employees and area residents, region- wide visual impact on scenery and view sheds and the impact on plant and animal life.
7253	36	Organization	- What species currently occur in or depend on the springs and perennial waters in this watershed an in what abundance?
7253	38	Organization	- What are the potentials for damage to the aquatic communities and ecosystems from this project. - Do present biological communities show any evidence of natural or man-made contamination caused by historic mining operations? - If any aquatic species are harmed by this project how would their demise affect the food chain in the area? - What is the potential for water catchments or storage ponds at the mine site to host invasive aquatic species that could harm the native species? - What are the possible impacts to the aquatic resources that could be affected by this project, and how would these impacts be mitigated? - How would the aquatic life and habitat be monitored during the entire project from start of construction to end of reclamation?
7253	51	Organization	Since the mine would require additional electrical power equivalent to the demand from a medium sized city of 130,000 people, several impacts need to be investigated: -Damage to animal and plant life, scenery and property values from the increased infrastructure (transmission lines, substations, etc.) that would be required.
7253	62	Organization	HEALTH IMPACTS A number of questions need to be answered with respect to the health risks associated with the proposed mine: -What are the types of chemicals that would be used at the mine, and how would they affect people and animals if they were released into the environment?
7253	64	Organization	HEALTH IMPACTS A number of questions need to be answered with respect to the health risks associated with the proposed mine: -What are the types of chemicals that would be used at the mine, and how would they affect people and animals if they were released into the environment? -What are the concentrations proposed for use at the mine and at what concentrations do they become harmful to people or animals?
7253	69	Organization	The mine would cause many land disturbances, including loss of recreational land, loss of wildlife habitat and corridors, loss of open space, and viewsheds.

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Record ID	Comment Number	Commenter Type	Comment Text
7253	74	Organization	-Where is the nearest similar location that the displaced wildlife can use for habitat, foraging, breeding or migration?
7253	88	Organization	-How much would the aquifer be drawn down as a result of pit dewatering? -How far from the pit would the effects of dewatering occur? -How would this impact Davidson Canyon and the springs in the area? -How would the dewatering of these local resources be mitigated by Augusta? -How would Augusta compensate the public for the loss of wildlife watering locations, impacts to vegetation from lowering of the water table, and the general loss of riparian areas from pit dewatering?
7253	94	Organization	RECREATIONAL USES The major concern is that elimination of this part of the Forest for recreational purposes will shift activities to already overcrowded places elsewhere in the Forest. -What additional facilities will be made available? -Who will pay for them, taxpayers or the applicant? -What will be the effect on wildlife of this shift?
7253	131	Organization	An additional water consideration should be the effect on plant and animal life of any pipelines that are built to transmit water from well sites to the mine site. The impact from the pipe line construction must also be evaluated and a mitigation plan should be in place.
7253	135	Organization	WILDLIFE According to Kurt Bahti (Arizona Game & Fish) many species of wildlife in the Santa Rita Mountains would be "devastated" by any level of open pit mining in the Rosemont Valley because of loss of habitat, boundary effects of industrialization, loss of corridors and fragmentation of forage and prey opportunities. -What are the wildlife species that are found in the area, or likely to be found, that may be affected by this proposal? -Which ones are threatened, endangered, species of concern, candidates for listing, or have other special status? -What is the current condition and extent of the wildlife habitat in the project area, and the affected watershed? -How would the project affect the wildlife and habitat? -What physical and/or chemical agents would have the potential to cause harm to wildlife directly or indirectly? -Which species were surveyed for and when were the surveys conducted? -Were these surveys conducted over multiple years and seasons to get a true idea of what is there, due to the highly variable rainfall in this area that strongly impacts how species reproduce, and how easily they'll be found? -Will new biological surveys should be conducted over several years to account for population variability from variable rainfall, new listings, etc.
7253	137	Organization	What is the projected wildlife mortality rate from the mine-related increase in traffic on highway 83? Which species are most likely to be impacted by the increased traffic? How would the company mitigate this impact?

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Record ID	Comment Number	Commenter Type	Comment Text
7259	1	Individual	The Tucson Herpetological Society is an organization dedicated to conservation, education, and research concerning the amphibians and reptiles of Arizona and Mexico. The Tucson Herpetological Society on behalf of our membership want to facilitate the Forest Service NEPA precess by voicing our concerns of how the proposed Rosemont Copper mining operation might affect the herpetofauna and other wildlife of the area. It is our opinion that Coronado National Forest as well as the entire Cienega Creek watershed could be adversely affected by an operation of this magnitude.
7259	3	Individual	Fish and amphibians are extremely sensitive to water quality. Further more, these animals are low on the food chain supporting an entire ecosystem.
7259	5	Individual	Invasive Species A hazardous byproduct of mining operations is water catchments or reservoirs that support invasive aquatic species and could potentially devastate native aquatic ecosystems down stream and throughout the watershed. Many of the worst aquatic invasive species like green sunfish, crayfish, and bullfrogs depend on man made water impoundments to thrive in our arid climate. These populations become breeding sites with dispersal events throughout the wet seasons. Bullfrog dispersals have been documented to cover a radius of 8 miles from the source population in one summer. Piping water from the Central Arizona Project could bring invasive aquatic pests to the facility threatening the entire watershed. The Rio Grande leopard frog is an introduced species to the Colorado River that hybridizes with our native lowland leopard frogs producing sterile offspring. There is potential for these invasive species to be transported via CAP water to the Cienega Creek watershed.
7259	6	Individual	Loss of Habitat The immediate area of the proposed mine and the surrounding National Forest are habitat for many often overlooked reptiles and amphibians as well as other wildlife.
7304	2	Individual	We are deeply concerned about putting in the Rosemont Mine for the following reasons: destruction of the headwaters into Davidson Canyon which would affect water to Cienega creek & the Pantano Wash & cause adverse conditions to the wildlife living in the mountains.
7311	3	Individual	Has there been a study of the ecological impact upon the area's flora and fauna of the proposed mine?
7313	8	Individual	What are the impacts of dust and chemical dust suppressants on the health of the Area residents, wildlife, and vegetation?
7313	12	Individual	4. How will the proposed mine operations affect wildlife and vegetation in the area?

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Record ID	Comment Number	Commenter Type	Comment Text
7313	38	Individual	11. There is a concern that Scenic Highway 83 does not have the capacity for mine-related traffic. This highway is narrow with inadequate shoulders and has poor traffic visibility. Without major improvements, Scenic Highway 83 will not be able to safely handle the increased traffic from mine operations. The Highway is especially unsafe from Marker 44 to Interstate 10. Large trucks are routinely encountered driving over the centerline in this area because the roadway is narrow and often has not shoulders on either side of the road. What consideration will be given to the safety of the many bicyclists who enjoy riding along Scenic Highway 83? What measures are being taken by Rosemont to ensure that heavy mining traffic does not damage the pavement or make the road even more dangerous than it now is? Who will be responsible for improving and maintaining the road? What consideration is being given to the fact that free-roaming cattle can oftentimes be found on the "wrong side of the fence"? What planning is being done in consideration of the wildlife whose migratory paths intersect Scenic Highway 83?
7316	10	Organization	2)□The impacts on listed species (Threatened, Endangered, Sensitive, Species of Special Concern) such as losses due to: a.□Habitat fragmentation and migratory routes disrupted by roads, fences, power lines and greatly increased traffic.
7316	15	Organization	f.□Degradation or outright loss of habitat.
7323	2	Individual	Please see the attached picture of the deer which are on our property. We've had as many as 30 at one time. This mine will adversely affect the wildlife, including but not limited to mule deer, white-tailed deer and the many species of birds. How will this be mitigated?
7325	2	Individual	I am opposed to the pit mine and would like a reconsideration of the environmental impact on the wildlife, as well as, a second look at how this mine will economically impact tourism and ranching in this specific area.
7327	8	Individual	The loss of wildlife, habitat, and recreation on the proposed mine site and dump.
7327	16	Individual	The loss of hunting, camping and hiking opportunities; wildlife corridors; disruption of runoff waterways; and, potential to harm or disrupt freshwater springs.
7328	7	Individual	What about wildlife and recreational areas nearby?
7329	5	Individual	Imagine wildlife whose home will be destroyed; where will they go? how will they live? What will happen when they disappear?
7334	3	Individual	First, the environmental impact is not negligible. This includes the scenic impact, the impact to wildlife and the impact to water and air quality in the Corona de Tucson and Green Valley area.
7334	7	Individual	It will also likely lead to health impacts to the human and wildlife inhabitants.
7336	26	Individual	Environment- The Rosemont Mine's proposed plan will completely destroy over 4,000 acres of land. Identify all flora and fauna that live here full time, part-time, and migrate through this wild corridor connecting Northern Mexico to the Rincon's , the Catalina's, and central Arizona...

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Record ID	Comment Number	Commenter Type	Comment Text
7336	28	Individual	Environment- The Rosemont Mine's proposed plan will completely destroy over 4,000 acres of land. Identify all flora and fauna that live here full time, part-time, and migrate through this wild corridor connecting Northern Mexico to the Rincon's , the Catalina's, and central Arizona... Specifically look at the risk to Tarahumara frogs, recently reintroduced in the Santa Rita's. Copper mine runoff is considered to be the most likely reason for their extirpation from Arizona in 1983, according to the Fish and Wildlife website. How many other threatened or endangered species exist here? How thorough can a handful of wildlife surveys be? How will all of the animal and plant species be affected by crushing, burying, heavy machinery, construction, chemical storage and ore processing facilities, blasting, lights, noise, dust, traffic, exposed contaminated surface water, rock and soil, exhaust, fumes, etc.?
7340	3	Individual	The area aforementioned within the Coronado National Forest are recognized biodiversity hotspot. The Santo Rita Mountains and surrounding desert and grassland areas are globally recognized for the diversity of birds, reptiles, amphibians, bees and plants.
7340	12	Individual	Destruction of wildlife habitat, wildlife movement corridors, native plants and ecosystems.
7343	4	Individual	Streams with high metal concentrations will not support desirable plant and animal life. Streams with a pH less than 4 are usually sterile except for acid tolerant bacteria and algae.
7348	15	Individual	3) Other impacts: A) A vital wildlife corridor, identified by the Sonoran Desert Conservation Plan will be disrupted.
7349	2	Individual	Please don't allow another travesty in beautiful and majestic Arizona to be developed by yet another large corporation which has no concern for your local quality of life for humans or the welfare of local wildlife.
7359	3	Individual	I wonder how it is that you can sell off not only the beauty of this area, but also the communities and their livelihoods to people who, not only don't live in our country, but don't care about the people, the wildlife and the natural beauty and resources of this area. You were entrusted with the stewardship of this land, and to approve this would betray the people, the land, and the history of the area. Once it's gone, it's forever.
7364	7	Individual	Having spent the past year not only working at, but also living at the Espona Center at Apache Springs Ranch, I have had a unique opportunity that few others share. In how many places can one still walk about in the night and be guided only by the light of the full moon, or look up on a clear evening at the wonder of a star filled sky? I've not only had the pleasure of spending hours enjoying the horses of the Espona herd, but have also watched in amazement as a bobcat wandered by in broad daylight, listened as a young mountain lion called for its mom in the late hours of the morning, and watched deer, foxes, and skunk move about the property on a daily basis. To sit and enjoy the setting sun in the company of hawks, owls, woodpeckers, hummingbirds and a multitude of other splendid birds is amazing. Who is it that is looking out for the interests of these magnificent creatures during this process?

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Record ID	Comment Number	Commenter Type	Comment Text
7371	4	Individual	Liabilities: 1. Draining potable water supply, which is more precious than copper, to thousands of residents. Contaminating water supply with toxins, that will be there forever, that wildlife and plants need to survive..
7374	2	Individual	This is not even limiting access to preserve the area but permitting a process that has significant impact on the beautiful natural setting and wildlife in the area
7377	2	Individual	Not only would this irreparably scar the land, it would displace the wildlife and destroy the ecosystem.
7379	7	Individual	The noise of heavy mining equipment, the added danger on a two lane scenic highway of 88 roundtrips daily of mine related vehicles, including 56 twenty four ton ore trucks, daily blasting, (seven days a week) air pollution from windblown dust and sulfuric acid and diesel fumes, the unlimited pumping of groundwater, destruction of wildlife habitat on the West side, is totally incompatible with the Peace and Serenity and... Conservation of the East side of Highway 83!
7379	10	Individual	There will be no peace for anyone in the Sonoita Valley and surrounding communities, nor for wildlife, if this mine is approved by the Forest Service... and this government agency will have failed to honor it's motto--"Caring for the Land and Serving the People."
7405	3	Individual	The risk to the wildlife is not worth the monetary human gain. I urge you to put a stop to this travesty before it's too late.
7410	1	Individual	We plead with you to please help this community, including all the wonderful birds, bears, deer, mountain lions that will be sacrificed for a mine owned by foreign companies and investors.
7419	10	Individual	For the wildlife that suffer or are killed, you will be responsible.
7431	2	Individual	Importantly, the general area of the proposed mine is a vital wildlife corridor between the Santa Ritas and the Rincon Mts.
7442	2	Individual	Mining not only destroys habitats, but historically, mining companies have been hit with violations, more often than not. When regulations fail, we are left with those consequences.
7443	3	Individual	One of the places we love to enjoy, relish and share is the Santa Rita mountains, part of the Sky Island bioregion. Designated a World Biodiversity Hotspot by Conservation International, this region is both ecologically rich and imperiled by human development.
7443	14	Individual	And then there's loss of habitat not only for recreationists - the area is heavily used by mountain bikers, hikers, off-highway vehicles, bicyclists, and hunters - but for the wildlife that depends on the landscape for its home, corridor, existence. The Santa Ritas are recognized as an Important Birding Area (IBA) and the Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of its Biological Core.
7451	19	Individual	There are SO many issues and following is just a few to consider: 27. Wildlife Corridors will be blocked-impact as this is project area

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Record ID	Comment Number	Commenter Type	Comment Text
7453	19	Individual	There are SO many issues and following is just a few to consider: 27. Wildlife Corridors will be blocked-impact as this is project area
7456	2	Government	Our preliminary review indicates that despite any and all mitigation measures, this project will result in significant adverse impacts to wildlife, wildlife habitat, and wildlife recreation. We believe that the project will render the northern portion of the Santa Rita Mountains virtually worthless as wildlife habitat and as a functioning ecosystem, and thus also worthless for wildlife recreation. Furthermore, the project has great potential to impact wildlife and habitat off the forest. We therefore do not support the development of the Rosemont Mine.
7456	4	Government	The mine plan of opertations (Section 3.3.3) states, "it is anticipated that disruption to wildlife habitat and use will be minimal." Further, the mine plan of operations (Section3.5.2.1.2) states, "loss of hunting ground is not expected to have significant impact on hunting in the area." The Department completely disagrees with both of these statements. The amount of land disturbance, traffic, noise, light, and general mining activity will completely disrupt wildlife in the area. Wildlife and hunting impacts will be much greater than the footprint of the active mine area.
7456	26	Government	We understand that Rosemont Copper Company plans to replace their ground water withdrawl with CAP water, but at least for now that replacement water is being provided into the aquifer at Avra Valley, 36 miles away from the withdrawl site. Depositing water into the Avra Valley will do nothing for the water table that supports the wildlife habitats around the Santa Cruz River and the Santa Rita Mountains.
7456	27	Government	If the water table is lowered around the Santa Cruz River or in the Santa Rita Mountains, the impacts to vegetation will adversely impact wildlife (which in turn impacts wildlife recreation).
7456	31	Government	The only way to insure that the mine does not impact water resources (and thus wildlife habitat) in the Santa Cruz basin is for the mine to use only CAP water and be prohibited from using ground water.
7456	34	Government	Davidson Canyon and Cienega Creek and very important habitats for wildlife, and decreases in water flow to these habitats will adversely impact wildlife.
7456	37	Government	Any pollution of waters into Davidson Canyon and Cienega Creek will have significant adverse impacts to wildlife, including federally listed and sensitive species.
7456	40	Government	We also have a concern about failure of reclamation to occur or to be adequte for the needs of wildlife. Rosemont Copper Company tells us that mining operations can be completely rehabilitated. However, we have never seen this occur in Arizona's dry habitats. There is always a legitimate reason for the lack of reclamation, e.g., the mine is staying open to extract ore in the future, or the original company declared bankruptcy and is no longer responsible.
7456	44	Government	As we stated above, we believe that this mine will impact wildlife, wildlife habitat in an area that is much larger than the footprint of the mine. If this mine is permitted, the entire northern portion of the Santa Rita Mountains will be virtually lost of wildlife values.

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Record ID	Comment Number	Commenter Type	Comment Text
7456	50	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Loss of game and non-game habitat
7456	52	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Impacts to wildlife corridors that allow wildlife movement from blocks of habitat
7456	57	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Monitoring of wildlife impacts.
7456	59	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Impacts to wildlife from increased vehicular traffic, both on the Forest and off the Forest
7456	60	Government	Impacts to wildlife from dust and air pollution during construction, during mining operations, and after mining has stopped, both on the Forest and off the Forest
7456	64	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Best Management Practices that protect wildlife, including birds and bats, from being killed by the toxic solutions on the site
7456	65	Government	As stated above, we are providing only preliminary comments in this letter. Other issues that we expect to be analyzed in the EIS include the following. -Habitat fragmentation
7462	1	Organization	The proposed Rosemont Copper Project would destroy or degrade many square miles of habitat in the northern Santa Rita Mountains for the wildlife (1) (2). Impacts from this large-scale mining operation would likely have far-reaching negative consequences for the conservation of wild species--the project area gateways principal habitat linkages in southeastern Arizona, connecting the Tumacacori-Atascosa and Santa Rita-Patagonia mountain ranges with the Rincon Mountains and other ranges to the north
7462	4	Organization	Frankly, this project, if approved, would cause tremendous damage to a vital core area of habitat for wildlife, as well as degrade or destroy what may be the most significant north-south movement corridor for wildlife in southeastern Arizona.
7466	9	Individual	I would like you to address the following issues in the EIS. -How will the mine ensure wildlife does not drink from the tailings pond?
7466	20	Individual	I would like you to address the following issues in the EIS. - What is the effect of blasting on wildlife near the proposed mine?
7474	3	Individual	I would think the mining project would also adversely impact the wildlife
7484	6	Individual	And of course I am opposed to the proposed mine on all the other issues cited by environmentalists: disruption of wildlife
7487	21	Individual	The Cienegas valley is a unique environment to all southern AZ with its high altitude grasslands and wildlife. It is quiet, peaceful and beautiful.

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Record ID	Comment Number	Commenter Type	Comment Text
7487	25	Individual	Please provide an analysis and any related studies on the impact of species distribution due to the effects of blasting. Will the local species such as owls, hawks and antelope currently ranging in the Northeast section of the Cienegas Reserve be displaced? If they are displaces, can it be estimated by how much and how far?
7487	30	Individual	I am concerned about the immediate and long term effects on habitat.
7488	3	Individual	It is especially difficult to estimate the impact of open pit mining on wildlife and wildlife habitat. The Santa Ritas are widely recognized as an Important Birding Area (IBA) and as difficult as it is likely to be, we believe that it is essential for the EIS to include multiple scenarios estimating the impact of both traditional and novel approaches to handling the waste materials generated by this form of mining throughout its active life, and for an extended period thereafter. These analyses should be detailed, taking note of the likely impact of this project on specific, highly valued, and especially vulnerable species common to the Rosemont area. We count among them: the lesser long-nosed bat, Chiricacahua leopard frog, and yellow-billed cuckoo.
7491	3	Individual	I have concerns about the the impact on the area's biodiversity
7491	6	Individual	With almost 4,000 acres being involved it will destroy wildlife habitat
7493	9	Individual	My other concerns are: The effect of the mining operations on wildlife corridors in the area.
7495	6	Individual	The Santa Rita's represent a priceless and unique land heritage that deserves to be protected for its natural fauna
7497	2	Individual	This mine is no way helps our country. A legacy of pollution and destruction of habitat, that as public lands we have a right and duty to protect.
7500	5	Individual	How is this going to affect the migration and mating habits of our ecosystem?
7502	7	Individual	Questions remain regarding how this mine will affect: 5. habitat
7504	34	7508	The effects of all this heavy metal contamination on the local; desert flora and fauna must be examined, especially in the streams and riparian areas adjacent to this proposed Rosemont mine.

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Record ID	Comment Number	Commenter Type	Comment Text
7504	70	7508	The northeastern Santa Rita Mountains receive approximately 18 to 22 inches of rainfall each year, almost twice that received by the adjacent valleys. This rain, fresh and uncontaminated, flows from the mine area via two streams northeastward into Davidson Canyon and then into Cienega Creek and, finally, Pantano Wash, which drains westward toward Tucson. The streams serve the following purposes: 1. They create riparian zones that support healthy vegetation necessary for a diverse ecology and for control of erosion of stream banks. 2. They supply a number of springs and tinajas that are the source of water for countless birds and other animals, large and small, that inhabit the area. 3. They recharge small groundwater basins along their courses - the sources of water for a number of domestic wells. 4. They are a significant source of fresh, uncontaminated water for the Tucson groundwater basin, the source of most of Tucson's potable water. 5. They serve as treasured recreation sites for residents and visitors alike.
7504	91	7508	How will natural habitat and wildlife corridors be affected by the mining proposal and a proposed pipeline, and how will these impacts be mitigated?

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Record ID	Comment Number	Commenter Type	Comment Text
7504	98	7508	Toxic chemicals are used in the Flotation Process to separate the copper and out of the milled powder. Link to a complete explanation of processing copper: http://electrochem.cwru.edu/ed/encycl/art-m02-metals.htm This Flotation Process is the major extraction method where there is poor quality of the ore. Xanthate chemicals produce bubbles that the copper adheres to and the "bad stuff" falls to the bottom. These chemicals used for flotation are hydrocarbons with complex configurations, but some are as simple as kerosene. It is claimed that the volatile organics used in the Flotation Process do not go into the slurry that goes into the tailings impoundment because they are filtered out before the slurry goes to the impoundment. This is not a sound analysis. 1) Filtration is not a treament technology for volatile organics. Treatment is pushing air through the solution, which releases the volatile chemicals into the air, the equivalent of landfilling the waste chemicals in the air. 2) Some are amine compounds that break down into nitrates, so the presence of nitrates in the groundwater is an indicator of travel of these compounds, which can be very mobile in an oxygen solution (H2O). Some of the Chemicals Used in Flotatino Process and in the Thickening Process that takes the water out of the used slurry: Alky Aryl Oxime Petroleum Distillate Sulfosuccinate surfactant Alkyl Xanthate salt Nalco 7873 - no chemical formula given Alcohol/hydrocarbon blend Pits become toxic lakes that are harmful to wild life and not consistent with a recreational area: The operation plans to remediate the tailings and waste rock as it goes along, which means there will be no back-filling of the pit because there will be nothing to fill it with. When the operations cease, the pit will no longer be dewatered. Therefore, the pit will fill with water from the ground and storms. A natural lake has mud and clay lining, whereas the pit will be exposed minerals which will create a significant potential for acid water in the pits once the mining has stopped. What will be the long term and cumulative impacts? How will this be prevented and mitigated?

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Record ID	Comment Number	Commenter Type	Comment Text
7504	103	7508	The Forest Service has written a report on the flooding by groundwater of open-pit mines in several abandoned mines in Region 6 pit lake. Water quality in these pit lakes varies from highly acidic to alkaline. Www.fws.gov/pacific/ecoservices/envicon/pim/reports/Reno/PitMines.htm The Berkeley Pit in Butte, Montana is a 1.5 square mile open pit approximately 1,700 feet in depth. Ground water has infiltrated the open pit and created a pit lake about 710 feet in depth containing 30 billion gallon of water with a pH of 2.5. Birds landing these acidic pit lakes can ingest this water which causes severe trauma to their gastrointestinal tracts and eventual death. The acidic water also removes natural oils from the birds' feathers causing them to die by drowning or hypothermia. In 1995, the Berkeley Pit proved lethal to over 300 snow geese which used the pit lake as a migratory stopping place.
7504	138	7508	What will be done to protect nearby residents, wildlife, and recreational users in the Coronado National Forest from the deleterious impacts of daily blasting? What will be the cumulative environmental, economic, and cultural impacts of this blasting on nearby residents, wildlife, and recreational users in the Coronado National Forest?
7504	142	7508	What will be done to protect nearby residents, wildlife, and recreational users in the Coronado National Forest from the deleterious impacts of daily blasting? What will be the cumulative environmental, economic, and cultural impacts of this blasting on nearby residents, wildlife, and recreational users in the Coronado National Forest?
7504	151	7508	Intensive development of the site as an open pit mine will result in loss of a significant portion of the wildlife habitat and movement corridor on the eastern side of the Santa Ritas, potentially impacting endangered, threatened, and candidate species, in addition to priority vulnerable species or species of special concern.
7504	153	7508	The Santa Ritas are recognized for the biological values and are an Important Birding Area (IBA). In addition, the Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of the Biological Core.
7504	157	7508	The foot-print of the Rosemont Mine is stated to come within four miles of Madera Canyon; a world known birding area that harbors several rare species of birds, some endangered. The wetlands within Madera canyon are spring fed possibly sharing the same source as the springs within the proposed Rosemont Mine area. Since these spring fed wetlands share the same water source will Madera canyon's wetlands suffer from the Rosemont mine: and, what will be the effect of the Rosemont mining project on endangered wildlife and these birds? Has Rosemont contracted biological population studies on all species of endangered wildlife; and, can they say with certitude that their mine will not endanger the wildlife and International tourism to the Santa Cruz valley?

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Record ID	Comment Number	Commenter Type	Comment Text
7504	159	7508	The foot-print of the Rosemont Mine is stated to come within four miles of Madera Canyon; a world known birding area that harbors several rare species of birds, some endangered. The wetlands within Madera canyon are spring fed possibly sharing the same source as the springs within the proposed Rosemont Mine area. Since these spring fed wetlands share the same water source will Madera canyon's wetlands suffer from the Rosemont mine: and, what will be the effect of the Rosemont mining project on endangered wildlife and these birds? Has Rosemont contracted biological population studies on all species of endangered wildlife; and, can they say with certitude that their mine will not endanger the wildlife and International tourism to the Santa Cruz valley?
7509	4	Individual	Those of us who live here and will be directly impacted by the environmental damage to our landscape, water, wildlife - and perhaps even our abiltiy to remain in our homes- have no voice in this matter.
7510	3	Individual	The proposed mining site is contiguous with the Santa Rita Mountains and I am very concerned about the LOSS OF CONTIGUOUS WILDLIFE HABITAT which is a well-documented concern amongst conservationists (Google :loss of contiguous wildlife habitat: and explore websites such at that of the Vermont Fish and Wildlife Department).
7514	1	Individual	The proposed mine will endanger wildlife in the surrounding areas, especially Madera canyon, Box canyon, Gardner canyon, Davidson canyon, Las Cienegas NCA and Cienega Creek Preserve.
7514	17	Individual	I am extremely concerned about the impact the mine will have on birds and wildlife in the area. Some of the birds and wildlife seen in this area are not seen anywhere else in the United States. People come from all over to view wildlife in this area. The value of tourism is long reaching and not dangerous to the environment. The copper in these mountains is a limited resource that will play out in a few years leaving an environmental hazard in its wake. The damage the mine will cause cannot be undone and the area will never be restored to its former beauty.
7517	6	Individual	However, along with the vast majority of Forest Service Volunteers in Southern Arizona, I want to express my deep concern and negative feelings about a mne in that area. Depletion of water table, diminished air quality due to both mining operation and increased traffic, negative implact on home values, depletion of flora and therefore fauna in the area are some of the concerns.
7523	8	Individual	In the PRISTINE environment of the proposed mine site, the earth itself would be killed, to say nothing of its flora and wildlife, who with each such undertaking have less and less habitat.
7540	3	Individual	The mearns habitat needs to be protected at all cost.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
7546	7	Individual	People travel from all over the United States and Arizona to hunt Mearns quail in the Santa Ritas. Southern Arizona is one of the only places to hunt these quail, the other being a small part of New Mexico. The proposed tailings area would destroy thousands of acres of prime Mearns habitat - rolling hills of oak with grassy cover. This is also ideal habitat for Coues whitetail deer. Because the area is relatively accessible from FS 62 (or "Box Canyon road"), it is a favority destination for sportsmen. I regularly travel down to the area in quail season to hunt. The economic benefit to the community provided by hunters like myself and others should be considered.
7546	9	Individual	Additionally, the Arizona Fish and Game Department along with local chapters of the National Wild Turkey Federation recently has reintroduced Gould's turkey in the area. Arizona is the only state in which these turkey may be legally hunted. The hills in the proposed area are vegetated with oak and grass, which are ideal winter and fall habitat for wild turkey populations. There are also canyons that contain pools and perennial water sources, as well as several springs in the area. The mining developers propose to bury these areas in tailings, thus completely eliminating and negatively impacting areas where dispersing turkey populations could eventually establish themselves. The operation of the mine also presents a threat to the turkey populations due to noise, light, and dust. The footprint of the operations will likely exceed beyond the large tailings piles. The US Forest Service in cooperation with the Arizona Game and Fish Department should study the impact of the mine on the Gould's reintroduction program and the ability for growing populations to reproduce and disperse prior to issuing any EIS or draft EIS.
7550	4	Individual	Intensive development of the site as an open pit mine will result in loos of a significant portion of the wildlife habitat and movement corridor on the eastern side of the Santa Rita's, potentially impacting endangered, threatened, and candidate species, in addition to priority vulnerable species or species of special concern. The Santa Rita's are recognized for the biological values and are an Important Bird Area (IBA). In addition,the Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of the Biological Core.
7550	6	Individual	Intensive development of the site as an open pit mine will result in loos of a significant portion of the wildlife habitat and movement corridor on the eastern side of the Santa Rita's, potentially impacting endangered, threatened, and candidate species, in addition to priority vulnerable species or species of special concern. The Santa Rita's are recognized for the biological values and are an Important Bird Area (IBA). In addition,the Sonoran Desert Conservation Plan lists part of the area around Rosemont as part of the Biological Core.
7562	3	Individual	These site diagrams also show that the tailings piles will be 600 to 1000 feet (southern end to northern end) higher than the current exisiting terrain. This increase is the equivalent of a wall of 60 to 100 story buildings over a length of approximately three miles of the western side of the Sonoita Hwy. All of the flora, fauna, wildlife and recreation associated with the buried Barrel Canyon drainage area will be eliminated or changed forever.

Wildlife and Habitat

01 - General

Record ID	Comment Number	Commenter Type	Comment Text
7563	2	Individual	We are land owners near the proposed mine. This is a terrible idea. It will ruin the area and destroy the habitat. Mines can be placed further from city limits. Not near homes.
7566	2	Individual	Do not build the mine. Save our animals!
7571	11	Individual	This proposal would disturb extensive amounts of Forest Service land. The EIS should analyze the amounts and types of land disturbances that would result from this proposal. Many existing land uses would never be replaced if this mine were approved, including loss of recreational land, loss of wildlife habitat, loss of wildlife corridors and foraging opportunities, loss of watershed functions, loss and damage to water resources, loss of soil and plant resources, loss of open space, and loss of viewshed. The EIS should determine whether these losses are worth the benefits from this mine, and determine how these extensive land disturbances should be mitigated.
7571	32	Individual	Many studies have shown that the Santa Rita Mountains contain important wildlife habitat and serve as a key migration corridor from Mexico to the Rincon/Santa Catalina Mountains. The EIS should determine which wildlife species are found in the area, or are likely to be found, that may be affected by this proposal. It should determine which ones are threatened, endangered, species of concern, candidates for listing, or have other special status. The EIS should determine how these species use the area, and how far the displaced wildlife must go to find similar habitat for foraging, breeding or migration. Surveys must be conducted to determine the presence, absence and abundance of each of these species. Similar information and surveys must be conducted for plants species, also. For example, the Rosemont Talussnail (Sonorella rosemontensis) is likely to be found here as it is endemic to the Santa Ritas. The Arizona Game & Fish Heritage Database states that the type locality for this species is "the Santa Rita Mountains, North end at Station 49 near Rosemont, Pima County; elevation not given, but collected later at ca 5,500 ft" (Bequaert, J.C., and W.B. Miller 1973. The Mollusks of the Arid Southwest. The Univeristy of Arizona Press, Tucson, Arizona). At least four species of State protected reptiles are known to reside at this site: ridge-nosed rattlesnake, rock rattlesnake, desert tortoise and the Gila monster. Surveys must be conducted to determine whether these species are present in the area, and in what abundance. Surveys for reptiles, and all wildlife and plant species should be conducted over several seasons over multiple years to account for variations in climate that affect population abundance.
7579	11	Individual	Wildlife and Wildlife habitat: With intensive development of the site as an open pit mine this will result in a significant portion of the wildlife habitat and movement corridor on the eastern side of the Santa Rita's. This could impact endangered species. This is a wonderful birding area and this would be impacted.
7579	13	Individual	Wildlife and Wildlife habitat: With intensive development of the site as an open pit mine this will result in a significant portion of the wildlife habitat and movement corridor on the eastern side of the Santa Rita's. This could impact endangered species. This is a wonderful birding area and this would be impacted.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
7582	13	Individual	We believe that the Rosemont mine would negatively impact the air, water, scenic view, recreation, wildlife, plantlife and traffic within a far reaching area surrounding the mine and that these negative long term impacts for many US citizens should not be overlooked so a few can gain financial reward for the short term.
7587	5	Individual	Other concerns are that mining activities will negatively impact the abundant wildlife habitat of animals and plants, including that of endangered species such as the Pima Pineapple cactus.
7588	7	Individual	We regularly have 20-30 mule deer on our property and 4 white tailed deer, along with many, many different types of birds. There is no question that all of these animals will not be handing around while this mine is constructed and operated 24/7 every single day of the year.
7590	1	Individual	My biggest question is if the rosemont mine were in place how can you assure that the protected creatures and habitat of these areas would stay a viable life sustaining home. The measures proposed do not prove that these areas would stay safe from pollution, how would a clean up bill restore the habitat, water and delicate balance to the vital and unique area?
7592	41	Individual	A cursory examination of listings by the US Fish and Wildlife Service resulted in an endangered species, the Pima Pineapple Cactus, whose range is well within the proposed project area. Further attention should be paid to ensure all appropriate species are included.
7592	42	Individual	Considerable disturbance will be produced by proposed activity on the west side of the Santa Rita Mountains. Analysis of the issues concerning endangered and sensitive species should be undertaken for this area as well.
7595	4	Individual	Just a few of the reasons that generate the most concensus include: The impact on the local roads/traffic, the tremendous waste of water and what that will mean for local residents, the destruction of the environment including plants, animals, forests, etc, the eyesore it will create, and the fact that this is an endeavor owned and operated primarily by foreign concerns.
7598	30	Individual	The Cienegas valley is a unique environment to all southern AZ with its high altitude grasslands and wildlife. It is quiet, peaceful and beautiful. Scenic Hwy 83 is the gateway to this environment which will be impacted forever if this project goes forward. Regular blasting with the sonic & seismic effects could likely impact local species and their distribution.
7598	31	Individual	Please provide an analysis and any related studies on the impact of species distribution due to the effects of blasting. Will the local species such as owls, hawks, and antelope currently ranging in the Northeast section of the Cienegas Reserve be displaced? If they are displaced, can it be estimated by how much and how far?

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
7598	40	Individual	a) Please provide analysis of air constituents as a function of distance and direction from mining operations and year of operation. Analysis should include all stimulus factors such as dust generation from blasting, shoveling, hauling, dumping, and grading, emissions from power generation and vehicles both onsite and in transit, use of chemical volatiles in the course of operations, effectiveness of dust control techniques, variability of the local climate and winds, and changes in the local micro-climate due to effects created by mining operations such as wind pattern changes created from the pit and waste tailing mounds. Please provide an uncertainty analysis on these predicted effects. B) Please provide the long term health effects of item a above. C) Please provide the plant and animal effects of item a above.
7600	2	Individual	This whole area is truly a natural sanctuary for the vast amount of wildlife that inhabit this very blessed spot on Mother Earth.
7620	3	Individual	Has there been a study of the ecological impact upon the area's florn and fauna of the proposed mine?
7630	4	Individual	There will be the destruction of animals, birds.
7632	4	Individual	Water will go into hole in ground, will impact Cienega Creek bought also for wildlife habitat
7642	4	Individual	It will harm too many animals
7648	2	Individual	This is NOT a "not in my backyard" situation. To say this is to be little wildlife issues.
7650	14	Individual	We live in the Sonoran Desert, with limited water. Water dictates life here. It is absolutely critical for human, animal
7651	9	Individual	Myself and friends and family have enjoyed this area for over 40 years. It has a lot of wildlife, whitetail and mule deer javelina. Coati's, bobcats and mountain lions,etc. If they are hunted they are a renewable resource. If you take their home away they will be gone forever.
7652	8	Individual	How does Rosemont mine plan to protect the animals of the Coronado National Forest from being buried alive under the hundreds of tons of dirt which they plan to cover the 4,400 acres with?
7654	3	Business	OUR WILDLIFE,
7655	3	Individual	In order to mine copper you must extract much more rock than copper. What this means is that there are huge areas of ground and wildlife habitat destroyed during the mining for copper.
7692	1	Organization	The Santa Rita Mountains are an important range within the sky island region, providing important habitat for a wide array of wildlife species.
7694	1	Organization	All aspects of mining compromise & destroy the environment and sensitive wildlife habitats. Unless these issues are adequately addressed, we hope the Rosemont Mine.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
7698	2	Organization	This mine is counterproductive to the conservation goals of this community and would result in habitat destruction, fragmentation.
7809	3	Business	THE PROPOSED ROSEMONT MINE WILL HAVE DRAMATIC AND IRREVERSABLE IMPACTS: IMPACTS ON OUR WATER, OUR WILDLIFE, CULTURE AND ARCHAEOLOGY---
8594	6	Individual	I really think that the impact on the wildlife and the scenic values there do not make it worth this mine.
8604	1	Individual	I just wanted to oppose the Rosemont Mine for the environmental reasons as far a the animals, the pollution, air pollution, and noise pollution and, uh, draining the water table. Also for the health hazards it's going to cause for the people in the area.
8622	2	Individual	the Santa Ritas are home to many beautiful animals, bear, deer, lions and where will they relocate.
8642	3	Individual	I live in Benson, which is a short ways away from where the Rosemont Mine has been proposed. That is absolutely total destruction of a beautiful area. The environment, the animals, the people that live nearby, and the biggest issue is the water and the traffic that will be generated by this absolute horrendous idea of running trucks, working 24 hours, 7 days a week is absolutely insane.
8663	3	Individual	Cienega Creek, which by the way Augusta wants to fill (unintelligible) Canyons, yet claims no impact to the Cienega Creek water shed. And Davidson Canyon and not only wildlife habitats as well as Rosemont are decreasing water tables, peace, beauty, solitude and scenic (unintelligible) for thousands of out of state tourists all in seeious peril of becoming a beautiful memory our children will only have heard of.
8680	5	Individual	With so many people living in Southern Arizona now, water has become a precious commodity. Far more valuable than copper or other minerals in the earth. Regardless of how many EIP's are conducted, the Rosemont Mine poses a potential threat to our water table, the wells, the wildlife and the scenic beauty of the Santa Rita Mountains.
8703	4	Individual	The animal life there, the beauty the fact that it is in a very pristine and lovely area close to the Tucson area, which is growing, is not an auspicious place to have the mine.
8704	4	Individual	The animal life there, the beauty the fact that it is in a very pristine and lovely area close to the Tucson area, which is growing, is not an auspicious place to have the mine.
8715	4	Individual	A hundred years from now, nobody will know the difference as far as the shape of the mountain is concerned or the effects of the mining of the remedial aspects that are in play now will not damage anything over the long run and the wildlife will benefit as they have from the former AMAMAX mine. That mine being alive with deer heards and coyotes and bobcats and other wildlife.
8730	2	Individual	I'm against open pit mining for copper, and it's too close to Tucson, for one. And I don't like it. I'm not against it in the state, but I'm against being so close to Tucson, and mostly because of the way it affects the animals and the water.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
8740	2	Individual	Ecologically, it has a very negative effect on the wildlife and many other aspects of ecology.
8784	2	Individual	And I want you to know that I have spent quite a bit of time in the area that the Rosemont Mine is going to be. It is a beautiful and in many ways pristine area with unique land and in -- unique plants and animals that simply can't be found any place else. It's an area where many people go for recreation and spend time.
8802	2	Individual	Animal life and ecosystems will be harmed if the mine is built.
8806	4	Individual	I think that it is of very, very deep concern to me related to what it will do to our water table, and the impact on wildlife,
8806	11	Individual	and we will have a disruption of the wildlife.
8865	6	Individual	It's a sky island and there are many plants and animals that I think should be preserved.
8874	5	Individual	I would like to go on record strongly objecting to the Rosemont Mine project. The reasons are inadequate water, and water contamination, air pollution, destruction of habitat and other safety issues.
8882	3	Individual	We're also concerned that it will ruin the environment for the wildlife.
8883	3	Individual	I'm concerned about how the toxins from the road that isn't going to be kept dust free by water but by chemicals, how that will affect the terrestrial species such as snakes and lizards, horny toads, turtles, or the tortoises, how that will be affected. That needs to be studied and the affects of that also need to be made known to the public.
8896	5	Individual	What planning is being done in consideration of the wildlife whose migratory paths intersect Scenic Highway 83?
8903	5	Individual	Regarding Davidson Canyon; what is the impact of the decision by the U.S. Army Corps of Engineers to suspend the designation of the Santa Cruz River and its tributaries as a navigatable river? Will the resulting ease of the discharge of waste increase the amount of groundwater contamination by Rosemont via Davidson Canyon? How will this decision impact the Davidson Canyon? How will the contamination be controlled and who will be responsible for such a control? What is the impact on the water flow and quality of water, vegetation and wildlife in Cienega Creek area?
8906	5	Individual	Have studies been done to compare "mine" vs. "no mine" and the impacts on the economy, tourism, recreation, the ecosystems, vegitation, wildlife, groundwater, surface water, water quality and availability, roadways and emergency services? If so, are the studies available for public scrutiny? If studies have not been done, what is the reason for this inaction?
8922	3	Organization	STOP MAKING WILDLIFE LOOK FOR A PLACE TO EXIST!!!!!!
8933	1	Organization	Wildlife should rate over a mine!
8987	2	Organization	The loss of this beautiful area would be staggering. For those of us who live nearby, the loss of wildlife is just unthinkable.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
9147	5	Organization	It is sad day to think that our county and state leadership would approve destroying the wildlife.
9155	1	Organization	We have so little left as legacy to our future generations, so little that indicates our respect for the land whose biodiversity assures the future of the earth on which all living things depend for survival.
9236	1	Organization	There is too much destruction in the proposed mining proposal and would destroy too much of a delicate habitat of the Sonoran Desert.
9265	1	Organization	A large mine at Rosemont would imperil biological values in Davidson Canyon and Cienega Creek.
9299	2	Organization	Stop destroying what's left of scarce wildlife
9346	3	Organization	This is home to a large diversity of fauna.
9394	2	Organization	The area is biologically important and should be protected from the deleterious impacts that a copper pit mine would have on the area.
9462	1	Organization	Mining will be a travesty for the biodiversity- just say NO!
9488	4	Organization	I urge the US Forest Service to do the right thing -- protect this landscape important to wildlife by rejecting Augusta's Mining Plan of Operations and withdrawing these lands from Mineral Entry to ensure their permanent protection from mining.
9510	1	Organization	save the wildlife
9532	2	Organization	The Santa Ritas are our favorite areas for exploring. I have seen may different types of wildlife.
9599	1	Organization	Preserve wildlife for future generations.
9629	1	Organization	I am strongly opposed to any further degradation of wildlife habitat
9641	3	Organization	I oppose the loss of such a wonderful area to such a greedful and useless need this area has FAR TOO many Copper mines as it is and I see no reason to ruin the habitat and the wildlife corridor for a developer who not only is NOT a citizen of our country (and should have no right to buy it) nor are they acting in the best interest of the area and its residents.
9659	2	Organization	This land is far more valuable to the residents of Arizona as it is - a home for wildlife - then it would be degraded as a mine. Please to not allow this to happen to this beautiful land.
9671	4	Organization	It is a disgrace to rob future generations of this beautiful area with such a rich history. Furthermore, it would be a shame to lose the Rosemont area to a short-sighted, greed driven lot with no true regard for the land, much less the animals. I believe that only a huge outcry from the public will put a halt to Canadian-based, Augusta Mining's "fifty billion dollar dream".
9698	1	Organization	We have to protect our natural habitats!!!

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
9718	1	Organization	We are required, as citizens of the Earth, to protect nature and preserve what little balance there is between man and the environment, including all of what the environment encompasses. When we take all native habitat away from the organisms that have survived there, where will they go? Will we continue to exterminate these "pests" when they have no other choice but to survive in our houses and yards? This land is a corridor and vital territory for millions of animals. It is bad enough that new hoursing developments are encroaching on this beautiful wilderness, the last thing it needs is a mine.
9844	1	Organization	This land is too precious of a wild life area to be mined
9849	2	Organization	Please save all the animals, This can not be replaced, we our the caretakers of this earth.
9918	3	Organization	There is nothing positive which can come from mining the Santa Rita Mountains -- only a detrimental & destructive impact to the wildlife. Who benefits? only the mining companies and then they move on. This must not happen.
9967	1	Organization	There are numerous unique fauna that occur in the Santa Ritas and to consider mining them is a travesty. Particularly with the Bush Administration working harder every day to loosen or remove any ecological operational mandates that promote preserving the surrounding areas and watersheds. Together, allowing this mining to go through under the rule of the current administration is a time bomb the US Forest service will regret.
10092	2	Organization	Please consider carefully the cost to our natural habitat, to our diminished wildlife sanctuaries.
10110	1	Organization	This area is too valuable to scar. Our wildlife depend on this unspoiled area.
10115	2	Organization	Save the habitat & open space for society & wildlife.
10116	2	Organization	Save some wildlife habitat! Do we have to destroy everything? Stop the mine!
10140	3	Organization	The needs of wildlife should take precedence over the economic benefits to a private enterprise.
10161	2	Organization	This area represents an irreplaceable wildlife resource. The long term benefits of managing the area as such, far outweighs the short term benefits of its use for mineral extraction.
10255	3	Organization	Only if there were an ecologically friendly way to mine, which didn't kill the animals would I even consider any mines.
10255	5	Organization	I love precious stones and copper and other beautiful minerals, but I would rather do without them than endanger animals and ruin the earth.
10279	1	Organization	This is a unique and important bird and wildlife habitat area that should remain undeveloped by extractive industries.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
10296	1	Organization	I would just like to say that Rosemont is my favorite place to bowhunt for deer. Ive seen alot of deer in their, to include some trophy bucks, Up, until they started cutting roads there. And now I don't see nearly the deer I use to. Before I could go in there every wekend and see deer. Now, youre lucky if you see a deer. Especially the bucks! Ive also seen alot of other wildlife in there too, some people hardly ever see or it is rare to see in the wild. Such as Mountain Lion, and seen a badger in there one time. Two coyotes were chasing it, I would imagine the coyotes, would be in for a big surprise once they caught up to the badger.
10304	1	Organization	Our natural habitats are more precious than a handful of short-term jobs. Join the fight!
10347	1	Organization	preserve habitat for future generations
10352	1	Organization	This propsed mine will be a disaster to the Santa Ritas and surrounding areas in terms distruction of habitat and eco systems.
10370	1	Organization	I oppose the mine due to environmental concerns. This area has high wildlife value.
10405	1	Organization	There is already encroachment by houses, mining would decimate the area which is rich in birdlife and other important species particular to this habitat which I visit frequently. Because of the this important bird area and sky island, many visitors from all over the world come and provide ongoing revenue for the state and local merchants. The mining would be a one shot deal and give revenue to the industry. It is not sustainable and would not be renewable. Mining would change the area forever. Please do not let this happen. Thanks.
10559	3	Organization	The impacts to the animals by mining operation is completely unacceptable.
10584	1	Organization	Pronghorns! YEAH! YEAH!! YEAH!!!!!
10706	3	Organization	They won't care about what they distroy let alone the wild life!
10777	2	Organization	This area is not suitable for mining due to the inevitable harm and degradation it will do to the wildlife
10798	2	Organization	landowner near mine concerned about environment
10799	2	Organization	Please save our wildlife
10807	1	Organization	Please don't let one of the best birding areas in the World be desecrated.
10809	2	Organization	save our wildlife...PLEASE!!
10810	2	Organization	save our wildlife
10819	5	Organization	I strongly oppose any mining activity in the Rosement Ranch area. It would have devastating long term negative impact on the animals in the area.
10839	3	Organization	Save our animal life!
10877	3	Organization	More damage to the planet, irreversible destruction to the wild life and natural fauna.
10905	2	Organization	It is important to preserve wildlife corridors.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
10924	2	Organization	Stop the destruction of our wildlife in our state by big corporate businesses and corrupt politicians who are destroying our planet and the future of generations.
10928	1	Organization	I feel the value of biodiversity in the area and preservation of habitat are critical so that mining should not be allowed in this area.
10960	2	Organization	This is a bad idea for the residents who live in the area, not to mention the destruction of a diverse animal preservation.
10978	1	Organization	Save the enviroment and it's wildlife, don't allow the mining.
10997	1	Organization	Bad choice for a location. Too much biodiversity is lost to outweight the gain in copper ore.
11000	1	Organization	It would be an extreme shame to destroy such diversity of wildlife.
11023	1	Organization	Habitat destruction must be stopped.
11047	14	Individual	As the dry tailings, according to my understanding, have not been tried in a climate with this high of a rainfall, what will happen if the suppressant is sprayed, and then it all runs off in the rain? What happens to the wildlife (to include insects, amphibious creatures and so forth if they drink water with chemical suppressnts?)
11047	20	Individual	How will the project prevent wildlife from trying to access these poison water areas? Will there be walls? Fences? I have miniature cattle and have done extensive research with the USDA on how to keeps Mountian Lions away from my cattle. There really is no fencing to keep out big cats so we use a combination of 6-7 foot stock flimsy stock fence with a cattle guard dog. How does Rosemont propose to keep Big Cats away from the water that has chemicals in it? I suggest two tiers of protection. One layer of electric flagged fence and then a ten foot deer fence around any potential areas of poisonous water. This should keep deer and cats out.
11055	1	Individual	How will natural habitat and wildlife corridors be affected by the mining proposal (and a proposed pipeline) and how will these impacts be mitigated?
11055	3	Individual	How will the wildlife on our property in the attached pictures be protected in our immediate area? How will the impacts on these species be mitigated?
11068	41	Individual	A cursory examination of listings by the US Fish and Wildlife Service resulted in an endangered species, the Pima Pineapple Cactus, whose range is well within the proposed project area. Further attention should be paid to ensure all appropriate species are included.
11068	42	Individual	Considerable disturbance will be produced by proposed activity on the west side of the Santa Rita Mountains. Analysis of the issues concerning endangered and sensitive species should be undertaken for this area as well.
11073	2	Individual	There is some truth to the reasons given for not opening the mine. First of all, the scenery will be changed forever. This is unavoidable, but the disturbed area will be contained and regulated with some of the most strict environmental laws around. There is going to be a forced relocation of of the animals that live in the area along with water that becomes polluted. However, the animals will be able to adapt as they have for millions of years (this time they will have human help to care for any that are sick and wounded before the mine opens so some will actually live longer) and the water contaminants must be below the guidelines set by our government.

Wildlife and Habitat

01 General

Record ID	Comment Number	Commenter Type	Comment Text
11078	1	Individual	How will natural habitat and wildlife corridors be affected by the mining proposal (and a proposed pipeline) and how will these impacts be mitigated?
11078	3	Individual	How will the wildlife on our property in the attached pictures be protected in our immediate area? How will the impacts on these species be mitigated?
11082	5	Individual	"A stormwater diversion ditch along the planned mine access road will divert water..." I would like to know how exactly. Is it going to run off the access road which is used by concentrate trucks, delivery trucks and other misc. vehicles which have tires with chemicals and so forth, engines that leak oil? What other potential pollutants from other locations will run off the planned main access road? The main storm water diversion drainage tunnel is quite large according to the Tetra Tech Dry Tailing Facilities Design Book I read this evening. Who will maintain this (The large culvert, not the book) and keep it free of debris and Undocumented Immigrants? As you may know, Border Patrol is quite active in the area. I have also heard from a Rancher in the area that the CNF has been releasing bear and mountain lion secretely into the Santa Ritas. How does Rosemont Copper intend to keep these animals out out of the storm water diversion drainage? Also, Africanized bees are an issue in the area and can make places such as this their home.

APPENDIX A

Database Reports of all Comments by Category

THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
5000 W. CAREFREE HIGHWAY
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REGION V, 555 N. GREASEWOOD ROAD, TUCSON, AZ 85745

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ROBERT R. WOODHOUSE, ROLL
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JACK F. HUSTED, SPRINGERVILLE
DIRECTOR
LARRY D. VOYLES
DEPUTY DIRECTORS
GARY R. HOVATTER
ROBERT D. BROSCHEID

September 22, 2009

Mr. Kenneth Kertell
Senior Biologist
SWCA Environmental Consultants
343 West Franklin Street
Tucson, Arizona 85701

Re: List of Arizona Special-Status Species and Habitat-Related Issues Regarding the Rosemont Copper Project, Pima County, Arizona

Dear Mr. Kertell:

The Arizona Game and Fish Department (Department) appreciates the opportunity to provide SWCA input on habitat related issues regarding the Rosemont Copper Project. Attached please find a special status species list from the Department's Heritage Data Management System for species occurring within 3 miles of the project area as depicted in the map you provided.

The Department has provided specific comments on potential impacts to wildlife resources and conflicts with Department goals, objectives and policies in our response to the Forest's scoping request and preliminary alternative elements. As a Cooperating Agency the Department continues to learn about the project and provide comments as we learn more about the various alternatives which are in development and meets with the other agencies.

The Department has requested greater coordination with the interdisciplinary team so that we may provide input on an ongoing basis as new information comes to our attention. Due to the size and duration of the Rosemont Copper Project, and in the interest of time, I am providing you with the HDMS list and only briefly offer further comment on potential impacts to wildlife resources and habitat related issues at this time. Please refer to our previous comment letters for more information. We would, however, like to provide information to you and to the Forest on a continual basis as this project proceeds; as we gain a greater understanding of the project and its potential impacts, and as the alternatives are developed.

The Department would like to propose regular working meetings with SWCA and/or the Forest and representatives of Cooperating Agencies that wish to participate to discuss these issues and to provide input as we learn more about the project. The Department has public trust responsibility for all wildlife species regardless of land ownership and requests that all data, reports, geographic information system (GIS) files, and other knowledge related to those resources be shared with us on a regular basis.

The Department provides the following general comments regarding our concerns, most of which have been elaborated on in previous responses to the Forest, although some issues have gained greater importance as new information has come to light:

- The Department has recently become aware of Chiricahua leopard frog (*Lithobates chiricahuaensis*) localities within the footprint of the project. The Department is very concerned about impacts to this species, the integrity of the metapopulation which these sites are integral to, and impacts to water resources which the species depends upon.

- The Department has recently become aware of Rosemont tallus snail (*Sonorella rosmontensis*) localities within, or in very close proximity to, the footprint of the project. Very few data exist for this species, which is not listed under the endangered species act and which does not show up on the HDMS check due to its lack of status. However, preliminary information gained by the Department seems to indicate that it is endemic to the Rosemont area. The Department is very concerned about the potential impact of the project on Rosemont tallus snail habitat and the potential negative impacts the project may have on the biology of this endemic.

- The Rosemont Copper Project will directly convert highly functional wildlife habitat into land virtually unusable by wildlife. Moreover, the Department is concerned about the integrity of the ecosystem within the Santa Rita Mountains and the impact the Rosemont Copper Project will have on this integrity. The potential fragmentation effect of this project deserves close attention as it will not only replace existing habitat with an open pit mine and associated dump sites, but will effectively fragment a large portion of the landscape.

- The Department is concerned about impacts to all sensitive species listed in the HDMS check. In addition to the uncommon, rare, or listed species, the Department is concerned about the impact to all of our trust-responsibility species, including game species such as white tail deer, Mearn's quail, black bear, mountain lion, and many others.

- The Department is concerned about the loss of hunting opportunity and the impact on our game management program due to a loss of both game habitat and a loss of access by hunters to habitat that continues to support game species.

- The Department is concerned about the effects of groundwater use on waters that wildlife depend upon, as well as the effect the mine may have on the watershed, especially on Davidson Canyon and Cienega Creek. Our experience with other mining operations has demonstrated that mines have the potential to devastate aquatic systems when mine wastes and toxins have been accidentally discharged into these extremely rare ecosystems which support imperiled species.

- The Department is concerned about impacts to wildlife from dust, air, noise, light, and water pollution resulting from the mine.

Please contact me at 520-388-4442, or jwindes@azgfd.gov if you have any questions pertaining to this letter. We would appreciate any opportunities to meet with your to further discuss our concerns and possible mitigation strategies.

Sincerely,

John Windes
Habitat Program Manager Region V

cc: Leonard Ordway, Regional Manager
Diane Tilton, District Wildlife Manager
Laura Canaca, Project Evaluation Program Manager
Teresa Ann Ciapusci, Coronado National Forest
Reta Latford, Deputy Forest Supervisor

Special Status Species within 3 Miles of Davidson Creek from Rosemont Mine to Pantano Dam

NAME	COMMON NAME	ESA	USFS	BLM	STATE	QUAD	TOWNRANGE
Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC		S		32110-A6	160S160E
Bat Colony						32110-A6	160S160E
Catostomus clarkii	Desert Sucker	SC		S		32110-A6	160S160E
Choeronycteris mexicana	Mexican Long-tongued Bat	SC		S	WSC	32110-A6	160S160E
Coryphantha scheeri var. *robustispina*	Pima Pineapple Cactus	LE			HS	31110-H6	160S160E
Coryphantha scheeri var. *robustispina*	Pima Pineapple Cactus	LE			HS	32110-A6	160S160E
Echinomastus erectocentrus var. *erectocentrus*	Needle-spined Pineapple Cactus	SC	S		SR	31110-H6	160S160E
Echinomastus erectocentrus var. *erectocentrus*	Needle-spined Pineapple Cactus	SC	S		SR	32110-A6	160S160E
Rana yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC	32110-A6	160S160E
Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC		S		31110-H5	160S170E
Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC		S		32110-A5	160S170E
Bat Colony						32110-A5	160S170E
Bat Colony						31110-H5	160S170E
Buteo nitidus maxima	Northern Gray Hawk	SC	S	S	WSC	31110-H5	160S170E
Buteo nitidus maxima	Northern Gray Hawk	SC	S	S	WSC	32110-A5	160S170E
Carex ultra	Arizona Giant Sedge		S	S		32110-A6	160S170E
Choeronycteris mexicana	Mexican Long-tongued Bat	SC		S	WSC	32110-A6	160S170E
Choeronycteris mexicana	Mexican Long-tongued Bat	SC		S	WSC	32110-A5	160S170E
Choeronycteris mexicana	Mexican Long-tongued Bat	SC		S	WSC	31110-H5	160S170E
Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	C			WSC	32110-A6	160S170E
Echinomastus erectocentrus var. *erectocentrus*	Needle-spined Pineapple Cactus	SC	S		SR	31110-H5	160S170E
Eriogonum ericifolium var. *ericifolium*	Heathleaf Wild-buckwheat		S			32110-A5	160S170E
Eriogonum terrenatum	San Pedro River Wild Buckwheat			S		32110-A5	160S170E
Gila intermedia	Gila Chub	LE	S		WSC	32110-A6	160S170E
Gila intermedia	Gila Chub	LE	S		WSC	32110-A5	160S170E
Gopherus agassizii (Sonoran Population)	Sonoran Desert Tortoise	SC		S	WSC	32110-A6	160S170E
Lilaeopsis schaffneriana var. *recurva*	Huachuca Water Umbel	LE			HS	32110-A5	160S170E

NAME	COMMON NAME	ESA	USFS	BLM	STATE	QUAD	TOWNRANGE
Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE			WSC	32110-A6	160S170E
Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE			WSC	32110-A5	160S170E
Rana yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC	32110-A6	160S170E
Rana yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC	31110-H5	160S170E
Thamnophis eques megalops	Brown Gartersnake	C	S		WSC	32110-A5	160S170E
Coryphantha scheeri var. *robustispina*	Pima Pineapple Cactus	LE			HS	31110-H6	170S160E
Echinomastus erectocentrus var. *erectocentrus*	Needle-spined Pineapple Cactus	SC	S		SR	31110-H6	170S160E
Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC		S		31110-H6	170S170E
Aspidoscelis burti stictogrammus	Giant Spotted Whiptail	SC	S			31110-H6	170S170E
Echinomastus erectocentrus var. *erectocentrus*	Needle-spined Pineapple Cactus	SC	S		SR	31110-H6	170S170E
Eriogonum capillare	San Carlos Wild-buckwheat	SC			SR	31110-H5	170S170E
Choeronycteris mexicana	Mexican Long-tongued Bat	SC		S	WSC	31110-G7	180S150E
Hackelia ursina	Chihuahuan Stickseed		S			31110-G7	180S150E
Hedeoma dentatum	Mock-pennyroyal		S			31110-G7	180S150E
Sigmodon ochrognathus	Yellow-nosed Cotton Rat	SC				31110-G7	180S150E
Aspidoscelis burti stictogrammus	Giant Spotted Whiptail	SC	S			31110-H6	180S160E
Aspidoscelis burti stictogrammus	Giant Spotted Whiptail	SC	S			31110-G6	180S160E
Choeronycteris mexicana	Mexican Long-tongued Bat	SC		S	WSC	31110-G6	180S160E
Hedeoma dentatum	Mock-pennyroyal		S			31110-G7	180S160E
Hexalectris revoluta	Chisos Coral-root		S		SR	31110-G6	180S160E
Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	LE	S		WSC	31110-G6	180S160E
Sigmodon ochrognathus	Yellow-nosed Cotton Rat	SC				31110-G6	180S160E
Tragia laciniata	Sonoran Noseburn		S			31110-G6	180S160E
Carex ultra	Arizona Giant Sedge		S	S		31110-G7	190S150E
Choeronycteris mexicana	Mexican Long-tongued Bat	SC		S	WSC	31110-G7	190S150E
Graptopetalum bartramii	Bartram Stonecrop	SC	S	S	SR	31110-G7	190S150E
Hedeoma dentatum	Mock-pennyroyal		S			31110-G7	190S150E
Lithobates chiricahuensis	Chiricahua Leopard Frog	LT	S		WSC	31110-G7	190S150E
Muhlenbergia dubioides	Box Canyon Muhly		S			31110-G7	190S150E
Muhlenbergia xerophila	Weeping Muhly		S			31110-G7	190S150E
Pectis imberbis	Beardless Chinch Weed	SC	S			31110-G7	190S150E

NAME	COMMON NAME	ESA	USFS	BLM	STATE	QUAD	TOWNRANGE
Rana yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC	31110-G7	190S150E
Agathymus aryxna	Arizona Giant Skipper		S			31110-G6	190S160E
Erigeron arisolius			S			31110-G6	190S160E
Sigmodon ochrognathus	Yellow-nosed Cotton Rat	SC				31110-G6	190S160E

Designated Critical Habitat for Gila chub (*Gila intermedia*) within project area.
Rincon - Santa Rita - Whetstone Wildlife Corridor Linkage Design

Arizona Game and Fish Department, Heritage Data Management System, September 4, 2009

EIS Environmental Impact Statement
Rosemont Copper Project

Forest Service Mitigation Concepts - as of November 2009

Draft

Forest Service Mitigation Concepts – as of November 2009

Note to Cooperating Agencies – The following tables represent (1) permit requirements known to the Forest Service as of November 2009, and (2) concepts and ideas for potential mitigation measures associated with the proposed action (Mine Plan of Operation) and conceptual alternatives developed to date. No decisions have yet been made regarding which of these permit requirements and mitigation ideas or concepts will be utilized in the *DEIS* or incorporated into final decisions. These tables are provided as a starting point for further dialogue about permit requirements and mitigation. In completing the data requests for additional permit requirements and potential mitigation measures detailed in the letter of November 23, 2009, cooperating agencies are encouraged to review these tables and provide further detail or modifications to any of the listed items, note agency concerns with these items, and to provide additional items not yet listed. It is not necessary; however, to duplicate items already included in these tables.

Permits or Authorizations		
Agency	**Permit or Authorization**	**Purpose**
Federal		
COE	Individual Section 404 permit (Clean Water Act (CWA))	Allows for the dredging of material or placement of fill into waters of the US or their tributaries
EPA	Hazardous Waste Identification Number	For hazardous waste that is generated and transported off site in quantities in excess of 100 pounds.
USDOT	Hazardous Materials Transportation Permit	For the transport hazardous materials as defined by the USDOT.
USDA FS	Revised *MPO* (after the publication of the Final EIS and *Record of Decision*)	A revised MPO would be required to address issues in the Record of Decision.
USFWS	Biological Opinion	Ensures that the Coronado's approval of the revised MPO would not jeopardize the continued existence of a threatened or endangered species.
State of Arizona		
ADEQ	*Aquifer* Protection Permit	For discharge into groundwater.
ADEQ	Section 401 Certification	To be obtained prior to the discharge of any wastewater to waters of the United States.
ADEQ	Arizona Pollution Discharge Elimination System (AZPDES) Permit (*Priority State* enforcement of Section 402 of the CWA)	Describes project discharges to surface waters that would be regulated under Section 402 of the CWA.
ADEQ	Solid Waste Permit	Regulates disposal of solid waste on sight.
ADEQ	Hazardous Waste Management	Registration for all EPA Identification numbers.
ADEQ	Drinking Water Registration	Registration for all non-community not-transient drinking systems.
ADEQ	Construction Stormwater General Permit	Issued for construction activities.
ADWR	Groundwater *Withdrawal* Permits	Groundwater withdrawal rights
ADWR	Well Drilling Permit	Issued anytime drilling may intercept the water table.
Arizona State Mine Inspector	Arizona Mined Land *Reclamation* Permit	For reclamation activities at the site.

ADA	Notice of Intent to clear native vegetation.	Required under the Arizona Native Plant Law
SHPO	Section 106 of the National Environmental Policy Act	Protects archaeological and historical properties.
Local		
Pima County PCDEQ	Air Activity Permit	Covers activities leading up to mining and well development.
Pima County Development Services	Grading Permit	For lot development for well sites, grading, and fencing.
Pima County Zoning	Business License and Occupancy Permit	Zoning Code requirements for buildings

Mitigation Common to All Action Alternatives

Air Resources	
Type	**Mitigation**
Dust Generation	Develop a dust management program for the East Access Road, Santa Rita Road, Forest System and all mine site roads including the haul roads including measures to control fugitive dust by use of BMP's such as water sprays, surface binders, and the enforcement of speed limits on all mine roads
Dust Generation	Control fugitive dust from the ore crushing, stockpile, and conveyor facilities by covering crushing and conveyor facilities and use of water sprays, as needed
Dust Generation	Control fugitive dust resulting from the management of tailings by covering conveyors and conveyor transfer points and compacting the tails as they are placed in the tailings facilities
Dust Generation	If dust from the tailings exceeds conditions set forth in the Air Activity Permit issued by Pima County, implement additional measures including the application of soil stabilizers or the mixing of stabilizing polymers with the tailings as approved by the Coronado and Pima County
Internal Combustion Engine Emissions	Establish truck specifications to reduce emissions (Tier II diesel engines) and review equipment purchase options to select mine haul trucks that optimize operations to reduce the number of road miles
	To reduce VOC emissions, stipulate the use of only low-sulfur diesel fuel and - to reduce VOC emissions
	To reduce VOC emissions, provide all fuel storage tanks with submerged-fill equipment
	Establish a Park and Ride Program to encourage workers to carpool and reduce the number of personal vehicle miles driven to and from the Project
	To eliminate the need for on-site electrical generation using diesel-powered generators, construct electric lines as a first step in developing the mine.
	Utilize alternative methods for power generation, such as solar, for administration buildings
Fugitive Chemical Mist Emissions	Use emitters, similar to drip irrigation, to apply the acid leaching solution to the heap to mitigate fugitive chemical mist emissions from the heap leach facility.
Fugitive Chemical Mist Emissions	Use secondary acid mist controls to mitigate fugitive chemical emissions from the electrowinning tankhouse
Grazing	
Type	**Mitigation**
Livestock and Wildlife Water Sources	Develop one sustainable water source for each leased pasture. Prior to implementation of this measure, submit a plan to the Coronado for approval that provides at a minimum, the locations, materials, description of the area to be disturbed and required maintenance; and that demonstrates that the construction and maintenance of the water sources does not adversely impact heritage, biological, or other sensitive resources.
Livestock and Wildlife Water	Treat reclaimed areas with seed mixes according to mitigation for visual resources, ensuring that native grass seed mixes applied according to this plan and provide forage

Sources	for cattle as reclamation proceeds
Emergency Management, Spill Control and Fire	
Type	**Mitigation**
Spill Control	Prior to any change in transportation route or method update plans for spill prevention and control of hazardous materials in MPO supplements The plans should • Describe the toxic or hazardous materials at the site, and how they are transported, stored, used and disposed of. • Describe the emergency procedures, equipment and personnel that would be used to respond to an accidental spill, both on site and during transport on National Forest System Lands • Describe spill response training of all company employees, subcontractors and their employees. Document a plan that describes • Monitoring procedures to ensure, that all storage and contained facilities meet the prescribed standards • All emergency first aid and spill response materials are available and stored in the proper place • All communications equipment is in working order All shipping companies are complying with the terms of their USDOT use permit for hazardous waste shipments
Spill Control	Prior to transporting any chemical or fuel not previously listed in the plans update plans for spill prevention and control of hazardous materials in MPO supplements The plans should • Describe the toxic or hazardous materials at the site, and how they are transported, stored, used, and disposed • Describe the emergency procedures, equipment and personnel that would be used to respond to an accidental spill, both on site and during transport on National Forest System Lands • Describe spill response training of all company employees, subcontractors and their employees. Document a plan that describes • Monitoring procedures to ensure, that all storage and contained facilities meet the prescribed standards • All emergency first aid and spill response materials are available and stored in the proper place • All communications equipment is in working order All shipping companies are complying with the terms of their USDOT use permit for hazardous waste shipments
Spill Control	As required by federal law for storage of petroleum products at the Project, prepare a Spill Prevention Control and Countermeasures Plan (SPCC) that addresses design standards for storage facilities, and response strategies in the event of a spill
Spill Control	As required by the Forest Service for transport of hazardous materials on Forest Roads and management and storage of hazardous materials at the Project site, prepare a Spill Response Plan that includes terms requiring all suppliers of such material to submit spill response plans which describe the procedures, equipment and personnel which would be used in case of a spill during transport. Ensure requirements for transport of hazardous or petroleum materials on Forest roads include: • Use of single unit haul (4,500 gallon maximum, no tractor-trailer) vehicles not tandem trailers for transport of fuel • Locations of spill response materials • Provisions for radio contact with the mine site and the Pima County Sheriff • Advance plans for diversion of streams which could be affected by spills of hazardous materials Notification procedures in the event of a spill.
Spill Control	Require all suppliers of hazardous materials or petroleum products to comply with the

	Rosemont Copper Company's approved Transportation and Spill Response Plans insofar as it affects any part of their operation
Spill Control	Require all vehicles hauling hazardous materials and petroleum products carry first aid and containment equipment along with a copy of the most recent spill response plan.
Spill Control	Require all vehicle drivers complete spill response, and safety training, at least once annually prior to transporting hazardous materials and petroleum products.
Spill Control	Require all suppliers of toxic or hazardous materials provide evidence of spill response training, plans, and spill cleanup materials that would be used in transporting materials to the mine.
Spill Control	Request certification that all trucks used to transport materials to the mine site meet or exceed USDOT standards for use material being transported. and provide this information to the Coronado prior to shipping hazardous materials or fuels
Spill Control	Require notification to the Coronado prior to changing types of transport vehicles, materials, or material containers for hazardous materials.
Spill Control	Require annual inspection and review of • All storage and containment facilities to ensure they are maintained to standard and adequate to contain spills • Emergency first aid and spill response materials to see that they are current and stored in the proper place • Radio communications equipment to see that it is in working order • Transport companies to ensure that they are complying with the terms of their road use permit for shipments on Forest roads and on the mine site Document the results of the annual review, certifying to the Coronado and other appropriate agencies that all Plan requirements are being met.
Fire Protection	Comply with all rules and regulations pertaining to fire protection and health and safety of project employees.
Fire Protection	Comply with Coronado requirement that operators on Forest System lands comply with procedures for protecting against starting wildfire and providing assistance in the suppression of wildfires.
Fire Protection	Comply with Mine Safety and Health Administration (MSHA) mandatory requirements for on-site fire protection
Fire Protection	Install water supply hookups on the mine site compatible with the equipment of the local wildland structural fire control agencies. Provide the locations of these hookups and any other potential sources of water, such as stock tanks, to the Coronado and update as necessary.
Emergency Management	Comply with MSHA provisions for ensuring worker safety.
Emergency Management	Develop and implement a training program that complies with MSHA standards to include annual first aid and hazardous materials training for all employees.
Emergency Management	Maintain trained personnel and equipment to respond to fires and/or medical emergencies at the mine site.
Emergency Management	Provide emergency medical technicians and land based emergency transport service from the mine to Tucson.
Emergency Management	Designate a helicopter landing facility at the mine property and maintain a standing agreement for "Life Flight" services to allow rapid transport in the case of extreme emergencies.
	Heritage Resources
Type	**Mitigation**
Heritage	Comply with Section 106 of the National Historic Preservation Act and associated regulations requirements for management of heritage and cultural resources on federal lands or federally funded, licensed, or permitted projects.
Heritage	Wherever possible and feasible, avoid important cultural sites.
Heritage	Continue to conduct consultation between the Coronado and all interested Native American tribes regarding Traditional Cultural Properties.
Heritage	Provide access to tribal members for the collection of traditional plant materials
Heritage	Develop a Programmatic Agreement to identify procedures for compliance with National

	Historic Preservation Act and other laws that includes • An historic properties management plan • Treatment and monitoring of historic properties • Treatment of all human remains, sacred objects, and objects of cultural patrimony discovered as a result of the implementation Established measures for compliance with the Native American Graves Protection and Repatriation Act
Heritage	Fund a grant from Rosemont Copper Company for the development of interpretive kiosks for cultural/historical sites along the Los Colinas segment of the Arizona Trail.
Heritage	Ensure any surface disturbing activities in the vicinity of any identified cultural resource are monitored by an archaeologist.
Heritage	Cease operations near archaeological remains found or discovered during construction or mining operations
Land Use	
Type	**Mitigation**
Land Use	Protect or reference benchmarks, section and corner monuments prior to disturbance.
Land Use	Submit a plan that describes plans to protect or reference benchmark, section or corner monuments prior to disturbing them
Night Skies	
Type	**Mitigation**
Night Skies	Create a management position to develop and implement a lighting program that complies with the Pima County Outdoor Lighting Code (Ordinance 2006-91)
Night Skies	Submitted a plan for monitoring, auditing, and reporting light emissions to the Coronado for approval
Night Skies	Use shielded or hooded lights, directional lighting, or low-pressure sodium lighting in areas that will not compromise worker safety
Night Skies	Minimize decorative lighting
Noise and Vibration	
Type	**Mitigation**
Noise	Restrict blasting to daylight hours
Noise	Enforcing speed limits on the East Access Road
Noise	Use attenuated backup alarms on the East Access Road
Noise	Prohibit the use of un-muffled engine brakes (such as Jake Brakes®) on the East Access Road
Noise	Comply with MSHA requirements for worker health and safety, including requiring noise protection for workers in high noise areas.
Noise	Comply with all health and safety requirements pertaining to noise generation
Vibration	Use computer-based blasting technologies that phase the blasting sequences to minimize vibration
Noise and Vibration	Prepare a Noise and Vibration Monitoring Plan to be approved by the Coronado. Annually submit noise and vibration monitoring results to the Coronado for review.
Public Health and Safety	
Type	**Mitigation**
Safety	Prohibit public entry into the mining area
Safety	Sign and fence the active mining area to minimize the potential for the public to accidentally enter any portion of the mine operational area
Recreation	
Type	**Mitigation**
Recreation Access	Maintain access around the operations so that access from the eastern portions of the Santa Rita Mountains would not be cut off from the western, including maintaining access across Gunsight Pass

Recreation Access	Construct a perimeter road would around the mining operations that would link existing roads.
Recreation Access	Continue to work within the Arizona Game and Fish Cooperative Land Owner Program (CLOP) which would help ensure public access to private lands not affected by mine-related operations
Open Space	Place private lands on the west side of the Santa Rita Mountains in the Game and Fish Cooperative Land Owner Program (where safety considerations permit).
Arizona Trail	In coordination with the Coronado and the Arizona Trail Association, fund realignment and relocation of a portion of the Las Colinas segment of the Arizona Trail
Arizona Trail	Provide a water station for horses at the Los Colinas segment of the Arizona Trail
Arizona Trail	Fund interpretive signage along a portion of the Arizona Trail
Arizona Trail	Complete an additional segment of the Arizona Trail up to "Sentinel Peak," including an observation point
Riparian	
Type	**Mitigation**
Riparian	Provide fenced exclosures for highest value riparian habitat on private lands
Riparian	Exclude selected areas from livestock grazing that would have the potential for priority high quality riparian use during reclamation and post-mining
Riparian	Fence off a portion of livestock water areas for priority wildlife areas.
Riparian	Identify and exclude a portion of the stock ponds in leopard frog habitat that would provide protection for frog habitat within the pond area.
Socioeconomic	
Type	**Mitigation**
Community Endowment	Develop a community endowment program • Fund an initial $25 million permanent endowment • Fund an additional $500,000 annual contribution during the life of mining operations The Endowment would be managed by an independent Board of Trustees, which would provide annual reports to the Coronado documenting the administration of the endowment.
Research	Support research into sustainable mineral development technologies as detailed in a proposal to the Coronado that identifies funding and detail objectives and which establishes reporting requirements.
Soils	
Type	**Mitigation**
Soils	Recover soil material and materials suitable for growth media from areas of project disturbance where practicable as identified in the Reclamation Plan.
Soils	Conduct reviews of soil erosion and productivity following all surface disturbing activities and large storm events. As appropriate, use the results of this monitoring to update the plans for erosion, surface water control, and reclamation.
Growth Media	Provide for incorporation of additional growth media if required based on site-specific analysis and study results.
Growth Media	To the maximum extent practicable, incorporate organic material produced during grubbing into the growth media.
Financial Assurance of Reclamation	Annually review the MPO including the Reclamation Plan and financial assurance on an annual basis, and as appropriate, modify or supplement to address soil issues.
Transportation	
Type	**Mitigation**
Access	Ensure access road design meets Coronado specifications (USDOT, 2003) for road width, grade, alignment, surfacing, drainage, quality control and signing and any exceptions to these standards meet with Coronado approval.
Access	Ensure Coronado pre-approves all location or design changes for access and haul roads

Access	Develop plans to control public access to mine areas such as fencing and posting to prohibit unauthorized entry to hazardous areas, and that provide for administrative traffic, as well as access for Forest visitors, contractors or operators
Access	For all access roads, guarantee administrative and contractor use of the mine access road during the active life of the mine including construction, reclamation and long-term monitoring
Access	Coordinate all use of approved and alternative access routes within the Coronado during the construction period
Road Construction	Comply with Forest Plan requirements for road construction and natural resource protection
Road Construction	Submit designs for road construction and improvements to the Coronado for review and approval prior to initiating construction
Employee Transport	Develop Park and Ride Program (PARP)
Transport	Develop a written policy for compliance with all Forest traffic rules and require that all contractors comply with State and Forest rules for oversize and overweight loads
Scheduling	Alter trucking schedules to avoid times when school busses are operating on State Route 83.
Signage	Maintaining all signs, fencing and other features of the mine safety and security program
Safety	Prohibit use of all secondary trailers (pups)
Safety	Include training requirements for all drivers including a requirement that all new drivers transporting fuel, chemicals or concentrate make their first trip to the site accompanied by a company representative in the transportation and/or spill control plan
Safety	Provide pilot car accompaniment for all fuel, chemical supply and concentrate trucks, all tractor trailer units and any single unit vehicles more than 45 feet in length
Safety	annually to review the MPO, including the transportation plan and modify or supplement as necessary to address transportation and safety issues
Safety	Develop a testing and inspection schedule as outlined in Coronado guidelines (USDOT, 2003), acceptable to the Forest for all construction and reconstruction of mine access and haul road
Safety	Providing "as-built" certification of all items by a licensed professional engineer
Safety	Ensure the Forest Administrator reviews the Project construction during construction to ensure compliance with approved Plans.
Safety	Forward certification, results of tests and inspections, to the Forest for review and approval.
Safety	Annually inspect all access and haul roads for the purpose of certifying that all design features are functioning as designed, and/or to identify any needed improvements or changes
State Route 83	Design for two (2) truck turnouts along SR83
State Route 83	Design for up to five school bus turnouts along SR83
State Route 83	Establishing Park and Ride areas
State Route 83	Provide ADOT with design alternatives for the intersection of State Route 83 and the East Access Road that, at a minimum, include acceleration/deceleration lanes and divided highway pass-through lanes
Water Resources	
Type	**Mitigation**
East Side Groundwater Resources	Develop a water resources monitoring program to provide enhanced water monitoring to detect, document, and quantify effects of mining. The modified monitoring plan would support a performance-based approach to compliance assessment, where groundwater quality data from select operational monitoring wells to be located down-gradient of the mines would be evaluated for compliance. If performance criteria exceed pre-established targets (e.g. if the calculated groundwater load were to result in exceedance of a surface water compliance target), a response action would be required by the mine to reduce the groundwater load to acceptable levels.
East Side Surface Water Resources	Provide a Stormwater Pollution Prevention Plan (SWPPP) that includes:

	• Permanent water control structures that would exist beyond the life of mine • Culverts on streams designed to handle flow from the 100-year storm event (TBD). • Road sediment control BMPs designed for the 25 year, 24-hour precipitation event (TBD). • Utilizes best management practices for project sediment control. *Sediment* control monitoring.
Sediment	
Type	**Mitigation**
Runoff	Divert runoff from undisturbed areas around all surface disturbances through ditches or berms. Design diversions that would exist beyond life of mine would to safely pass flows from the 100-year, 24-hour storm event
Non-Point Sediment	Non-point source sediment control measures would consist of practices such as: • Disturbing the smallest area practical • Concurrent reclamation when feasible • Intercepting and treating runoff from disturbed areas in accordance with best management practices and the Storm Water Pollution Prevent Plan (SWPPP) to prevent sediment from leaving the site Diversion of all runoff from undisturbed areas around areas of disturbance.
Non-Point Sediment	Prohibit commencement of surface disturbing activities until provisions for erosion and sediment control have been reviewed and are in place
Non-Point Sediment	Use berms and ditches to control runoff from road surfaces.
Non-Point Sediment	Ensure ditches include settling basins, hay bales or silt fences to control sediment
Runoff	Place sediment control devices such as stormwater dispersion terraces, silt fences, gabion sediment traps, or straw bale barriers as needed to minimize road runoff on the undisturbed areas between and downhill of roads.
Revegetation	To minimize the sediment transport from these disturbed areas, seed road cuts and fills with a quick growing cover consisting of native species approved by the Coronado and adapted to site conditions as soon as practicable after construction
Revegetation	Use hydroseeding for road revegetation on steeper or more erodible cuts or fills as appropriate
Sediment Control	Inspect all diversions and sediment control or treatment measures and certify that the facility was constructed as planned, prior to use
Sediment Control	Inspect and maintain sediment control measures after severe storm events, document the results, and make submit them annually for review by the Coronado
Sediment Control	As necessary, supplement the MPO with site-specific plans for erosion and sediment control facilities and practices in areas that are proposed for disturbance
Sediment Control	Review the site-specific plans for erosion and sediment control facilities and practices prior to construction to ensure that they meet the intent of the approved MPO and the Coronado Preferred Alternative.
Sediment Control	Approve the design and location of sediment control structures prior to installation
Sediment Control	Annually, review and approve the effectiveness of ongoing erosion and sediment control measures prior to the next year's operation.
Reclamation	
Type	**Mitigation**
Financial Assurance	Require a bond or other financial assurance sufficient to cover the actual cost of reclamation.
Facilities Reclamation	Remove ore processing and other ancillary facilities, including foundations, and return the areas to as near the original contour as practicable, including replacing topsoil and revegetating
Land Reclamation	Require reclamation activities to maintain water quality and establish native vegetation
Land Reclamation	Submit cross sections and topographic maps, which display post-mining topography for all reclaimed areas. Ensure slopes on these areas are three to one or less, unless it can be demonstrated to the satisfaction of the Coronado that a steeper slope can be reclaimed to

	the same standard and stocking criteria.
Land Reclamation	Edges of topographic disturbances would be blended with adjacent undisturbed land and would have no sharp topographic breaks.
Land Reclamation	Restore soil storage sites to pre-mine topography upon removal of stockpiles.
Land Reclamation	Re-contour and revegetate all roads, including haul roads that are not needed for long-term access needs to the extent practicable.
Land Reclamation	Reclaim roads as soon as the lack of need for future use is identified
Land Reclamation	Revegetate with native species to minimize the amount of time to return to near natural conditions and to minimize the spread of non-native species
Land Reclamation	Salvage growth media from disturbed areas sufficient to cover all disturbed areas with 1 foot of cover.
Land Reclamation	Place soil stockpiles in locations that are stable, isolated from surface and subsurface water, gently sloping and well drained.
Land Reclamation	Ensure stockpiles are convex in shape and have no more than three to one slopes.
Land Reclamation	Immediately revegetated stockpiles to prevent erosion.
Land Reclamation	Use sediment control structures to ensure that no soil material is lost
Land Reclamation	Identify appropriate reference sites in the Project vicinity to determine native species occurrence and cover and use this information to develop a long-term site reclamation plan. Based on the reference site data, appropriate native seed mixes and/or plant lists would be reviewed and approved by the Forest Service prior to any site revegetation.
Land Reclamation	For short-term site reclamation, such as seeding topsoil stockpiles, utilize native species or short-lived non-native species, such as annual grasses or forbs. Prohibit use of persistent non-native species for reclamation.
Land Reclamation	Use the following reclamation criteria to minimize impacts to the environment: • Select vegetative species based on the following priorities: o Native species capable of being self-sustaining on the selected site o Erosion control and stability o No non-native plants. • Use sediment and erosion control measures to prevent erosion to the extent possible on reclaimed surfaces, and to retain sediment onsite if erosion does occur. • Maintain all sediment control measures until the reclamation effort has met established standards and bonds have been released. Isolate all toxic or hazardous substances from the surface environment
***Noxious Weed* Control**	Submit a weed control plan to the Forest Service for review and approval that includes specifics on reducing noxious weed introduction and weed control in the Project area.
Noxious Weed Control	Ensure noxious weed control activities at the site are ongoing to prevent the establishment of noxious weed populations.
Reclamation	Annually submit a summary of reclamation activities including monitoring that includes maps and photos that provide an accurate accounting of disturbed and reclaimed acreage; plans that project the following seasons disturbance and reclamation work; and details on vegetation removal and treatment, soil salvage, storage and revegetation, and annual reclamation requirements.
Reclamation	Conduct an annual Forest Administrator inspection of site reclamation
Reclamation	Record species composition and canopy cover of seeded/planted and "volunteer species." If seeded/planted species have not become established following the first year, undertake supplemental seedings and plantings. Remove any noxious weeds that invade revegetated areas by mechanical or other approved methods specified in the weed control plan. Conduct additional annual monitoring for a minimum of 3 years or until successful revegetation is confirmed by Forest Service. Prepare and submit a report assessing the status of the revegetation program to the Coronado and other appropriate agencies. Modify or supplement the MPO as necessary to address reclamation issues.
Visual Resources	
Type	**Mitigation**
Land	Complete a comprehensive plan to mitigate visual impacts that incorporates information gained during on-sight studies conducted independently to determine the effectiveness of a variety of growth media and plant pallets. The Plan would, at a minimum incorporate

	the *"Diverse Habitat Mosaic Reclamation Approach"* that includes a variety of surface treatments, varying slope lengths and angles with less prescriptive water management techniques.
Land	Reestablishing drainage areas that integrate talus slopes, rocky outcrops, trees, and riparian characteristics. In addition to the predominant grasslands with forbs and shrubs plant communities, re-establish other existing plant communities at selected locations on site, including but not limited to agave, a variety of trees, ocotillo, and shrubs. Plant and seed to mimic the existing mosaic of vegetation and to provide diversity to the visual landscape. Work variations of the drainage versus upland areas into the design such that the prescriptive ridge and drainage considerations would be augmented by other treatments to provide a more variable landform
Land	Ensure all plantings, seed mixes, and their suppliers are approved by the Coronado prior to planting..
Land	Paint, stain, or vegetate portions of the pit wall and road cuts visible from Key Observation Points (KOPs). Ensure all paints or stains are approved by the Coronado prior to use.
Facilities	Paint all buildings and other major project features with non-reflective, earth-tone paints, approved by the Forest Service.
Wildlife and Vegetation	
Type	**Mitigation**
Listed Species	Follow the conservation measures developed in consultation with the USFWS under Section 7 of the *Endangered Species* Act to address impacts to federally listed threatened and endangered species, or those proposed for listing as documented in the Biological Opinion from the USFWS
Wildlife Habitat	Address long-term restoration wildlife habitats and existing vegetation types in the Reclamation Plan
Wildlife Habitat	Provide for measures designed to produce high value wildlife habitat in reclamation efforts. These measures would include reseeding with mixtures of native plants of value to wildlife; and creation of diverse habitats for game and non-game animals. Use native species to ensure achievement of self-sustaining vegetation following reclamation. Establish vegetation reference areas adjacent to the Project to quantify reclamation goals for vegetative cover. Conduct surface vegetation clearing in compliance with Forest Service guidelines and practices and only after receiving Coronado approval.
Weed Control	Institute a weed control plan that conforms to Coronado and State of Arizona guidelines.
Wildlife	Educate employees about: • Avoidance of inadvertent or purposeful harassment of wildlife • Recognition and protection of state and federal threatened and endangered species and Forest Service sensitive species in the Project area Reporting of any threatened, endangered, or sensitive plant or animal species to the Forest Service or Arizona Game and Fish Department
Power Poles	To prevent accidental electrocution of raptors, follow the guidelines in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* (APLIC, 1996) when constructing new power poles
Vehicle/Wildlife Collisions	Report vehicle/wildlife collisions on mine and Forest roads
Water Sources	Upgrade the Rosemont Ranch livestock water system with goal of one sustainable wildlife water source in each of the individual pastures under lease to Rosemont
Fencing	Provide fenced livestock exclosures for highest value riparian habitat on Rosemont Ranch private lands.
Fencing	Identify and protect with fencing, that portion of the stock ponds in leopard frog habitat that would provide protection for frog habitat within the pond area.
Bat Habitat	Upgrade protection of selected bat habitat on Rosemont Ranch private lands
Offsite Measures	Implement specified areas of offsite mitigation to meet permit conditions or stipulations of US ACOE, US DOI FWS, BLM, and other cooperating agencies such as the *AGFD*.
Other Mitigation	
Type	**Mitigation**
Annual Review	Conduct an annual review with the Coronado to determine if activities are in accordance

	with the approved Plan and if any changes to the MPO or financial assurance are needed
Annual Report	Provide an annual report summarizing mining, reclamation, and monitoring activities and projecting proposed activities for the coming year.
Permit Changes	Provide notice to the Coronado and make appropriate modifications to the MPO if there are significant changes to project permits (such as NPDES, 404 or Air Quality).
Testing	Throughout the life of the mine, test waste rock and tailings materials to evaluate potential for acid generation and metals leaching

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Rosemont Copper Project
Mitigation Lands

July 2010

DRAFT

Rosemont Copper Project Mitigation Concept

- Focus on onsite mitigation
  - Onsite habitat improvements
  - Placement of restrictive covenants on Rosemont ranch lands
  - Placement of restrictive covenants on patented claims
- Offsite mitigation to supplement onsite mitigation efforts
  - Placement of conservation easements or restrictive covenants on new lands
  - Provision of access across new lands
  - Acquisition of new lands
  - In-lieu fee payment to third party project (e.g. Audubon Society)

Relevant Mitigation Agencies or Entities

- Regulatory mitigation obligation
  - U.S. Army Corps of Engineers (ACOE)
  - U.S. Fish and Wildlife Service (USFWS)
- Mitigation policy or interest
  - Arizona Department of Mines and Mineral Resources (DMMR)
  - Arizona Game and Fish Department (AGFD)
  - Arizona State Parks
  - Bureau of Land Management (BLM)
  - Coronado National Forest (CNF)
  - Pima County
  - Tribal entities (Tohono O'odham, et al)

11 Issues Being Analyzed in the EIS

- Land Stability and Soil Productivity
- Air Quality
- Water Resources
- Springs, Seeps, and Riparian Habitats
- Plants and Animals
- Visual Resources
- Recreation
- Public Safety
- Dark Skies and Astronomy
- Heritage Resources
- Socioeconomics

Agencies' Priority Issues for Mitigation

Issue	ACOE	USFWS	BLM	AGFD	Tribes	DMMR	State Parks	Pima Co.	Consensus Priorities
Land Stability and Soil Productivity									
Air Quality									
Water Resources	X	X						X	
Springs, Seeps, and Riparian Habitats	X	X		X	X			X	
Plants and Animals		X	X	X	X			X	
Visual Resources									
Recreation			X	X			X		
Public Safety									
Dark Skies and Astronomy									
Heritage Resources			X		X			X	
Socioeconomics						X			

X = Agency priority (Regulatory obligation) X = Agency priority (Policy or Interest)

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Mitigation Lands

- The focus of the mitigation lands effort will be on the five issues most commonly identified as a priority (or assumed to be a priority) for agencies or entities with a mitigation obligation or interest.

Agencies' Priority Issues for Mitigation

Issue	ACOE	USFWS	BLM	AGFD	Tribes	DMMR	State Parks	Pima Co.	Consensus Priorities
Land Stability and Soil Productivity									
Air Quality									
Water Resources	X	X						X	
Springs, Seeps, and Riparian Habitats	X	X		X	X			X	
Plants and Animals		X	X	X	X			X	
Visual Resources									
Recreation			X	X			X		
Public Safety									
Dark Skies and Astronomy									
Heritage Resources			X		X			X	
Socioeconomics						X			

X = Agency priority (Regulatory obligation) X = Agency priority (Policy or Interest)

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Agencies' Priority Issues for Mitigation

Issue	ACOE	USFWS	BLM	AGFD	Tribes	DMMR	State Parks	Pima Co.	Consensus Priorities
Land Stability and Soil Productivity									
Air Quality									
Water Resources	X	X						X	X
Springs, Seeps, and Riparian Habitats	X	X		X	X			X	X
Plants and Animals		X	X	X	X			X	X
Visual Resources									
Recreation			X	X			X		X
Public Safety									
Dark Skies and Astronomy									
Heritage Resources			X		X			X	X
Socioeconomics						X			

X = Agency priority (Regulatory obligation) X = Agency priority (Policy or Interest)

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Mitigation Lands

- Mitigation for the Rosemont Project will focus first on onsite mitigation efforts
- Offsite mitigation will be accomplished through a hierarchical series of mechanisms.

Conservation Easements/Restrictive Covenants

- Recordation of Conservation Easements or Restrictive Covenants on existing lands

Mitigation Mechanism by Key Issue

Mitigation Mechanism	Water Resources	Springs, Seeps, and Riparian	Plants and Animals	Recreation	Heritage Resources
Conservation Easement/Restrictive Covenant	Existing		200 acres of PPC habitat	2,000 acres CLOP	40 acres near Helvetia

Conservation Easements/Restrictive Covenants

- Recordation of Conservation Easements or Restrictive Covenants on new lands

Mitigation Mechanism by Key Issue

Mitigation Mechanism		Water Resources	Springs, Seeps, and Riparian	Plants and Animals	Recreation	Heritage Resources
Conservation Easement/Restrictive Covenant	Existing			200 acres of PPC habitat	2,000 acres CLOP	40 acres near Helvetia
	New		Unknown acres of riparian habitat (TBD)			2 other TCP (TBD)

Access

- Provision of access to resources across new lands

Mitigation Mechanism by Key Issue

Mitigation Mechanism		Water Resources	Springs, Seeps, and Riparian	Plants and Animals	Recreation	Heritage Resources
Conservation Easement/Restrictive Covenant	Existing			200 acres of PPC habitat	2,000 acres CLOP	40 acres near Helvetia
	New		Unknown acres of riparian habitat (TBD)			2 other TCP (TBD)
Access					3 new access points	4 access points to resource collection or sacred sites

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Acquisition

- Acquisition of new lands

Mitigation Mechanism by Key Issue

Mitigation Mechanism		Water Resources	Springs, Seeps, and Riparian	Plants and Animals	Recreation	Heritage Resources
Conservation Easement/Restrictive Covenant	Existing			200 acres of PPC habitat	2,000 acres CLOP	40 acres near Helvetia
	New		Unknown acres of riparian habitat (TBD)			2 other TCP (TBD)
Access					3 new access points	4 access points to resource collection or sacred sites
Acquisition	Known		40 acres of habitat on east side of Santa Rita Mountains	400 acres of suitable agave habitat on east side of Santa Rita Mountains	700 acres of habitat suitable for hunting on west side of Santa Rita Mountains	
	Unknown	Unknown acres of waters of the U.S. (TBD)		Unknown acres of additional habitat in support of AGFD (TBD)		

In-lieu Fee

- Payment in-lieu to a third party interest

Mitigation Mechanism by Key Issue

Mitigation Mechanism		Water Resources	Springs, Seeps, and Riparian	Plants and Animals	Recreation	Heritage Resources
Conservation Easement/Restrictive Covenant	Existing			200 acres of PPC habitat	2,000 acres CLOP	40 acres near Helvetia
	New		Unknown acres of riparian habitat (TBD)			2 other TCP (TBD)
Access					3 new access points	4 access points to resource collection or sacred sites
Acquisition	Known		40 acres of habitat on east side of Santa Rita Mountains	400 acres of suitable agave habitat on east side of Santa Rita Mountains	700 acres of habitat suitable for hunting on west side of Santa Rita Mountains	
	Unknown	Unknown acres of waters of the U.S. (TBD)		Unknown acres of additional habitat in support of AGFD (TBD)		
In-lieu		In-lieu fee for lost waters of the U.S. – approximately 40 acres of waters, mitigated at 3x	20 wells	20 guzzlers 3 protected bat roosts	20 guzzlers	

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December 15, 2009

Jeanine A. Derby
Forest Supervisor
Coronado National Forest
300 W. Congress
Tucson, Arizona 85701

Re: Request for mitigation measures, planned studies, or needed technical reports in relation to the Rosemont Copper Project.

Dear Ms. Derby:

This letter is in reply to your letter Dated November 23, 2009, requesting the information and data to support the ongoing analysis process for the Rosemont Copper Project. The Arizona Game and Fish Department has public trust responsibility wildlife within the state of Arizona irrespective of landownership, excepting those wildlife existing on American Indian trust-status lands. 17-102 expresses that "wildlife . . . are the property of the state". The Department shares responsibility for federally listed species and migratory birds with the U.S. Fish and Wildlife Service.

The Department regulates take of 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." Although the possibility for direct take from this project may exist, the project proponent has not notified the Department of any anticipated, foreseeable, take as defined above. Any such take associated with the project would require compliance with ARS Title 17 as well as all rules promulgated by the Arizona Game & Fish Commission.

MITIGATION MEASURES

Except for Department-owned property, the Department does not have regulatory authority over wildlife habitat, e.g. land and water, and therefore has no permitting authority under which to mandate mitigation measures or terms and conditions due to habitat losses. The Department must therefore seek mitigation for habitat losses through the various permitting agencies when habitat losses are anticipated. **The Arizona Game and Fish Commission (Commission Policy A2.16) has directed the Department to seek mitigation at a 100% level for actual or potential habitat losses resulting from land and water projects.** Per Commission policy, habitat compensation plans developed [by the Department] in accordance with Federal and State law, must utilize resource category designations as stipulated in the Department's Wildlife and Wildlife Habitat Compensation Procedures (Department Policy I2.3 below). Among factors deemed important by the Commission are potential impacts to special category species and/or economically important wildlife species as well as issues which reflect the value, quantity, and quality of habitats which may be impacted by proposed projects.

Arizona Game and Fish Department Policy I2.3 Wildlife and Wildlife Habitat Compensation

Effective: 06/04/1994

Process Owner: WMHB Branch Chief

Department Policy: It shall be the policy of the Department to develop adequate compensation plans for actual or potential habitat losses resulting from land and water projects in accordance with State and Federal laws. Habitat compensation plans will seek compensation at a 100% level, where feasible, and will be developed using habitat resource category designations. See Commission Policy A2.16.

Authority: The Director of the Arizona Game and Fish Department is authorized under A.R.S. Title 17-211, Subsection D, to perform the necessary administrative tasks required to manage the wildlife resources of the State of Arizona. Pursuant to those duties and in accordance with federal environmental laws and resource management acts, such as the National Environmental Policy Act, Fish and Wildlife Coordination Act, and Endangered Species Act, the Director is further charged with cooperating in the determination of potential impacts to Arizona's wildlife resources resulting from federally funded land and water projects. In addition, a Commission M.O.U. assigns similar responsibilities for evaluating proposed projects on lands administered by the State Land Department. An integral part of this process is the development of adequate compensation measures aimed at eliminating or reducing project-associated impacts.

Procedure: Criteria used to identify general compensation goals are as follows:

A. Resource Category I.

1. **Designation Criteria.** Habitat in this category are of the highest value to Arizona wildlife species, and are unique and/or irreplaceable on a statewide or ecoregion basis.
2. **Compensation Goal.** No loss of existing in-kind habitat value.
3. **Guideline.** The Department will recommend that all potential losses of existing habitat values be prevented. Insignificant changes that would not result in adverse impacts to habitat values may be acceptable provided they will have no significant cumulative impact.
4. **Habitat Types.** Habitat types associated with Resource Category I shall include, but not limited to the following examples:
   a. Perennial Stream Habitats
   b. Wetlands and Riparian habitats of at least one acre in size, which are associated with perennial waters. Biotic communities included in this classification follow descriptions provided in Brown (1982) and Henderson and Minckley (1984).
   c. Key utilization areas for species listed or proposed for listing under the Endangered Species Act of 1973 as Threatened or Endangered and Endangered State Threatened Native Wildlife species.

B. Resource Category II.

1. **Designation Criteria.** Habitats in this category are of high value for Arizona wildlife species and are relatively scarce or becoming scarce on a statewide or ecoregion basis.
2. **Compensation Goal.** No net loss of existing habitat value, while minimizing loss of in-kind value.
3. **Guideline.** The Department will recommend that all potential losses of Resource Category II habitat values be avoided or minimized. If significant losses are likely to occur, the Department will recommend alternatives to immediately rectify, reduce, or eliminate these losses over time.
4. **Habitat Types.** Habitat types associated with Resource Category II shall include, but not limited to, the following examples:
   a. Key utilization areas for antelope and bighorn sheep.
   b. Key utilization areas for Threatened and Candidate State Threatened Native Wildlife species, candidate species for federal listing as Threatened or Endangered (Categories I and 2).
   c. Actual or potential reintroduction sites for species that are listed as Extirpated or Endangered on the State Threatened Native Wildlife list.
   d. Blue ribbon fishing areas (i.e., Lee's Ferry and Becker Lake).

e. Isolated mountain ranges provided Subalpine-coniferous forest habitats (i.e., Pinaleno Mountains).
f. State and federally operated game preserves, refuges or wildlife areas.
g. Montane meadows.

C. **Resource Category III.**
1. **Designation Criteria.** Habitats in this category are of high to medium value for Arizona wildlife species, and are relatively abundant on a statewide basis.
2. **Mitigation Goal.** No net loss of habitat value.
3. **Guidelines.** The Department will recommend ways to minimize or avoid habitat losses. Anticipated losses will be compensated by replacement of habitat values in-kind, or by substitution of high value habitat types, or by increased management of replacement habitats, so that no net loss occurs.
4. **Habitat Types Involved.** Habitats in this category are of a natural, undisturbed condition or they involve bodies of water of economic importance and shall include, but not be limited to, the following examples:
   a. Chihuahua, Great Basin, Mohave, and Sonoran Desert habitat types.
   b. Desert-grasslands and Chaparral zones.
   c. Oak and coniferous woodlands and coniferous forests.
   d. Reservoir habitats.

D. **Resource Category IV.**
1. **Designation Criteria.** Habitats in this category are of medium to low value for Arizona wildlife species, due to proximity to urban developments or low productivity associated with these lands.
2. **Mitigation Goal.** Minimize loss of habitat value.
3. **Guideline.** The Department will recommend ways to avoid or minimize habitat losses. Should losses be unavoidable, the Department may make a recommendation for compensation, based on the significance of the loss.
4. **Habitat Types Involved.** Habitat types associated with Resource Category IV shall include, but not be limited to, the following examples:
   a. Agricultural Lands.
   b. Undeveloped urban areas (i.e., land proximal to waste water treatment facilities, municipal mountain preserves, and undeveloped lands in proximity to municipal and industrial areas). Habitats exhibiting low wildlife productivity as a result of man's influence.

Arizona Game and Fish Commission Policy A2.13 Riparian Habitat

Effective: 03-15-1991

Riparian habitat is defined as distinct vegetation and land shape, which occur in or adjacent to drainage ways and/or their flood plains. It is characterized by different species or life forms, both plant and animal, than those of the immediately surrounding habitat. The riparian zone is typically the strip of land bordering lakes, rivers, and streams whose vegetation depends on a high water table resulting from proximity to an aquatic ecosystem or to subsurface water.

Riparian habitats in the arid Southwest provide forage, water, and cover for a substantial number of game and nongame species, as well as providing essential components for aquatic life. Importance of riparian habitats is further evidenced by considering that a majority of special category wildlife species are obligate riparian inhabitants.

Riparian habitat in Arizona has been a focal point for human development and resource utilization since the early 1800s. The result has been the deterioration and loss of this rare and valuable natural resource. Less than 15 percent of historic riparian areas remain at this time.

It is the policy of the Arizona Game and Fish Commission that the Department shall recognize riparian habitats as areas of critical environmental importance to wildlife and fisheries. The Department shall actively encourage management practices that will result in maintenance of current riparian habitat, and restoration of past or deteriorated riparian habitat in accordance with the Department Wildlife Habitat Compensation procedures. Further, the Department shall actively encourage the maintenance, restoration, and protection of instream flows, which are often essential to maintaining riparian habitat.

MITIGATION COMPENSATION GOAL FOR ROSEMONT COPPER PROJECT

The habitat impacted by the Rosemont Copper Project may include habitat in categories I, II, and III. It is yet unknown what the extent of the effects of the project will be but is reasonable to assume that category I habitat in Cienega Creek has the potential to be affected, while Category II and III habitat within the footprint of the mine will certainly be a total loss to wildlife during the operation of the mine and quite likely for the foreseeable future. Moreover, the mine and associated waste will fragment the larger habitat block generally delineated by the Coronado National Forest Santa Rita unit, and the modeled wildlife linkages connecting this unit to the Whetstone and Rincon units (see http://corridordesign.org/linkages/arizona).

FOR RESOURCE CATEGORY I HABITAT: All springs, and riparian habitat (including Cienega Creek), or areas where federally listed species have been documented and which may be important habitat for those listed species including lesser long-nosed bat (*leptonycteris cursoae*) and Chiricahua leopard frog (*lithobates chiricahuensis*). The Department seeks:

COMPENSATION GOAL. - No loss of existing in-kind habitat value, e.g. no amount of degradation or loss will be supported by the Department.

GUIDELINE - The Department recommends that all potential losses of existing habitat values be ***prevented.*** Insignificant changes that would not result in adverse impacts to habitat values may be acceptable *provided they will have* ***no significant cumulative impact.***

FOR RESOURCE CATEGORY II AND III HABITAT: The footprint of the mine and associated waste (exclusive of category I habitat such as springs); any other area within this category that is impacted by the project; any area which may be habitat for listed species as well as habitat for the Rosemont Talus Snail (*Sonorella rosemontensis*) (whose status is currently under review by the Fish and Wildlife Service.) The range of this species may be wholly within the project area, and is therefore of particular concern, as its habitat may be wholly or substantially eliminated. **Should this be the case, the compensation goal set below, as is standard for unlisted species, is not meaningful, as no other habitat may exist.** Indeed this is wholly an artifact of the listing process which may have not adequately addressed the threats to this species' survival.

COMPENSATION GOAL - No net loss of existing habitat value, while minimizing loss of in-kind value, e.g. the Department seeks that 100% of the value of public trust resources be returned to the public.

GUIDELINE - The Department recommends that all potential losses values be avoided or minimized. If significant losses are likely to occur, the Department recommends that alternatives to immediately rectify, reduce, or eliminate these losses over time be developed. Such alternatives might include compensatory lands of equal or higher value be purchased for public benefit.

COMPENSATORY LANDS

The Department understands the Forest has requested the cooperating agencies identify lands which may be purchased for mitigation purposes. The Department applauds this and will respond to this request in another document. The Department recommends, however, that the Forest develop criteria for scoring lands which may be available for purchase as compensation for lands which are not longer available for public trust purposes. In order to acquire the best possible lands for compensation, the Department recommends that the Forest seek input not just from the cooperating agencies but from landowners, and the public at large, as to which lands may fit these criteria and which parcels may be available for these purposes. The cooperating agencies are surely unaware of many of the potentially available lands and of their unique qualities.

STUDIES

The Department does not have any studies completed or planned specifically relating to the Rosemont Copper proposal. The Department has many technical reports, papers, and data which may be relative to wildlife in the area, a full bibliography of such would require extensive investigation and so is beyond the scope of this letter (an example - Ockenfels, R.A., D.E. Brooks, and C.H. Lewis. *General Ecology of Coues With-Tailed Deer in the Santa Rita Mountians.* Technical Report no. 6. Proj W-78-R. Arizona Game and Fish Department.) Please contact us with specific requests for information you need.

TECHNICAL REPORTS THE DEPARTMENT WOULD RELY UPON IN ISSUEING AN AUTHORIZING INSTRUMENT OR PERMIT.

As stated above, the Department does not anticipate issuing any authorizing instrument or permit. However, the Department's public trust responsibility resources, e.g. wildlife, will be significantly impacted by the project. The Department needs to know the extent of this impact.

Specifically, the Department would like to see the cost to the public quantified in terms of direct loss of wildlife now and into the future and loss of indirect benefits of wildlife now and into the future including loss of wildlife-related recreation.

There is still some uncertainty on the Rosemont talussnail distribution in the Rosemont project area, which may be complicated with the distributions of the *Sonorella* conspecifics overlapping some of that range. The Department recommends additional investigations into the distributions and localities of extant talussnails within and around the Rosemont project areas. Additionally, the Department recommends investigation into the genetic and taxonomic identification of *S. Rosemontensis* and its local conspecifics. The genetic and taxonomic analyses should be conducted as a "blind batch" test by independent and recognized experts.

The Department would like to see a full accounting of the potential impact of the mine on water resources which wildlife use, including modeling which accounts for fracture, fault, and karst geology, and any indirect effect from the impact to water resources. The Department is concerned about the potential for as-yet undiscovered cave-dwelling wildlife which may be impacted. It is our understanding that there is some potential for undiscovered caves within the geology that may be important habitat. The Department would like to see studies that determine the impact to wildlife movements between the Santa Rita, Whetstone, and Rincon habitat units. The Department would like to know what effects the traffic, lighting, and noise will have on wildlife including bats. The Department would like a full risk assessment outlining the potential for water pollution and associated impacts, especially regarding Cienega Creek. Such assessment should model the potential threat as many years into the future as possible, not just for the lifetime of the mine, or the next 100 years, or any arbitrary date.

If you have any questions please feel free to contact me at 520-628-5376, or jwindes@azgfd.gov.

Sincerely,

John Windes
Habitat Program Manager

JDW:jw

cc: Laura Canaca, Project Evaluation Program Manager

COUNTY ADMINISTRATOR'S OFFICE
PIMA COUNTY GOVERNMENTAL CENTER
130 W. CONGRESS, TUCSON, AZ 85701-1317
(520) 740-8661 FAX (520) 740-8171

C.H. HUCKELBERRY
County Administrator

December 23, 2009

Jeanine Derby, Forest Supervisor
Coronado National
300 W. Congress Street
Tucson, Arizona 85701

Re: **Compensatory Mitigation Lands**

Dear Ms. Derby:

The County continues to be concerned over the adverse impacts associated with the proposed Rosemont mine. The measures proposed by Rosemont in their mining Plan of Operations are clearly inadequate to offset these adverse environmental impacts. Should the mine proceed, we request that the Forest Service uphold mitigation guidelines intended to assist the region in building an interconnected biological reserve system that crosscuts various jurisdictions. The mitigation guidelines and biological reserve design are embodied in the Maeveen Marie Behan (MMB) Conservation Lands System, a key outcome of the Sonoran Desert Conservation Plan (SDCP). The US Department of Agriculture Coronado National Forest was a participating agency in the SDCP development.

In previous correspondence with Rosemont, and then later with your agency, I have repeatedly outlined five environmental performance standards, one of which is tied to the MMB Conservation Lands System mitigation ratios. Based on Rosemont's initial Plan of Operations, we have estimated compensatory mitigation at approximately 8,800 acres. Since then, we have learned of other project components that lie outside the mine footprint *per se.* The Forest Service should demand mitigation for lands directly affected by all mine-related facilities, including utilities and other offsite land disturbances.

Attachment 1 to this letter outlines general mitigation principles that we would expect for the compensation of public land. In general, mitigation should be applied only after all efforts to avoid and minimize are applied. The Forest Service needs to ensure that mitigation will occur prior to impacting Forest Service lands. This assures compensation actually takes place, regardless of whether the project fails and funding, promises, and contracts fall apart. Mitigation lands must be closed to new mineral and substantially free of mining claims. Any land acquisition must include related water rights or claims that currently exist. We also assume that mitigation lands would be managed, monitored and protected in perpetuity.

Another performance standard is to ensure there is no impact to the water resources of the Cienega Basin. Rosemont's own groundwater model shows that the project would greatly reduce underflows of groundwater to Davidson Canyon and many springs in the area during the 122-year period they analyzed. Our model shows impacts to upper Cienega Basin that would expand and endure over thousands of years. We continue to oppose a mine that would jeopardize the long-term water resources of the upper and lower Cienega Basin, in which federal and local governments have invested millions of dollars.

If the Forest Service permits a mine that would impact aquatic resources of Cienega Creek, **there will be no suitable replacement habitat.** Notwithstanding our opposition to irreversible and irretrievable loss of water and aquatic habitat and our belief that these impacts cannot be mitigated, we suggest in the attachment certain additional principles to govern selection of mitigation for aquatic resources, separate from upland and riparian resources.

Per your request, we have identified a number of properties that may address the needs for compensatory mitigation of upland and riparian habitat. Each property is identified via its parcel tax code (Attachment 2) and in color (brown, purple, blue, and gray) on the Rosemont Mitigation Parcels map (Attachment 3). You may use the County MapGuide tool at http://www.dot.pima.gov/gis/maps/mapguide/ to view the exact location of each parcel in greater detail. For aquatic habitat mitigation, the best mitigation of which we are aware would be to restore diverted flows to Cienega Creek at Township 16 South, Range 16 East, Section 14, through acquiring two acres of land and associated surface water rights held by Del Lago Golf associated with Parcel 305-11-024C and the well site at Parcel 305-11-028.

While we are pleased that the Forest Service is exploring compensatory mitigation lands, we would also like to point out that mitigation in the form of land acquisition would not replace reclamation of the mining site, including restoration of watershed functions to the degree possible.

Sincerely,

C.H. Huckelberry
County Administrator

CHH/mjk

Attachments

c: Julia Fonseca, Environmental Planning Manager
Pima County Office of Conservation Science and Environmental Policy

ATTACHMENT 1

Principles for Compensatory Mitigation

Lands protected as compensatory mitigation should be:

1) in the area of direct effect or as close as possible to the area of direct effect; and
2) adjacent to other protected lands; and
3) protected in perpetuity with legal instruments that secure minerals and water, and other land interests; and
4) managed for protection of land and water; and
5) monitored to assure the mitigation intent is being met; and
6) accessible to the public (at least by means of foot); and
7) located within the Maeveen Marie Behan Conservation Lands System (CLS); and
8) a total acreage that is consistent with the CLS guidelines for mitigation (~8,800 acres)

Based on these principles, the ideal lands would include (in no particular order):

1) portions of the Santa Rita Experimental Range adjacent to the Coronado National Forest;
2) private lands located inside or adjacent to the Santa Rita units of the National Forest, especially in Pima County close to the mine
3) Rosemont's fee-owned lands in or adjacent to the Santa Rita unit of the Coronado National Forest;
4) private and state trust lands along Barrel and Davidson Canyons, including lands owned by Rosemont, and state trust lands which are part of Pima County's Bar V Ranch.

Principles for waters for mitigation:

1) springs and perennial streams (if their existence is not threatened by the mine itself; and
2) inside other protected land areas; and
3) provide habitat for listed or candidate species; and
4) managed for protection of land and water;
5) monitored to assure the mitigation intent is being met;
6) Mitigation for water impacts to the Cienega Basin can include the purchase of the one-acre Vail diversion dam and associated water rights along Cienega Creek.

<u>If insufficient land is available from the ideal lands, then our preferences in order of priority are:</u>

1. State and private lands in the Santa Rita unit at similar elevation, including the private lands at the mouth of Madera Canyon;
2. State and private lands adjacent to BLM and County land in the Empire Mountains. The Empire Mountains are an important recharge area in the Cienega Basin. Possesses extensive outcrops of limestone, includes mine claims. Land is situated close to the mine and at a similar elevation. Includes lands in the area of visual effect. Several land owners in the area have approached Pima County with interest in selling.
3. State and private lands adjacent to BLM and County land in the piedmont of the Whetstone Mountains. Land is situated close to the mine and at a similar elevation. Includes lands in the area of visual effect.
4. Private lands along Agua Verde Creek south of the Rincon Mountains. Land includes riparian areas similar to those which would be affected along Davidson and Barrel Canyons. Is close to or adjacent to protected lands.

ATTACHMENT 2

POSSIBLE COMPENSATORY MITIGATION PARCELS IN RE: ROSEMONT MINE

PARCEL	USE	PARCEL OWNER	ACRES	DESCRIPTION	LOCATION	DISTANCE TO MINE (MILES)	TRS	CLS
303540200	9500	STATE OF ARIZONA	640	STATE LANDS	SANTA RITA EXPERIMENTAL	9.1	331714E	MULTI USE
303540210	9500	STATE OF ARIZONA	157	STATE LANDS	SANTA RITA EXPERIMENTAL	8.4	341714E	MULTI USE
303540210	9500	STATE OF ARIZONA	482	STATE LANDS	SANTA RITA EXPERIMENTAL	8.2	341714E	MULTI USE
303540220	9500	STATE OF ARIZONA	555	STATE LANDS	SANTA RITA EXPERIMENTAL	7.2	351714E	MULTI USE
303540220	9500	STATE OF ARIZONA	84	STATE LANDS	SANTA RITA EXPERIMENTAL	7.6	351714E	MULTI USE
303540230	9500	STATE OF ARIZONA	645	STATE LANDS	SANTA RITA EXPERIMENTAL	6.4	361714E	BIO CORE
304130120	4710	SANTA RITA RANCH INC	631	RANCHING	SANTA RITA EXPERIMENTAL	11.1	361813E	BIO CORE
304293140	9500	STATE OF ARIZONA	14,989	STATE LANDS	SANTA RITA EXPERIMENTAL	5.1	011814E	RIPARIAN
304293140	9500	STATE OF ARIZONA	603	STATE LANDS	SANTA RITA EXPERIMENTAL	5.8	011814E	BIO CORE
304293140	9500	STATE OF ARIZONA	2,130	STATE LANDS	SANTA RITA EXPERIMENTAL	8.3	011814E	BIO CORE
304450180	0014	HENDERSON TERRY M & SARAH E JT/RS	0	VACANT	SANTA RITA EXPERIMENTAL	8.0	221914E	BIO CORE
304450190	0014	HENDERSON TERRY M & SARAH E JT/RS	4	VACANT	SANTA RITA EXPERIMENTAL	8.0	221914E	BIO CORE
304450210	0004	KETTENBACH MICHAEL L TR 1/3 INT ETAL	82	VACANT	SANTA RITA EXPERIMENTAL	7.8	221914E	BIO CORE
304460010	4710	SANTA RITA RANCH INC	84	RANCHING	CORONADO FOREST	6.2	131914E	BIO CORE
304460020	9500	STATE OF ARIZONA	13	STATE LANDS	SANTA RITA EXPERIMENTAL	5.6	131914E	RIPARIAN
304460020	9500	STATE OF ARIZONA	290	STATE LANDS	SANTA RITA EXPERIMENTAL	5.7	131914E	BIO CORE
304460020	9500	STATE OF ARIZONA	168	STATE LANDS	SANTA RITA EXPERIMENTAL	6.0	131914E	BIO CORE
305210030	9500	STATE OF ARIZONA	114	STATE LANDS	BAR V RANCH	9.8	351616E	BIO CORE
305210030	9500	STATE OF ARIZONA	111	STATE LANDS	BAR V RANCH	9.7	351616E	BIO CORE
305210060	9500	STATE OF ARIZONA	320	STATE LANDS	BAR V RANCH	9.9	361616E	BIO CORE
305221540	9500	STATE OF ARIZONA	667	STATE LANDS	SANTA RITA EXPERIMENTAL	5.8	311715E	BIO CORE
305221550	9500	STATE OF ARIZONA	627	STATE LANDS	SANTA RITA EXPERIMENTAL	5.0	321715E	BIO CORE
305221560	9500	STATE OF ARIZONA	629	STATE LANDS	SANTA RITA EXPERIMENTAL	4.4	331715E	BIO CORE
305221570	9500	STATE OF ARIZONA	626	STATE LANDS	SANTA RITA EXPERIMENTAL	3.9	341715E	BIO CORE
305391370	9500	STATE OF ARIZONA	64	STATE LANDS	BAR V RANCH	9.4	021716E	BIO CORE
305391370	9500	STATE OF ARIZONA	233	STATE LANDS	BAR V RANCH	8.9	021716E	BIO CORE
305391640	9500	STATE OF ARIZONA	171	STATE LANDS	DAVIDSON CANYON	4.9	361716E	RIPARIAN
305391650	9500	STATE OF ARIZONA	473	STATE LANDS	BAR V RANCH	9.1	011716E	BIO CORE
305391650	9500	STATE OF ARIZONA	30	STATE LANDS	BAR V RANCH	9.1	011716E	BIO CORE
305391660	9500	STATE OF ARIZONA	242	STATE LANDS	BAR V RANCH	8.4	121716E	BIO CORE
305530050	4717	SANTA RITA RANCH INC	161	RANCHING	SANTA RITA EXPERIMENTAL	1.6	341815E	BIO CORE
305530090	9500	STATE OF ARIZONA	650	STATE LANDS	SANTA RITA EXPERIMENTAL	3.0	031815E	BIO CORE
305530100	9500	STATE OF ARIZONA	644	STATE LANDS	SANTA RITA EXPERIMENTAL	3.6	041815E	BIO CORE
305530110	9500	STATE OF ARIZONA	648	STATE LANDS	SANTA RITA EXPERIMENTAL	4.4	051815E	BIO CORE
305530120	9500	STATE OF ARIZONA	658	STATE LANDS	SANTA RITA EXPERIMENTAL	5.2	061815E	BIO CORE
305530130	9500	STATE OF ARIZONA	664	STATE LANDS	SANTA RITA EXPERIMENTAL	4.7	071815E	BIO CORE
305530130	9500	STATE OF ARIZONA	18	STATE LANDS	SANTA RITA EXPERIMENTAL	5.4	071815E	BIO CORE
305530140	9500	STATE OF ARIZONA	656	STATE LANDS	SANTA RITA EXPERIMENTAL	3.8	081815E	BIO CORE
305530150	9500	STATE OF ARIZONA	644	STATE LANDS	SANTA RITA EXPERIMENTAL	3.0	091815E	BIO CORE
305530200	9500	STATE OF ARIZONA	632	STATE LANDS	SANTA RITA EXPERIMENTAL	2.5	161815E	BIO CORE
305530210	9500	STATE OF ARIZONA	632	STATE LANDS	SANTA RITA EXPERIMENTAL	3.4	171815E	BIO CORE
305530220	9500	STATE OF ARIZONA	103	STATE LANDS	SANTA RITA EXPERIMENTAL	4.5	181815E	BIO CORE
305530220	9500	STATE OF ARIZONA	539	STATE LANDS	SANTA RITA EXPERIMENTAL	4.3	181815E	BIO CORE
305530230	9500	STATE OF ARIZONA	657	STATE LANDS	SANTA RITA EXPERIMENTAL	4.1	191815E	BIO CORE
305530240	9500	STATE OF ARIZONA	648	STATE LANDS	SANTA RITA EXPERIMENTAL	3.1	201815E	BIO CORE

POSSIBLE COMPENSATORY MITIGATION PARCELS IN RE: ROSEMONT MINE

PARCEL	USE	PARCEL OWNER	ACRES	DESCRIPTION	LOCATION	DISTANCE TO MINE (MILES)	TRS	CLS
305530250	9500	STATE OF ARIZONA	637	STATE LANDS	SANTA RITA EXPERIMENTAL	2.1	211815E	BIO CORE
305530260	9500	STATE OF ARIZONA	636	STATE LANDS	SANTA RITA EXPERIMENTAL	2.1	281815E	BIO CORE
305530270	9500	STATE OF ARIZONA	647	STATE LANDS	SANTA RITA EXPERIMENTAL	3.1	291815E	BIO CORE
305530280	9500	STATE OF ARIZONA	659	STATE LANDS	SANTA RITA EXPERIMENTAL	4.1	301815E	BIO CORE
305530290	9500	STATE OF ARIZONA	659	STATE LANDS	SANTA RITA EXPERIMENTAL	4.1	311815E	BIO CORE
305530300	9500	STATE OF ARIZONA	644	STATE LANDS	SANTA RITA EXPERIMENTAL	3.1	321815E	BIO CORE
305540020	4710	ROSEMONT COPPER CO	14	ROSEMONT	ROSEMONT PARCELS	0.9	131815E	BIO CORE
305540030	4710	ROSEMONT COPPER CO	20	ROSEMONT	ROSEMONT PARCELS	1.0	131815E	BIO CORE
305540040	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	0.8	131815E	BIO CORE
305540050	4710	ROSEMONT COPPER CO	22	ROSEMONT	ROSEMONT PARCELS	0.7	131815E	BIO CORE
305540060	4710	ROSEMONT COPPER CO	7	ROSEMONT	ROSEMONT PARCELS	0.8	131815E	BIO CORE
305540070	4710	ROSEMONT COPPER CO	22	ROSEMONT	ROSEMONT PARCELS	0.6	131815E	BIO CORE
305540080	4710	ROSEMONT COPPER CO	22	ROSEMONT	ROSEMONT PARCELS	0.6	131815E	BIO CORE
305540090	4710	ROSEMONT COPPER CO	14	ROSEMONT	ROSEMONT PARCELS	0.7	131815E	BIO CORE
305540100	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	0.5	131815E	BIO CORE
305540110	4710	ROSEMONT COPPER CO	16	ROSEMONT	ROSEMONT PARCELS	0.5	131815E	BIO CORE
305550010	4710	ROSEMONT COPPER CO	11	ROSEMONT	ROSEMONT PARCELS	1.5	141815E	BIO CORE
305550040	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	1.5	141815E	BIO CORE
305550050	4710	ROSEMONT COPPER CO	15	ROSEMONT	ROSEMONT PARCELS	1.4	141815E	BIO CORE
305550060	4710	ROSEMONT COPPER CO	9	ROSEMONT	ROSEMONT PARCELS	1.3	141815E	BIO CORE
305550070	4710	ROSEMONT COPPER CO	18	ROSEMONT	ROSEMONT PARCELS	1.2	141815E	BIO CORE
305550080	4710	ROSEMONT COPPER CO	9	ROSEMONT	ROSEMONT PARCELS	1.3	141815E	BIO CORE
305550090	4710	ROSEMONT COPPER CO	9	ROSEMONT	ROSEMONT PARCELS	1.1	141815E	BIO CORE
305550100	4710	ROSEMONT COPPER CO	11	ROSEMONT	ROSEMONT PARCELS	1.1	141815E	BIO CORE
305550110	4710	ROSEMONT COPPER CO	19	ROSEMONT	ROSEMONT PARCELS	1.1	141815E	BIO CORE
305550130	4710	ROSEMONT COPPER CO	20	ROSEMONT	ROSEMONT PARCELS	1.0	141815E	BIO CORE
305550140	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	1.0	141815E	BIO CORE
305550150	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	0.9	141815E	BIO CORE
305560040	4710	ROSEMONT COPPER CO	18	ROSEMONT	ROSEMONT PARCELS	1.9	151815E	BIO CORE
305560050	4710	ROSEMONT COPPER CO	17	ROSEMONT	ROSEMONT PARCELS	1.7	151815E	BIO CORE
305560060	4710	ROSEMONT COPPER CO	16	ROSEMONT	ROSEMONT PARCELS	1.6	151815E	BIO CORE
305560070	4710	ROSEMONT COPPER CO	13	ROSEMONT	ROSEMONT PARCELS	1.7	151815E	BIO CORE
305580080	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	0.7	231815E	BIO CORE
305580090	4710	ROSEMONT COPPER CO	15	ROSEMONT	ROSEMONT PARCELS	0.6	231815E	BIO CORE
305580090	4710	ROSEMONT COPPER CO	1	ROSEMONT	ROSEMONT PARCELS	0.6	231815E	BIO CORE
305580100	4710	ROSEMONT COPPER CO	20	ROSEMONT	ROSEMONT PARCELS	0.5	231815E	BIO CORE
305580110	4710	ROSEMONT COPPER CO	20	ROSEMONT	ROSEMONT PARCELS	0.8	231815E	BIO CORE
305580120	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	0.8	231815E	BIO CORE
305580130	4710	ROSEMONT COPPER CO	6	ROSEMONT	ROSEMONT PARCELS	1.1	231815E	BIO CORE
305580140	4710	ROSEMONT COPPER CO	13	ROSEMONT	ROSEMONT PARCELS	1.1	231815E	BIO CORE
305580150	4710	ROSEMONT COPPER CO	18	ROSEMONT	ROSEMONT PARCELS	1.0	231815E	BIO CORE
305580160	4710	ROSEMONT COPPER CO	3	ROSEMONT	ROSEMONT PARCELS	1.3	231815E	BIO CORE
305580170	4710	ROSEMONT COPPER CO	16	ROSEMONT	ROSEMONT PARCELS	1.3	231815E	BIO CORE
305580170	4710	ROSEMONT COPPER CO	0	ROSEMONT	ROSEMONT PARCELS	1.6	231815E	BIO CORE
305580180	4710	ROSEMONT COPPER CO	15	ROSEMONT	ROSEMONT PARCELS	1.4	231815E	BIO CORE

POSSIBLE COMPENSATORY MITIGATION PARCELS IN RE: ROSEMONT MINE

PARCEL	USE	PARCEL OWNER	ACRES	DESCRIPTION	LOCATION	DISTANCE TO MINE (MILES)	TRS	CLS
305580190	4710	ROSEMONT COPPER CO	1	ROSEMONT	ROSEMONT PARCELS	1.5	231815E	BIO CORE
305580200	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	1.2	231815E	BIO CORE
305580220	4710	ROSEMONT COPPER CO	5	ROSEMONT	ROSEMONT PARCELS	1.3	231815E	BIO CORE
305580250	4710	ROSEMONT COPPER CO	2	ROSEMONT	ROSEMONT PARCELS	1.2	231815E	BIO CORE
305580260	4710	ROSEMONT COPPER CO	5	ROSEMONT	ROSEMONT PARCELS	1.0	231815E	BIO CORE
305580270	4710	ROSEMONT COPPER CO	2	ROSEMONT	ROSEMONT PARCELS	1.0	231815E	BIO CORE
305580280	4715	ROSEMONT COPPER CO	11	ROSEMONT	ROSEMONT PARCELS	0.5	231815E	BIO CORE
305590060	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	0.3	241815E	BIO CORE
305590070	4710	ROSEMONT COPPER CO	20	ROSEMONT	ROSEMONT PARCELS	0.0	241815E	BIO CORE
305590070	4710	ROSEMONT COPPER CO	1	ROSEMONT	ROSEMONT PARCELS	0.0	241815E	BIO CORE
305590080	4710	ROSEMONT COPPER CO	16	ROSEMONT	ROSEMONT PARCELS	0.0	241815E	BIO CORE
305590090	4710	ROSEMONT COPPER CO	17	ROSEMONT	ROSEMONT PARCELS	0.0	241815E	BIO CORE
305590100	4710	ROSEMONT COPPER CO	16	ROSEMONT	ROSEMONT PARCELS	0.0	241815E	BIO CORE
305590110	4710	ROSEMONT COPPER CO	20	ROSEMONT	ROSEMONT PARCELS	0.1	241815E	BIO CORE
305590120	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	0.2	241815E	RIPARIAN
305590130	4710	ROSEMONT COPPER CO	15	ROSEMONT	ROSEMONT PARCELS	0.2	241815E	BIO CORE
305590140	4710	ROSEMONT COPPER CO	10	ROSEMONT	ROSEMONT PARCELS	0.4	241815E	BIO CORE
305590150	4710	ROSEMONT COPPER CO	16	ROSEMONT	ROSEMONT PARCELS	0.3	241815E	BIO CORE
305590160	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	0.3	241815E	BIO CORE
305590170	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	0.4	241815E	RIPARIAN
305590180	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	0.5	241815E	BIO CORE
305590190	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	0.6	241815E	BIO CORE
305590200	4710	ROSEMONT COPPER CO	20	ROSEMONT	ROSEMONT PARCELS	0.3	241815E	BIO CORE
305610040	4710	ROSEMONT COPPER CO	2	ROSEMONT	ROSEMONT PARCELS	0.0	361815E	BIO CORE
305620140	9500	STATE OF ARIZONA	637	STATE LANDS	DAVIDSON CANYON	3.2	021816E	BIO CORE
305620250	9500	STATE OF ARIZONA	537	STATE LANDS	DAVIDSON CANYON	2.4	111816E	BIO CORE
305620250	9500	STATE OF ARIZONA	79	STATE LANDS	DAVIDSON CANYON	3.0	111816E	RIPARIAN
305620320	9500	STATE OF ARIZONA	634	STATE LANDS	DAVIDSON CANYON	1.5	261816E	MULTI USE
305630040	4710	ROSEMONT COPPER CO	4	ROSEMONT	ROSEMONT PARCELS	0.0	191816E	BIO CORE
305660050	4710	ROSEMONT COPPER CO	20	ROSEMONT	ROSEMONT PARCELS	0.0	011915E	BIO CORE
305660070	4717	SANTA RITA RANCH INC	19	RANCHING	SANTA RITA EXPERIMENTAL	3.9	161915E	BIO CORE
305660080	4717	MC GIBBON WILLIAM A & NANCY H JT/RS	9	RANCHING	SANTA RITA EXPERIMENTAL	4.0	171915E	BIO CORE
305660090	0004	MC CULLOUGH ROBERT B & GRACE G TR	13	VACANT	CORONADO FOREST	2.7	231915E	MULTI USE
305660110	9500	STATE OF ARIZONA	318	STATE LANDS	SANTA RITA EXPERIMENTAL	1.7	031915E	BIO CORE
305660120	9500	STATE OF ARIZONA	204	STATE LANDS	SANTA RITA EXPERIMENTAL	2.9	091915E	BIO CORE
305660120	9500	STATE OF ARIZONA	24	STATE LANDS	SANTA RITA EXPERIMENTAL	2.5	091915E	BIO CORE
305660120	9500	STATE OF ARIZONA	202	STATE LANDS	SANTA RITA EXPERIMENTAL	2.6	091915E	BIO CORE
305660120	9500	STATE OF ARIZONA	78	STATE LANDS	SANTA RITA EXPERIMENTAL	3.3	091915E	BIO CORE
305660130	9500	STATE OF ARIZONA	73	STATE LANDS	SANTA RITA EXPERIMENTAL	2.0	101915E	RIPARIAN
305660130	9500	STATE OF ARIZONA	199	STATE LANDS	SANTA RITA EXPERIMENTAL	2.1	101915E	BIO CORE
305910160	0014	KPK HOLDING COMPANY LLC	39	VACANT	DAVIDSON CANYON	4.0	011816E	RIPARIAN
305910180	0014	CONTRERAS NORMA A	36	VACANT	DAVIDSON CANYON	4.6	011816E	BIO CORE
305910260	0014	SPIVACK KELLY EILEEN & RIOUX EILEEN E L	8	VACANT	DAVIDSON CANYON	4.4	011816E	BIO CORE
305910320	0014	HICKS THOMAS R & PATTERSON DIANNE JT/RS	18	VACANT	DAVIDSON CANYON	4.2	121816E	BIO CORE
305910360	0014	COLE JUDITH	12	VACANT	DAVIDSON CANYON	4.1	121816E	BIO CORE

POSSIBLE COMPENSATORY MITIGATION PARCELS IN RE: ROSEMONT MINE

PARCEL	USE	PARCEL OWNER	ACRES	DESCRIPTION	LOCATION	DISTANCE TO MINE (MILES)	TRS	CLS
305910370	0014	COLE JUDITH	8	VACANT	DAVIDSON CANYON	4.2	121816E	BIO CORE
305910380	0014	CLARK LARRY D	20	VACANT	DAVIDSON CANYON	4.0	121816E	BIO CORE
305910390	0014	MC CAIN CHARLES R & JILL STEVENS	20	VACANT	DAVIDSON CANYON	3.9	121816E	RIPARIAN
305910420	0014	MC CAIN CHARLES R & JILL STEVENS	2	VACANT	DAVIDSON CANYON	3.7	121816E	BIO CORE
305910440	0014	BOUCHARD PIERRE & ARLENE CP/RS	5	VACANT	DAVIDSON CANYON	3.7	121816E	BIO CORE
305910450	0014	BOUCHARD PIERRE & ARLENE CP/RS	5	VACANT	DAVIDSON CANYON	3.8	121816E	BIO CORE
305910460	0014	TANNER ROGER D	10	VACANT	DAVIDSON CANYON	3.8	121816E	BIO CORE
305910470	0014	HOWELL STEPHEN A	20	VACANT	DAVIDSON CANYON	3.8	121816E	BIO CORE
305910480	0014	HOWELL STEPHEN A	29	VACANT	DAVIDSON CANYON	3.9	121816E	BIO CORE
305910490	0014	SHERMAN DONALD F & GERALDINE K JT/RS	10	VACANT	DAVIDSON CANYON	4.1	121816E	BIO CORE
305910550	0014	D & B FAMILY TRUST	1	VACANT	DAVIDSON CANYON	4.2	121816E	BIO CORE
305910560	0014	LESZCZYNSKI LEON PAUL & CAROL ELLEN JT/RS	1	VACANT	DAVIDSON CANYON	4.1	121816E	BIO CORE
305910570	0014	SCHOON GREGORY D	1	VACANT	DAVIDSON CANYON	4.1	121816E	BIO CORE
305910580	0014	D & B FAMILY TRUST	1	VACANT	DAVIDSON CANYON	4.1	121816E	BIO CORE
305910590	0014	D & B FAMILY TRUST	1	VACANT	DAVIDSON CANYON	4.1	121816E	BIO CORE
305910600	0014	SULLIVAN W & J TRUST	1	VACANT	DAVIDSON CANYON	4.1	121816E	BIO CORE
305910620	0014	MORRIS RAYMOND E	2	VACANT	DAVIDSON CANYON	4.1	121816E	BIO CORE
305910650	0014	MEDSKER JEFFREY C & JO ANNE K JT/RS	5	VACANT	DAVIDSON CANYON	4.0	121816E	BIO CORE
305910690	0014	BLOUNT LOIS J	9	VACANT	DAVIDSON CANYON	3.8	121816E	BIO CORE
305910730	0014	EDMUNDS HARVEY S TR	13	VACANT	DAVIDSON CANYON	3.6	121816E	BIO CORE
305910750	0014	BOUCHARD PIERRE L & ARLENE M JT/RS	21	VACANT	DAVIDSON CANYON	3.5	121816E	BIO CORE
305910760	0014	BOUCHARD PIERRE L & ARLENE M JT/RS	16	VACANT	DAVIDSON CANYON	3.5	121816E	BIO CORE
305910780	0011	BOUCHARD PIERRE L & ARLENE M	4	VACANT	DAVIDSON CANYON	3.5	121816E	BIO CORE
305910840	0014	HANNAH JACK	0	VACANT	DAVIDSON CANYON	3.5	121816E	BIO CORE
306010270	9500	STATE OF ARIZONA	117	STATE LANDS	BAR V RANCH	11.4	301617E	BIO CORE
306010350	9500	STATE OF ARIZONA	252	STATE LANDS	BAR V RANCH	11.1	321617E	BIO CORE
306010350	9500	STATE OF ARIZONA	311	STATE LANDS	BAR V RANCH	10.6	321617E	BIO CORE
306050070	9500	STATE OF ARIZONA	40	STATE LANDS	BAR V RANCH	12.0	281617E	BIO CORE
306060040	9500	STATE OF ARIZONA	313	STATE LANDS	BAR V RANCH	11.5	291617E	BIO CORE
306080070	9500	STATE OF ARIZONA	5	STATE LANDS	BAR V RANCH	11.7	341617E	BIO CORE
306150270	9500	STATE OF ARIZONA	628	STATE LANDS	BAR V RANCH	8.9	081717E	BIO CORE
306150280	9500	STATE OF ARIZONA	632	STATE LANDS	BAR V RANCH	9.5	091717E	BIO CORE
306150290	9500	STATE OF ARIZONA	643	STATE LANDS	BAR V RANCH	10.1	101717E	BIO CORE
306150330	9500	STATE OF ARIZONA	628	STATE LANDS	BAR V RANCH	9.4	151717E	BIO CORE
306150340	9500	STATE OF ARIZONA	617	STATE LANDS	BAR V RANCH	8.1	171717E	BIO CORE
306150350	9500	STATE OF ARIZONA	611	STATE LANDS	BAR V RANCH	7.3	201717E	BIO CORE
306150370	9500	STATE OF ARIZONA	631	STATE LANDS	DAVIDSON CANYON	5.9	301717E	RIPARIAN
306150480	0014	TORGERSON JOEL ERIC	9	VACANT	DAVIDSON CANYON	7.7	191717E	BIO CORE
306150550	9500	STATE OF ARIZONA	234	STATE LANDS	DAVIDSON CANYON	6.7	191717E	RIPARIAN
306150580	4717	ANDRADA RANCH LTD PARTNERSHIP	276	RANCHING	DAVIDSON CANYON	7.0	191717E	BIO CORE
306150620	0014	HERTEL THOMAS A & PAMELA E CP/RS	8	VACANT	DAVIDSON CANYON	7.3	191717E	BIO CORE
306150630	9500	STATE OF ARIZONA	394	STATE LANDS	DAVIDSON CANYON	7.7	181717E	BIO CORE
306150640	0014	REYNOLDS DONALD R & CAROLYN A JT/RS	9	VACANT	DAVIDSON CANYON	8.2	181717E	BIO CORE
306150680	0014	GILBERT MIKE S	10	VACANT	DAVIDSON CANYON	8.0	181717E	BIO CORE
306150710	0014	ROSENFELD JAMES J & MURIEL E JT/RS	10	VACANT	DAVIDSON CANYON	7.7	181717E	RIPARIAN

POSSIBLE COMPENSATORY MITIGATION PARCELS IN RE: ROSEMONT MINE

PARCEL	USE	PARCEL OWNER	ACRES	DESCRIPTION	LOCATION	DISTANCE TO MINE (MILES)	TRS	CLS
306150720	0014	MULLEN MATTHEW D & TERESA M CP/RS	10	VACANT	DAVIDSON CANYON	7.8	181717E	BIO CORE
306150740	0014	KONEN LEROY & CYNTHIA LIVING TR	7	VACANT	DAVIDSON CANYON	7.9	181717E	BIO CORE
306150750	0014	ADAMS WILLARD M & DEBORAH A JT/RS	7	VACANT	DAVIDSON CANYON	7.9	181717E	BIO CORE
306150780	0014	SCHEOPNER NORMAN D & JEANNETTE E JT/RS	7	VACANT	DAVIDSON CANYON	7.8	181717E	BIO CORE
306150790	0014	CLAY YVONNE C REVOC TR	4	VACANT	DAVIDSON CANYON	7.7	181717E	BIO CORE
306150810	0014	PATTERSON JOSEPH R & MC NABOE	14	VACANT	DAVIDSON CANYON	7.6	181717E	RIPARIAN
306150820	0014	KELESIS FAMILY TRUST	8	VACANT	DAVIDSON CANYON	7.5	181717E	BIO CORE
306160050	9500	STATE OF ARIZONA	30	STATE LANDS	BAR V RANCH	11.9	031717E	RIPARIAN
306160050	9500	STATE OF ARIZONA	567	STATE LANDS	BAR V RANCH	10.9	031717E	BIO CORE
306160060	9500	STATE OF ARIZONA	629	STATE LANDS	BAR V RANCH	10.3	041717E	BIO CORE
306160070	9500	STATE OF ARIZONA	621	STATE LANDS	BAR V RANCH	9.7	051717E	BIO CORE
306170030	0014	THAYER RUTH THURSTON	2	VACANT	DAVIDSON CANYON	6.0	311717E	RIPARIAN
306170040	0014	MORALES ALFREDO	1	VACANT	DAVIDSON CANYON	6.1	311717E	RIPARIAN
306170090	9500	STATE OF ARIZONA	39	STATE LANDS	DAVIDSON CANYON	6.2	311717E	BIO CORE
306170140	0014	BURTON MICHAEL & KAREN M CP/RS	12	VACANT	DAVIDSON CANYON	5.4	311717E	BIO CORE
306170160	0014	NIKRASCH & LOSCIALPO FAMILY REVOCABLE LIVI	1	VACANT	DAVIDSON CANYON	5.4	311717E	BIO CORE
306170210	0014	LOOG PATRICIA ANN	9	VACANT	DAVIDSON CANYON	5.4	311717E	BIO CORE
306170230	0014	LAWWILL BENJAMIN H & JANET W JT/RS	9	VACANT	DAVIDSON CANYON	5.5	311717E	BIO CORE
306170240	0014	TRUJILLO P R III & ELIZABETH A JT/RS	2	VACANT	DAVIDSON CANYON	5.7	311717E	BIO CORE
307150030	4710	BARCHAS SARAH ELIZABETH	29	RANCHING	CORONADO FOREST	1.7	101916E	MULTI USE
307160120	4710	BARCHAS SARAH ELIZABETH	40	RANCHING	CORONADO FOREST	2.3	151916E	MULTI USE
307200040	4717	ROSEMONT COPPER COMPANY	5	ROSEMONT	ROSEMONT PARCELS	2.1	211916E	MULTI USE
307205040	6800	ROSEMONT COPPER COMPANY	0	ROSEMONT	CORONADO FOREST	2.2	211916E	MULTI USE
307210050	0004	WAGONER FAMILY TR	40	VACANT	CORONADO FOREST	3.2	221916E	MULTI USE
30413106B	9500	STATE OF ARIZONA	380	STATE LANDS	SANTA RITA EXPERIMENTAL	11.1	251813E	BIO CORE
30413106C	9500	STATE OF ARIZONA	69	STATE LANDS	SANTA RITA EXPERIMENTAL	11.1	241813E	RIPARIAN
30413106C	9500	STATE OF ARIZONA	30	STATE LANDS	SANTA RITA EXPERIMENTAL	11.1	241813E	BIO CORE
30445011B	9500	STATE OF ARIZONA	349	STATE LANDS	SANTA RITA EXPERIMENTAL	5.0	011914E	BIO CORE
30445011B	9500	STATE OF ARIZONA	1,293	STATE LANDS	SANTA RITA EXPERIMENTAL	5.7	011914E	RIPARIAN
30445011B	9500	STATE OF ARIZONA	4,901	STATE LANDS	SANTA RITA EXPERIMENTAL	6.9	011914E	BIO CORE
30445011B	9500	STATE OF ARIZONA	801	STATE LANDS	SANTA RITA EXPERIMENTAL	5.2	011914E	BIO CORE
30445011B	9500	STATE OF ARIZONA	0	STATE LANDS	SANTA RITA EXPERIMENTAL	6.8	011914E	BIO CORE
30445011B	9500	STATE OF ARIZONA	969	STATE LANDS	SANTA RITA EXPERIMENTAL	6.4	011914E	RIPARIAN
30445011B	9500	STATE OF ARIZONA	57	STATE LANDS	SANTA RITA EXPERIMENTAL	5.9	011914E	BIO CORE
30445011B	9500	STATE OF ARIZONA	25	STATE LANDS	SANTA RITA EXPERIMENTAL	7.9	011914E	BIO CORE
30445020C	0014	LUDWIG ERIC R	4	VACANT	SANTA RITA EXPERIMENTAL	7.9	221914E	BIO CORE
30539163A	9500	STATE OF ARIZONA	401	STATE LANDS	DAVIDSON CANYON	4.6	361716E	BIO CORE
30553003B	0014	QUEST PAT	9	VACANT	SANTA RITA EXPERIMENTAL	0.9	261815E	BIO CORE
30553003C	0014	BIRKSON ENTERPRISES LIMITED PARTNERSHIP	10	VACANT	SANTA RITA EXPERIMENTAL	0.9	261815E	BIO CORE
30553003F	9500	STATE OF ARIZONA	121	STATE LANDS	SANTA RITA EXPERIMENTAL	0.6	261815E	BIO CORE
30553004C	0014	TOVAR ENRIQUE	19	VACANT	SANTA RITA EXPERIMENTAL	1.5	271815E	BIO CORE
30553004D	4710	AVRA VALLEY RANCH & PROPERTIES LLC	39	RANCHING	SANTA RITA EXPERIMENTAL	1.6	271815E	BIO CORE
30553004G	0014	VESTERDAL ALAN FRED	11	VACANT	SANTA RITA EXPERIMENTAL	1.9	271815E	BIO CORE
30553004H	4710	AVRA VALLEY RANCH & PROPERTIES LLC	40	RANCHING	SANTA RITA EXPERIMENTAL	1.1	271815E	BIO CORE
30553004J	0014	GANT LONNY & LISA JT/RS	18	VACANT	SANTA RITA EXPERIMENTAL	1.4	271815E	BIO CORE

POSSIBLE COMPENSATORY MITIGATION PARCELS IN RE: ROSEMONT MINE

PARCEL	USE	PARCEL OWNER	ACRES	DESCRIPTION	LOCATION	DISTANCE TO MINE (MILES)	TRS	CLS
30553004M	0014	LANSKY RICHARD J & CORAZON B	14	VACANT	SANTA RITA EXPERIMENTAL	2.0	271815E	BIO CORE
30553006A	9500	STATE OF ARIZONA	124	STATE LANDS	SANTA RITA EXPERIMENTAL	1.9	341815E	BIO CORE
30553006B	9500	STATE OF ARIZONA	564	STATE LANDS	SANTA RITA EXPERIMENTAL	2.1	341815E	BIO CORE
30553006C	9500	STATE OF ARIZONA	121	STATE LANDS	SANTA RITA EXPERIMENTAL	1.6	341815E	BIO CORE
30553007A	9500	STATE OF ARIZONA	319	STATE LANDS	SANTA RITA EXPERIMENTAL	1.1	271815E	BIO CORE
30554012A	4710	ROSEMONT COPPER CO	20	ROSEMONT	ROSEMONT PARCELS	0.6	131815E	BIO CORE
30555012A	4710	ROSEMONT COPPER CO	5	ROSEMONT	ROSEMONT PARCELS	1.3	141815E	RIPARIAN
30557004D	4710	ROSEMONT COPPER CO	10	ROSEMONT	ROSEMONT PARCELS	1.8	221815E	BIO CORE
30558021A	4710	ROSEMONT COPPER CO	5	ROSEMONT	ROSEMONT PARCELS	1.2	231815E	RIPARIAN
30558023A	4710	ROSEMONT COPPER CO	3	ROSEMONT	ROSEMONT PARCELS	1.3	231815E	BIO CORE
30558023B	4710	ROSEMONT COPPER CO	4	ROSEMONT	ROSEMONT PARCELS	1.2	231815E	RIPARIAN
30558024A	4710	ROSEMONT COPPER CO	5	ROSEMONT	ROSEMONT PARCELS	1.1	231815E	BIO CORE
30558034C	4710	ROSEMONT COPPER CO	2	ROSEMONT	ROSEMONT PARCELS	1.0	231815E	BIO CORE
30559021A	4710	ROSEMONT COPPER CO	21	ROSEMONT	ROSEMONT PARCELS	0.0	241815E	BIO CORE
30562006B	4710	ROSEMONT COPPER CO	3	ROSEMONT	ROSEMONT PARCELS	2.3	141816E	BIO CORE
30562006B	4710	ROSEMONT COPPER CO	31	ROSEMONT	ROSEMONT PARCELS	2.1	141816E	BIO CORE
30562006C	9500	STATE OF ARIZONA	366	STATE LANDS	DAVIDSON CANYON	1.8	141816E	BIO CORE
30562006C	9500	STATE OF ARIZONA	207	STATE LANDS	DAVIDSON CANYON	2.0	141816E	BIO CORE
30562007D	4710	ROSEMONT COPPER CO	39	ROSEMONT	ROSEMONT PARCELS	1.4	151816E	BIO CORE
30562007F	4710	ROSEMONT COPPER CO	39	ROSEMONT	ROSEMONT PARCELS	1.6	151816E	BIO CORE
30562007G	4710	ROSEMONT COPPER CO	55	ROSEMONT	ROSEMONT PARCELS	1.6	151816E	BIO CORE
30562007G	4710	ROSEMONT COPPER CO	15	ROSEMONT	ROSEMONT PARCELS	1.7	151816E	BIO CORE
30562007H	4710	ROSEMONT COPPER CO	159	ROSEMONT	ROSEMONT PARCELS	1.7	151816E	BIO CORE
30562008C	4710	ROSEMONT COPPER CO	60	ROSEMONT	ROSEMONT PARCELS	0.6	211816E	BIO CORE
30562008F	4717	ROSEMONT COPPER CO	35	ROSEMONT	ROSEMONT PARCELS	0.5	211816E	BIO CORE
30562008G	4717	ROSEMONT COPPER CO	5	ROSEMONT	ROSEMONT PARCELS	0.5	211816E	BIO CORE
30562008H	4710	ROSEMONT COPPER CO	26	ROSEMONT	ROSEMONT PARCELS	0.5	211816E	BIO CORE
30562008J	4710	ROSEMONT COPPER CO	35	ROSEMONT	ROSEMONT PARCELS	0.3	211816E	BIO CORE
30562009A	4710	ROSEMONT COPPER CO	158	ROSEMONT	ROSEMONT PARCELS	2.0	231816E	BIO CORE
30562009B	9500	STATE OF ARIZONA	475	STATE LANDS	DAVIDSON CANYON	1.5	231816E	BIO CORE
30562011A	4710	ROSEMONT COPPER CO	40	ROSEMONT	ROSEMONT PARCELS	1.4	271816E	RIPARIAN
30563003A	4710	ROSEMONT COPPER CO	19	ROSEMONT	ROSEMONT PARCELS	0.0	191816E	BIO CORE
30566001C	4710	ROBINSON CATTLE LLC	34	RANCHING	SANTA RITA EXPERIMENTAL	2.2	101915E	BIO CORE
30566001D	4710	ROBINSON JOE R	5	RANCHING	SANTA RITA EXPERIMENTAL	2.4	101915E	BIO CORE
30566001E	4717	ROBINSON CATTLE LLC	40	RANCHING	SANTA RITA EXPERIMENTAL	2.4	101915E	BIO CORE
30566001J	4710	ROBINSON JOE R	78	RANCHING	SANTA RITA EXPERIMENTAL	2.7	091915E	BIO CORE
30566001J	4710	ROBINSON JOE R	1	RANCHING	SANTA RITA EXPERIMENTAL	2.8	091915E	BIO CORE
30566003B	9500	STATE OF ARIZONA	1,983	STATE LANDS	SANTA RITA EXPERIMENTAL	2.2	041915E	BIO CORE
30566003B	9500	STATE OF ARIZONA	1,532	STATE LANDS	SANTA RITA EXPERIMENTAL	3.6	041915E	BIO CORE
30566003B	9500	STATE OF ARIZONA	725	STATE LANDS	SANTA RITA EXPERIMENTAL	3.3	041915E	BIO CORE
30591001A	0014	FREELAND REVOCABLE LIVING TR	18	VACANT	DAVIDSON CANYON	4.4	011816E	BIO CORE
30591001E	0014	ROMERO ALFREDO D	6	VACANT	DAVIDSON CANYON	4.5	011816E	BIO CORE
30591002A	0014	FREELAND REVOC LIVING TR	20	VACANT	DAVIDSON CANYON	4.6	011816E	BIO CORE
30591002B	0014	HELIN GLORIA J	18	VACANT	DAVIDSON CANYON	4.5	011816E	BIO CORE
30591004A	0014	GAULT DONNA E REVOCABLE TRUST	16	VACANT	DAVIDSON CANYON	4.2	011816E	BIO CORE

POSSIBLE COMPENSATORY MITIGATION PARCELS IN RE: ROSEMONT MINE

PARCEL	USE	PARCEL OWNER	ACRES	DESCRIPTION	LOCATION	DISTANCE TO MINE (MILES)	TRS	CLS
30591006D	0014	DOWNEY DARRELL	6	VACANT	DAVIDSON CANYON	4.0	011816E	BIO CORE
30591006J	0014	DOWNEY DAVID A	10	VACANT	DAVIDSON CANYON	3.9	011816E	BIO CORE
30591006K	0014	DOWNEY DARRELL	4	VACANT	DAVIDSON CANYON	3.9	011816E	BIO CORE
30591017D	0014	REITZ GEORGE R & CAROL A REVOCABLE TRUST	19	VACANT	DAVIDSON CANYON	4.3	011816E	BIO CORE
30591019A	0014	JRS REALTY GROUP LLC	15	VACANT	DAVIDSON CANYON	4.5	011816E	RIPARIAN
30591019C	0014	LEKAWA RAYMOND E & ROSE M CP/RS	4	VACANT	DAVIDSON CANYON	4.4	011816E	BIO CORE
30591019D	0014	LEKAWA RAYMOND E & ROSE M CP/RS	4	VACANT	DAVIDSON CANYON	4.4	011816E	BIO CORE
30591019E	0014	LEKAWA RAYMOND E & ROSE M CP/RS	4	VACANT	DAVIDSON CANYON	4.5	011816E	BIO CORE
30591019F	0014	LEKAWA RAYMOND E & ROSE M CP/RS	4	VACANT	DAVIDSON CANYON	4.5	011816E	BIO CORE
30591019G	0014	LEKAWA RAYMOND E & ROSE M CP/RS	4	VACANT	DAVIDSON CANYON	4.5	011816E	BIO CORE
30591020A	0014	WILKINSON MICHAEL J & DIANE REVOC LIVING TR	20	VACANT	DAVIDSON CANYON	4.2	011816E	RIPARIAN
30591020B	0014	FUND LUCY ANN	13	VACANT	DAVIDSON CANYON	4.4	011816E	RIPARIAN
30591021B	0014	CONTRERAS NORMA A	16	VACANT	DAVIDSON CANYON	4.5	011816E	RIPARIAN
30591022A	0014	PERNO EUGENE M & SUSAN K JT/RS	25	VACANT	DAVIDSON CANYON	4.7	011816E	BIO CORE
30591022B	0014	PERNO EUGENE M & SUSAN K	12	VACANT	DAVIDSON CANYON	4.7	011816E	BIO CORE
30591023A	0014	CHAVEZ LARRY S	8	VACANT	DAVIDSON CANYON	5.1	011816E	BIO CORE
30591023B	0014	PINION JERRY W & VIRGINIA A JT/RS	29	VACANT	DAVIDSON CANYON	4.9	011816E	BIO CORE
30591024B	0014	PINION JERRY W & VIRGINIA A JT/RS	12	VACANT	DAVIDSON CANYON	4.8	011816E	BIO CORE
30591025A	0014	JONES LANITA J & BATELLI PENNY L JT/RS	10	VACANT	DAVIDSON CANYON	4.5	011816E	BIO CORE
30591080A	0014	MACK PATRICK A & CAROL L JT/RS	4	VACANT	DAVIDSON CANYON	3.3	121816E	BIO CORE
30591081A	0014	CHUK MICHAEL & VIRAMONTES OLIVIA JT/RS	5	VACANT	DAVIDSON CANYON	3.4	121816E	BIO CORE
30591082A	0014	OLSON JOHN	8	VACANT	DAVIDSON CANYON	3.3	121816E	BIO CORE
30591082B	0014	CHUK MICHAEL	1	VACANT	DAVIDSON CANYON	3.4	121816E	BIO CORE
30591085D	0014	COOPER ANDREW E & DEBORAH L CP/RS	4	VACANT	DAVIDSON CANYON	3.6	121816E	BIO CORE
30591085F	0014	HELM ROGER	5	VACANT	DAVIDSON CANYON	3.7	121816E	BIO CORE
30591087A	0014	KRAMP JAMES R REVOCABLE TR	7	VACANT	DAVIDSON CANYON	3.7	121816E	BIO CORE
30591087C	0014	O'NEIL GARY I	7	VACANT	DAVIDSON CANYON	3.8	121816E	BIO CORE
30591087F	0014	FRIEDMAN ALAN & GAY REVOCABLE TR	6	VACANT	DAVIDSON CANYON	3.7	121816E	BIO CORE
30601025A	9500	STATE OF ARIZONA	157	STATE LANDS	BAR V RANCH	11.1	331617E	BIO CORE
30607003A	9500	STATE OF ARIZONA	66	STATE LANDS	BAR V RANCH	11.0	311617E	BIO CORE
30607003A	9500	STATE OF ARIZONA	74	STATE LANDS	BAR V RANCH	10.5	311617E	BIO CORE
30607004A	9500	STATE OF ARIZONA	74	STATE LANDS	BAR V RANCH	10.6	311617E	BIO CORE
30607004A	9500	STATE OF ARIZONA	60	STATE LANDS	BAR V RANCH	10.2	311617E	BIO CORE
30615001B	9500	STATE OF ARIZONA	451	STATE LANDS	BAR V RANCH	9.3	061717E	BIO CORE
30615005C	9500	STATE OF ARIZONA	401	STATE LANDS	BAR V RANCH	8.0	211717E	BIO CORE
30615010B	9500	STATE OF ARIZONA	315	STATE LANDS	BAR V RANCH	8.6	071717E	BIO CORE
30615011B	9500	STATE OF ARIZONA	310	STATE LANDS	BAR V RANCH	9.1	161717E	BIO CORE
30615057A	0014	MULLINS GARY L & DAPHNE D CP/RS	12	VACANT	DAVIDSON CANYON	7.3	191717E	BIO CORE
30615073B	0014	ORMSBY WILLIAM R JR & DARLENE G CP/RS	10	VACANT	DAVIDSON CANYON	7.6	181717E	BIO CORE
30615073C	0014	AVERY RICHARD A & MARCIA L JT/RS	10	VACANT	DAVIDSON CANYON	7.7	181717E	RIPARIAN
30615073D	0014	STAM RYAN C	6	VACANT	DAVIDSON CANYON	7.8	181717E	BIO CORE
30615076A	0014	CORDARO HANK C	15	VACANT	DAVIDSON CANYON	7.9	181717E	BIO CORE
30615076B	0014	O'NEILL CHRISTOPHER H	6	VACANT	DAVIDSON CANYON	8.0	181717E	BIO CORE
30617001C	0014	ULRICH PAMELA J	10	VACANT	DAVIDSON CANYON	5.9	311717E	BIO CORE
30617001E	0014	ROMERO ALFREDO D	11	VACANT	DAVIDSON CANYON	6.1	311717E	BIO CORE

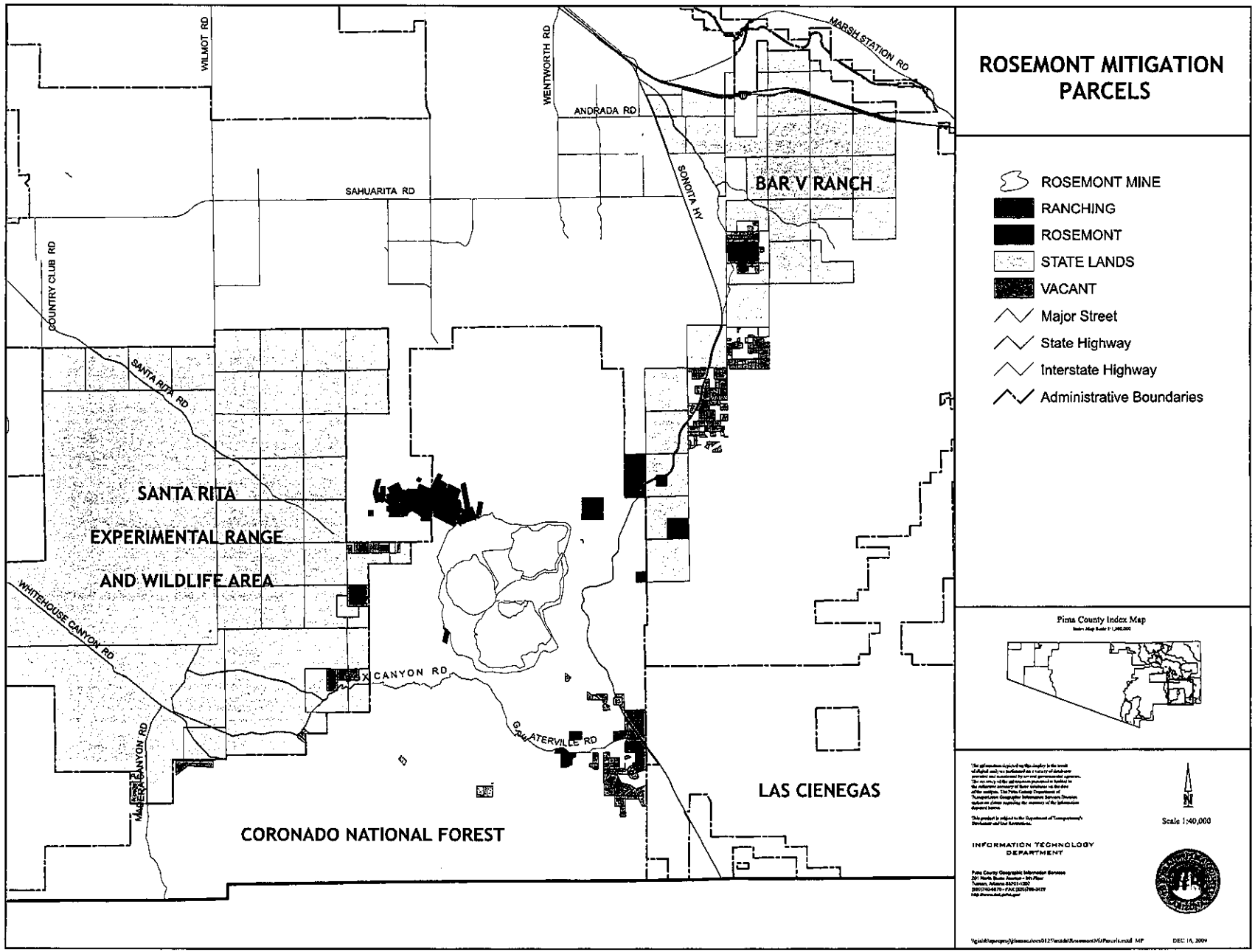
POSSIBLE COMPENSATORY MITIGATION PARCELS IN RE: ROSEMONT MINE

PARCEL	USE	PARCEL OWNER	ACRES	DESCRIPTION	LOCATION	DISTANCE TO MINE (MILES)	TRS	CLS
30617001H	0014	TRUJILLO ROY J & REGINA L JT/RS	40	VACANT	DAVIDSON CANYON	6.0	311717E	BIO CORE
30617001T	0014	WATTS JAMES W & JIMMIE NELL JT/RS	6	VACANT	DAVIDSON CANYON	6.0	311717E	BIO CORE
30617002J	0014	LOZINSKI RICHARD M & LUCINDA L JT/RS	10	VACANT	DAVIDSON CANYON	5.7	311717E	BIO CORE
30617002P	0014	MIKLOCHIK J MICHAEL & RITTER LINDA A CP/RS	5	VACANT	DAVIDSON CANYON	5.8	311717E	BIO CORE
30617002Q	0014	STEPHENS TODD M & LAURA M CP/RS	5	VACANT	DAVIDSON CANYON	5.9	311717E	BIO CORE
30617002S	0014	EIRICH CHRISTOPHER W & MAUREEN K CP/RS	8	VACANT	DAVIDSON CANYON	5.5	311717E	BIO CORE
30617002W	0014	GLOVER KARA	4	VACANT	DAVIDSON CANYON	5.7	311717E	BIO CORE
30617002X	0014	GLOVER KARA	4	VACANT	DAVIDSON CANYON	5.6	311717E	BIO CORE
30617002Y	0014	O'DONNELL MARC	10	VACANT	DAVIDSON CANYON	5.6	311717E	BIO CORE
30617005A	0014	MORALES RAMON	1	VACANT	DAVIDSON CANYON	6.0	311717E	RIPARIAN
30617010D	0014	BALDWIN LORRIE A	20	VACANT	DAVIDSON CANYON	5.8	311717E	BIO CORE
30617010F	0014	WILLINS STEPHEN C	8	VACANT	DAVIDSON CANYON	5.6	311717E	BIO CORE
30617010G	0014	SWAN WAYNE E & DONNA M JT/RS	10	VACANT	DAVIDSON CANYON	5.6	311717E	BIO CORE
30617010H	0014	GOLD ABE	8	VACANT	DAVIDSON CANYON	5.5	311717E	BIO CORE
30617010J	0014	ROMERO ALFREDO D	21	VACANT	DAVIDSON CANYON	6.0	311717E	BIO CORE
30617010K	0014	ETCHART GREGORY A & PAMELA K JT/RS	20	VACANT	DAVIDSON CANYON	5.9	311717E	BIO CORE
30617017A	0014	PROPST MARK A & EVANS PATRICIA S JT/RS	4	VACANT	DAVIDSON CANYON	5.2	311717E	BIO CORE
30617018B	0014	REAM JOHN T & BAUMANN-REAM	10	VACANT	DAVIDSON CANYON	5.2	311717E	BIO CORE
30617018C	0014	SAWICKI MICHAEL A & LINDA J CP/RS	8	VACANT	DAVIDSON CANYON	5.3	311717E	BIO CORE
30617018D	0014	HSIAO CHING-SONG GENE & YU-MEI UNA TR	10	VACANT	DAVIDSON CANYON	5.3	311717E	BIO CORE
30617020A	0014	ESTES AARON	5	VACANT	DAVIDSON CANYON	5.5	311717E	BIO CORE
30617022A	0014	LINN GEORGE W IV & GEE KAMI L JT/RS	5	VACANT	DAVIDSON CANYON	5.6	311717E	BIO CORE
30617022B	0014	LINN GEORGE W IV & GEE KAMI L JT/RS	5	VACANT	DAVIDSON CANYON	5.5	311717E	BIO CORE
30617025A	0014	TRUJILLO P R III & ELIZABETH A JT/RS	9	VACANT	DAVIDSON CANYON	5.7	311717E	BIO CORE
30617025B	0014	TRUJILLO P R III & ELIZABETH A JT/RS	40	VACANT	DAVIDSON CANYON	5.7	311717E	BIO CORE
30713007F	0014	URQUIDES JOSEPHINE P	20	VACANT	CORONADO FOREST	2.6	191916E	MULTI USE
30713007J	0014	URQUIDES JOSEPHINE P	13	VACANT	CORONADO FOREST	2.6	191916E	MULTI USE
30713007P	0014	DAVIS H JOHN & AUDREY LIFE EST THEN TO	5	VACANT	CORONADO FOREST	2.8	191916E	RIPARIAN
30713007Q	0014	SOLSBERRY DONNA DAVIS	21	VACANT	CORONADO FOREST	2.6	191916E	RIPARIAN
30713007S	0014	URQUIDES JOSEPHINE P	1	VACANT	CORONADO FOREST	2.6	191916E	MULTI USE
30713015F	0014	GILLESPIE CYNTHIA JOAN REVOC TR	40	VACANT	CORONADO FOREST	3.5	271916E	MULTI USE
30713015R	0014	HABER KAI TR	20	VACANT	CORONADO FOREST	3.8	271916E	MULTI USE
30714002S	0004	KOSTROSKI FAMILY LIMITED PARTNERSHIP	25	VACANT	CORONADO FOREST	1.3	091916E	MULTI USE
30714002U	0014	HOOPER GROUP INC	8	VACANT	CORONADO FOREST	0.6	091916E	RIPARIAN
30714002X	0014	WICKS FRANKLIN R & CONSTANCE J	8	VACANT	CORONADO FOREST	1.3	091916E	MULTI USE
30714002Z	0014	BURROWS RICHARD L & KAREN JT/RS	12	VACANT	CORONADO FOREST	1.2	091916E	MULTI USE
30714003C	0014	LAUDERBACH DENNIS G & GAIL A CP/RS	2	VACANT	CORONADO FOREST	0.6	091916E	RIPARIAN
30715001E	0004	BLUE OAKS CORP	13	VACANT	CORONADO FOREST	1.7	101916E	MULTI USE
30716001B	4710	BARCHAS SARAH ELIZABETH	72	RANCHING	CORONADO FOREST	2.3	151916E	MULTI USE
30716001B	4710	BARCHAS SARAH ELIZABETH	51	RANCHING	CORONADO FOREST	2.3	151916E	MULTI USE
30716001B	4710	BARCHAS SARAH ELIZABETH	47	RANCHING	CORONADO FOREST	2.4	151916E	MULTI USE
30716001C	4717	BARCHAS SARAH	35	RANCHING	CORONADO FOREST	2.1	151916E	RIPARIAN
30716001C	4717	BARCHAS SARAH	1	RANCHING	CORONADO FOREST	2.2	151916E	MULTI USE
30716013B	0004	ARCHAEOLOGICAL CONSERVANCY (THE)	1	VACANT	CORONADO FOREST	3.0	151916E	MULTI USE
30716013C	0004	ARCHAEOLOGICAL CONSERVANCY (THE)	1	VACANT	CORONADO FOREST	2.9	151916E	MULTI USE

POSSIBLE COMPENSATORY MITIGATION PARCELS IN RE: ROSEMONT MINE

PARCEL	USE	PARCEL OWNER	ACRES	DESCRIPTION	LOCATION	DISTANCE TO MINE (MILES)	TRS	CLS
30716013D	4710	BARCHAS SARAH ELIZABETH	1	RANCHING	CORONADO FOREST	3.0	151916E	MULTI USE
30716013D	4710	BARCHAS SARAH ELIZABETH	72	RANCHING	CORONADO FOREST	2.7	151916E	MULTI USE
30717001G	4710	ROSEMONT COPPER COMPANY	36	ROSEMONT	ROSEMONT PARCELS	1.7	161916E	MULTI USE
30717001K	4710	ROSEMONT COPPER COMPANY	2	ROSEMONT	ROSEMONT PARCELS	2.0	161916E	MULTI USE
30717001K	4710	ROSEMONT COPPER COMPANY	5	ROSEMONT	ROSEMONT PARCELS	2.1	161916E	MULTI USE
30717001N	4710	ROSEMONT COPPER COMPANY	2	ROSEMONT	ROSEMONT PARCELS	2.0	161916E	MULTI USE
30717001V	0014	PRUETT BARBARA H & H WAYNE TR	1	VACANT	CORONADO FOREST	2.4	161916E	MULTI USE
30717501K	6800	ROSEMONT COPPER COMPANY	0	ROSEMONT	CORONADO FOREST	2.1	161916E	MULTI USE
30717501N	6800	ROSEMONT COPPER COMPANY	0	ROSEMONT	CORONADO FOREST	2.0	161916E	MULTI USE
30718003D	4710	ROSEMONT COPPER COMPANY	5	ROSEMONT	ROSEMONT PARCELS	2.0	171916E	MULTI USE
30718003D	4710	ROSEMONT COPPER COMPANY	3	ROSEMONT	ROSEMONT PARCELS	2.0	171916E	MULTI USE
30718503D	6800	ROSEMONT COPPER COMANY	0	ROSEMONT	CORONADO FOREST	2.0	171916E	MULTI USE
30720001F	0004	SAN LAZARO LTD PARTNERSHIP	20	VACANT	CORONADO FOREST	2.4	211916E	MULTI USE
30720002E	0014	DUMBAULD JAMES L & BYRON JESSICA E TR	10	VACANT	CORONADO FOREST	2.6	211916E	MULTI USE
30720002J	0014	BURLESON BRADY W & VALERIE L CP/RS	4	VACANT	CORONADO FOREST	2.6	211916E	MULTI USE
30720003D	4710	ROSEMONT COPPER COMPANY	53	ROSEMONT	ROSEMONT PARCELS	2.1	211916E	MULTI USE
30720003F	8800	ROSEMONT COPPER COMPANY	0	ROSEMONT	CORONADO FOREST	2.2	211916E	MULTI USE
30720503D	6800	ROSEMONT COPPER COMPANY	0	ROSEMONT	CORONADO FOREST	2.3	211916E	MULTI USE
30720503F	6800	ROSEMONT COPPER COMPANY	0	ROSEMONT	CORONADO FOREST	2.2	211916E	MULTI USE
30721002J	0004	GOTTESMAN STACY M & MATTHEW J	5	VACANT	CORONADO FOREST	3.0	221916E	MULTI USE
30721002P	0004	SENG ALBERT F & REBECCA ELLEN CP/RS	6	VACANT	CORONADO FOREST	2.6	151916E	MULTI USE
30721002Q	0004	CONOVER PATRICK & MELISSA CP/RS	6	VACANT	CORONADO FOREST	2.6	151916E	MULTI USE
30721004A	0014	HOLLMAN GREG & MARTINEZ JOEY A JT/RS	10	VACANT	CORONADO FOREST	2.7	221916E	MULTI USE
30721004D	0014	ACHILLES PRESTON Y & NANCY J TR	10	VACANT	CORONADO FOREST	2.8	221916E	MULTI USE
30721004G	0014	STEPP LAWRENCE MILTON & VICKI SUE JT/RS	10	VACANT	CORONADO FOREST	2.8	221916E	MULTI USE
30721004J	0014	LORENTSEN ROBERT N & NANCY B CP/RS	10	VACANT	CORONADO FOREST	2.8	221916E	MULTI USE
30721004M	0014	GRAY LYNETTE P	10	VACANT	CORONADO FOREST	2.9	221916E	MULTI USE
30721004N	0014	GRAY LYNETTE P	10	VACANT	CORONADO FOREST	2.9	221916E	MULTI USE
30721006F	0014	ALLSMAN AXELROD LIVING TR	36	VACANT	CORONADO FOREST	3.4	221916E	MULTI USE
30721006K	0004	DOWNING DOUGLAS J REVOCABLE LIVING TR	36	VACANT	CORONADO FOREST	3.8	221916E	MULTI USE
30721006N	0004	WILLIAMSON KENNETH E & GEORGIA D CP/RS	15	VACANT	CORONADO FOREST	3.7	221916E	MULTI USE
30721006P	0014	LEE YONG-JOO & YOUNG-RAN CP/R	36	VACANT	CORONADO FOREST	3.7	221916E	MULTI USE
30721006S	4710	BARCHAS FAMILY LLC	37	RANCHING	CORONADO FOREST	3.2	221916E	MULTI USE
30721007B	0004	ARCHAEOLOGICAL CONSERVANCY (THE)	1	VACANT	CORONADO FOREST	3.1	221916E	MULTI USE
30721007D	0014	FELTMAN STEPHEN & RHONDA LIVING TR	1	VACANT	CORONADO FOREST	3.1	221916E	MULTI USE
30721007J	0011	TAYLOR BRADLEY E & NANCY J CP/RS	36	VACANT	CORONADO FOREST	3.2	221916E	MULTI USE
30721007K	4710	BARCHAS FAMILY LLC	72	RANCHING	CORONADO FOREST	3.0	221916E	MULTI USE
30721007M	0014	CHIN JAE MAN & CHRISTINA YOO CP/RS	18	VACANT	CORONADO FOREST	3.1	221916E	MULTI USE
30721007N	0013	LIEBERTHAL DAVID H & BOWER CYNTHIA E CP/RS	36	VACANT	CORONADO FOREST	2.9	221916E	MULTI USE
30721007P	0014	MARRS CHRISTOHER DEAN & JOAN	36	VACANT	CORONADO FOREST	3.1	221916E	MULTI USE

ATTACHMENT 3


ROSEMONT MITIGATION PARCELS
ROSEMONT MINE
RANCHING
ROSEMONT
STATE LANDS
VACANT
Major Street
State Highway
Interstate Highway
Administrative Boundaries
Pima County Index Map
WILMOT RD
WENTWORTH RD
MARSH STATION RD
ANDRADA RD
SAHUARITA RD
SONOITA HY
BAR V RANCH
COUNTRY CLUB RD
SANTA RITA RD
SANTA RITA
EXPERIMENTAL RANGE
AND WILDLIFE AREA
WHITEHOUSE CANYON RD
CANYON RD
GALATERVILLE RD
MADERA CANYON RD
LAS CIENEGAS
CORONADO NATIONAL FOREST
Scale 1:40,000
INFORMATION TECHNOLOGY DEPARTMENT
DEC 16, 2004

ROSEMONT MITIGATION LANDS - DRAFT (1/8/10)

4

Goal

Acquisition of, or easements on, additional conservation lands to mitigate natural and cultural resource impacts from the Rosemont Mine, both during the mine life and post-mine.

Criteria for High Priority Mitigation Lands

Wildlife

- Similar wildlife habitat and/or mitigates loss of habitat for wildlife, fish, and rare plants.
- SDCP biological core and/or Maeveen Marie Behan Conservation Lands System.
- Improves wildlife corridor/connection between Santa Rita Mtns, Cienega Creek, and Rincon Mtns.

Recreation and Open Space

- Similar recreation settings.
- Close proximity to Tucson visitors/recreationists.
- Restores or protects legal public (or agency) access.
- Available to the public (at least by foot).
- Similar recreational uses: OHV touring, horseback riding, hiking, dispersed camping, hunting.
- Provides "open space" (recreation, wildlife, scenery, ranching) in increasingly urban eastern Pima Co.

Water Resources

- Retires surface water rights or wells.
- Areas with wetlands, riparian areas, seeps, or perennial streams.
- Mitigates water impacts to Cienega Basin.

Cultural Resources

- Offsets the loss of cultural resources.

Location

- Close proximity to Rosemont Mine and/or Santa Rita Mountains.
- Adjacent to other protected areas.
- Maximizes the benefits of existing protected areas by increasing their size.
- Removes private inholdings within or adjacent to National Forest, especially in the Rosemont area, on the east side of Santa Rita EMA, and/or in Pima County.

Feasibility

- Currently available for acquisition, could be acquired quickly/prior to mine, etc.
- Easy to implement a conservation easement.
- Good options for management for protection of land and water (USFS, TNC, etc.).
- Good options for funding from Rosemont and others (Pima Co., USFWS, AGF, TEA, etc.).

Targets

- Sizes of parcels.
- Total mitigation acres (4,400 acres? 8,800 acres?).

Rosemont Copper Project EIS
Cooperating Agency Coordination Meeting 07/15/2010
DRAFT Agenda

Location: Federal Building, 300 West Congress, Tucson, Arizona, Room 4B
Facilitator: Teresa Ann Ciapusci, Cooperating Agency Liaison

AGENDA

09:30 – 09.45	**Welcome**	**Ciapusci**
09:45 – 10:30	**DEIS Draft Alternatives for Detailed Study**	**Everson**
10:30 – 11:00	**Mitigation Lands Concept**	**Rosemont**
11:00 – 11:15	**BREAK**	
11:15 – 12:00	**DEIS Chapter 1 Internal Review Instructions**	**Ciapusci**

INVITED COOPERATING AGENCIES

Tribes:	Tohono O'odham Nation
Federal:	Air Force, Army COE, BLM, Smithsonian Whipple Observatory
State of Arizona:	AZDEQ, AZMMR, AZDWR, AZGF, AZGS, AZSMI, AZSLD, AZSP, ADOT
Local:	Pima County, City of Tucson, Town of Sahuarita

INVITED GUESTS

Consultants:
Cheniae & Associates
Gordon Cheniae
Rosemont Copper Company
TBD

Michelle Black

From: John Windes
Sent: Friday, June 10, 2011 12:34 PM
To: Mike Ingraldi; Linda Pollock
Subject: RE: Jaguar: POSSIBLE sighting in Santa Rita Mountains on June 2, 2011

Very interesting. It is on the [redacted] of the Santa Ritas [redacted]
There is a 1933 location for a jaguar in HDMS [redacted]

John Windes
Wildlife Habitat Program Manager
Arizona Game & Fish Department
Tucson Regional Office
555 N. Greasewood
Tucson, AZ 85745
(ph) 520-388-4442
(fax) 520-628-5080

Click here to buy your hunting or fishing license online
Click here to enroll in the online Introductory Hunter Safety Class
Click here to enroll in the online Boat Arizona, Boater Safety Class
Click here to sign up for FREE Arizona Game and Fish Department e-news subscriptions

From: Michael Ingraldi [mailto:mingraldi@frontiernet.net]
Sent: Friday, June 10, 2011 12:25 PM
To: Linda Pollock
Cc: John Windes
Subject: Fw: Jaguar: POSSIBLE sighting in Santa Rita Mountains on June 2, 2011

Linda,
Jaguar at the Rosemont Mine site??

Michael

----- Original Message -----
From: Chantal OBrien
To: Esther Rubin ; Anne Justice-Allen ; Mike Ingraldi
Sent: Thursday, June 09, 2011 4:38 PM
Subject: FW: Jaguar: POSSIBLE sighting in Santa Rita Mountains on June 2, 2011

FYI – This is notification in case you have any projects in the vicinity of the Santa Rita Mtns. Please review the 8/17/10 Jaguar Ocelot Directives and current 10(a)(1)(A) permit to ensure that you and your personnel are abiding by the requirements.

Thanks,

Chantal (Chasa) O'Brien

Research Branch Chief

Arizona Game and Fish Department
5000 W. Carefree Highway

Phoenix, AZ 85086
Phone: (623)236-7247
Fax: (623)236-7918

From: Terry Johnson
Sent: Thursday, June 09, 2011 9:51 AM
To: FWS Steven L Spangle; FWS Erin Fernandez; FWS Wendy Brown; FWS Frank Solis; FWS Edward Meyers; FWS Nick Chavez; FS Jim Upchurch; FS Jim Copeland; FS Don G DeLorenzo; FS Bobbi L Barrera; USDA-WS David L Bergman
Cc: Tim Snow; Eric Gardner; Brian Wakeling; Chantal OBrien; Mark Weise; Raul Vega; Mark A. Hart; Bob Lemons; Robert Fink; Brad Fulk; Jim Heffelfinger; Gary R. Hovatter; Bob Broscheid; Mike Senn; Bill Vanpelt; Jim Paxon; Leonard Ordway; Sharen Adams; NMDGF RJ Kirkpatrick; NMDGF James N Stuart
Subject: Jaguar: POSSIBLE sighting in Santa Rita Mountains on June 2, 2011

Hi!

This message is to apprise you of a POSSIBLE jaguar sighting this week [redacted] the Santa Rita Mountains. I stress POSSIBLE but so far the report is looking pretty credible in terms of observer, location and details. As a formal record for this report is developed, including follow-up work by AGFD Region 5 staff and evaluation at the Regional and Phoenix levels, I will keep you apprised of any further significant developments, pro or con. For now, the attached map and the following summary will need to suffice. Statements (paraphrased for brevity) [redacted]

> While flying low level in a [redacted] helicopter I observed what I believe to be a large Jaguar. At 1045 on 2 June, 2011 [redacted] In steep densely forested terrain [redacted] a large cat bounded down hill [redacted]. The cat's color was dark copper orange with black spots and a long black tip tail [redacted] observed the cat from directly above, at times approaching within 100 feet. I observed the cat primarily from above, getting as close as 100 feet. Unfortunately no pics were taken. It was larger than a mountain lion, of which I have seen many, burnt orange in color, with obvious spotting. However, I could not discern rosettes or relatively larger head, shoulder or chest. I am certain about what I saw after comparing it photos of jaguars as seen from a distance. The cat's movements were unlikely cause by proximity to the Murphy Fire, some distance away, but rather caused by it being disturbed by the low-level flight [redacted] The cat was last seen headed [redacted] and was initially bounding, then remained relatively still.

Kudos [redacted] for timely reporting and for providing solid details about the observation!

One of the possibilities that will be evaluated is whether the cat might have been a large juvenile mountain lion in which the spots are persistent. Not necessarily a solid possibility but it is one that AGFD folks with relevant expertise will consider as they work through this report.

Mark Hart of AGFD's Tucson office is coordinating follow-up for Regional Supervisor Raul Vega. Several other employees are involved. We look forward to having sufficient information shortly to make a solid call on whether this sighting is sufficiently credible to warrant any more extensive follow-up on the ground.

With this message, I am also apprising AGFD work units of the need to ensure that any wildlife management activities the Department is conducting or authorizing in the subject area are fully compliant with the Department's state and federal authorities, permits, etc. For your convenience, I have attached copies of the relevant authorizations. Any questions about those authorizations should be directed to Eric Gardner, who administers the Departments ESA Section 6 program and our Section 10(a)(1)(A) permit from USFWS.

Thx, Terry

****

Terry B. Johnson
Endangered Species Coordinator
Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85086-5000
Tel 623-236-7707; Fax 623-236-7366
Email teebeej@azgfd.gov
Website http://azgfd.gov/

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THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
5000 W. CAREFREE HIGHWAY
PHOENIX, AZ 85086-5000
(602) 942-3000 • WWW.AZGFD.GOV

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DIRECTOR
LARRY D. VOYLES
DEPUTY DIRECTORS
GARY R. HOVATTER
BOB BROSCHEID

January 17, 2012

U. S. Army Corps of Engineers
ATTENTION: Marjorie Blaine (SPL-2008-00816-MB)
Tucson Resident Office
5205 E. Comanche Street
Tucson, AZ 85707

RE: Public Notice, Application No. SPL-2008-00816-MB for the Rosemont Copper Company

Dear Ms. Blaine:

The Arizona Game and Fish Department (Department) has conducted a preliminary review of the Public Notice SPL-2008-00816-MB, application of Rosemont Copper Company for a permit under Section 404 of the Clean Water Act (33 U.S.C. 1344) to develop an open pit copper mine in the Santa Rita Mountains, and for which a Draft Environmental Impact Statement (DEIS) has been issued by the Coronado National Forest. The following comments are submitted for your consideration regarding wildlife resource impacts in the state of Arizona in response to application No. SPL-2008-00816-MB and do not constitute the Department's comprehensive review of the Rosemont Copper Company project.

The proposed Rosemont Copper Project will directly impact approximately 38.6 acres of Waters of the United States (WUS) with the discharge of dredged/fill material. Additionally, approximately 2.5 acres will be indirectly impacted by the reduced flows in Barrel Canyon down to its confluence with McCleary Canyon, resulting from the development of the dry stack tailings and waste rock facilities in Barrel Canyon. Approximately 0.75 acres of potential WUS will be temporarily impacted by a water line crossing and road access for utility pole construction.

Given the size and scale of this proposed project and its location directly upstream from protected Outstanding Arizona Waters (OAW), Davidson Canyon and Cienega Creek, the Department believes the Corps of Engineers should carefully analyze the total impact of the proposed project, including all indirect as well as secondary and cumulative effects (40 CFR Part 230.11). The Corps' review should encompass the entire 4755 acre footprint of the project and all direct, indirect, and cumulative impacts to WUS, including uplands and downstream areas, and all interrelated and interdependent activities including those above the ordinary high water mark.

The Department holds a public trust responsibility for the protection of Arizona wildlife and its habitat, and is greatly concerned about potential impacts of the project on wetland and riparian-

dependent wildlife, including federally-listed species. The desert springs, perennial stream reaches, and riparian areas of Davidson Canyon and Cienega Creek provide essential resources for a diversity of fish and wildlife species.

The CWA 404(b)(1) guidelines, designed to restore and maintain the chemical, physical, and biological integrity of WUS, provide that dredged and fill material should not be discharged into aquatic ecosystems unless the applicant demonstrates that there is no less environmentally damaging practical alternative that achieves the applicant's project purpose.

CWA Section 303 and federal regulation 40 CFR 131.12, as well as the Arizona Tier 3 antidegradation rules (A.C.C. 18-11-107.01) require Davidson Canyon and Cienega Creek OAWs to be afforded the highest levels of protection for all designated uses, including aquatic and wildlife. The 2010 Arizona Pollutant Discharge Elimination System [AZPDES] Multi-Sector General Permit for stormwater discharges for the mineral industry, a required permit for the project, will not authorize any discharges lowering the water quality of Davidson Canyon or Cienega Creek. Any discharges of dredged and fill material from the proposed project to downstream receiving OAWs will likely result in significant and potentially long-term adverse impacts to these aquatic ecosystems.

It is the Department's position that the Rosemont DEIS does not sufficiently identify all potential direct, indirect, and cumulative impacts of the proposed project to WUS, including water quality, riparian areas, and habitat. Furthermore, the DEIS does not sufficiently analyze all potential alternatives for the least environmentally damaging practical alternative (40 CFR 230.10.a) which will also achieve federal and Arizona Tier 3 surface water antidegradation criteria. The Department's comments to the DEIS are incorporated by reference to this comment letter, which should be of equal relevance to the Corps for the purpose of its review of the CWA 404 permit application. The Corps' decision should also be informed by the relevant regulatory CWA reviews of the Environmental Protection Agency and the Department of Environmental Quality (ADEQ). ADEQ will be the reviewing agency for the AZPDES Multi-Sector General Permit for stormwater discharges required for the project.

Any approved mitigation plan should also account for all effects of the mine, not just direct impacts to waters of the United States, and must demonstrate that mitigation would adequately replace the loss and/or impairment of aquatic and biological functions resulting from the project.

Sincerely,

Josh Avey, Habitat Branch Chief

JTA:jw

cc: Rosemont Cooperating Agencies (via Email)
Raul Vega, Region V Supervisor
Jean Calhoun, USFWS Tucson

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January 18, 2012

Mr. Jim Upchurch
Forest Supervisor
Coronado National Forest
300 W. Congress
Tucson, Arizona 85701

Dear Mr. Upchurch:

The Arizona Game and Fish Department (Department) has reviewed the Draft Environmental Impact Statement (DEIS) for the Rosemont Copper Project and provides the following general comments on the DEIS here, with page specific comments in the attached table.

Hunter Opportunity

The Department appreciates that the Forest responded substantially to our comments on the Preliminary DEIS regarding impacts to hunting and hunters. Our previous estimates of impacts to hunting was based on a 20 year mine life, we have recalculated our estimates of hunter opportunity lost based on the revised mine life of 25 years and provide 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.

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. Given these numbers, and given such facts such as that current world records for Coues' white-tailed deer for both rifle and archery came from the Santa Rita Mountains, it is accurate to state that the Department considers the substantial impacts to the range a substantial loss for hunters.

In terms of economic losses this equates to 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 2003 figures (cited in the EIS) for value generated by hunting and fishing, the Department estimates losses to the local economy as a result of lost hunter opportunity to equate to $1,356,713 over those 25 years (See J. Heffelfinger, Rosemont Game/Hunter effects spreadsheet attached).

AN EQUAL OPPORTUNITY REASONABLE ACCOMMODATIONS AGENCY

Failure to Identify Adverse Impacts

Coronado National Forest (CNF) acknowledges its authority to require changes or additions to the MPO deemed necessary to meet the environmental protection standards of 36 CFR 228.8. CNF can prescribe changes to the MPO to minimize environmental impacts to CNF surface resources in accordance with the standards contained in § 228.8. For fisheries and wildlife habitat, CNF can require Rosemont to "take all practicable measures to maintain and protect fisheries and wildlife habitat which may be affected by the operations." 36 CFR § 228.8.

As is shown in the following comments of the Arizona Game and Fish Department, CNF has failed to articulate and identify all adverse impacts to species and wildlife habitat. Not having identified such impacts, it follows that no alternatives or mitigating measures are prescribed in this DEIS for these impacts, as required by NEPA.

Lack of Coordination with the Department

CNF has not adequately consulted with the Department in the preparation of the DEIS as required by 40 C.F.R. § 1501.6 and 1507.7.

In its letter to CNF dated July 8, 2008, the Department requested cooperating agency status in order to provide expert advice as a member of the Interdisciplinary Team (IDT) "as the EIS is developed and analyzed" concerning impacts to wildlife, habitat, and recreation. The Department was granted cooperating agency status and an MOU between the Department and CNF was executed on July 9, 2009.

However, the Department was never invited to attend an IDT meeting. On July 31, 2009 the Department wrote a letter to CNF which stated in part "[the Department has requested the opportunity to meet with CNF staff . . .[t]hese requests have gone unanswered . . [t]he Department is concerned that our staff is being kept at arm's length without the ability to provide meaningful input into the development of alternatives in terms of real-time give and take with CNF staff." The request went unanswered. On September 22, 2009 in a letter from the Department to SWCA Environmental Consultants, CNF's prime consultant, the Department again sought greater coordination with the IDT and proposed regular working meetings with SWCA and/or CNF to provide input on wildlife resources, to discuss concerns and possible mitigation strategies, and further requested that all data and reports be shared with the Department. This request also went unanswered.

The Department again requested by email a meeting with the IDT on September 14, 2009, and sent a letter Sept. 22 reiterating its request for "greater coordination with IDT" and proposing regular working meetings to discuss Department concerns and mitigation strategies. This also went unanswered.

Certainly, project proponent was required by the terms of its MOU with CNF to provide relevant technical and environmental information necessary for an environmental analysis. But so was the Department, in accordance with the terms of its MOU with CNF. As far as the Department can determine, CNF consulted only with Rosemont and its consultants in analyzing injury, developing alternatives and adopting mitigation measures for wildlife and wildlife habitat.

The Department did attend "Cooperating Agency" meetings sponsored by CNF, which were always attended by Rosemont representatives. These meetings were, in essence status updates to the DEIS and featured various topics for discussion. These meetings were not a conducive method of raising issues specific to wildlife, as all Cooperating Agencies attended these meetings.

CEQ 40 CFR 1501.6 states the lead agency "shall" meet with a cooperating agency at the latter's request and allocate responsibilities to such cooperating agencies. CEQ, 40 CFR 1501.7. CNF did not respond to the Department's requests for IDT meetings. The Department was not afforded a meaningful role in preparing the DEIS, analyzing injuries, alternatives or identifying mitigation measures. CFR 1501.7(a), As a result, CNF is not proceeding with all relevant information on the environmental consequences of its action. USC 4331(a).

The Department was denied an opportunity as a Cooperating Agency to review and comment on technical reports within its area of expertise due to CNF's failure to make the reports available for review until the Preliminary DEIS (PDEIS) was released to Cooperating Agencies. Where reports were made available, CNF imposed unrealistic and unreasonable time constraints to review such reports.

At the March 18, 2010, Cooperating Agency meeting, CNF distributed a list of 112 technical reports authored by the project proponent and its consultants, and asked each agency to analyze those reports within each agency's area of "specialized expertise" by April 30. The Department asked for several reports not posted on the CNF website and requested an extension of the deadline. On April 30 the Department submitted its comments on five biological reports, stating that [d]ue to the many reports available, breadth of information reported on, small staff available within the Department to review the reports, and the short timeframe in which to review the reports, [the Department] was unable to review all the reports . . . [w]e have appealed to the CNF to allow us more time to review the reports without relief."

In April 2010 the Department asked for missing technical reports not found on the CNF website. CNF replied on April 13 that the reports were not available. In its cover letter dated April 30, 2010, providing comments on available technical reports, the Department noted that it has been asking CNF more time to review reports without relief.

In a letter dated September 9, 2010, the Department again raised the issue of report unavailability and raised the topic at the September 16, 2010, Cooperators' meeting. CNF stated that it would conduct a full audit of technical reports and provide missing reports to the Department. CNF's September 24, 2010, reply to the Department's September 9 letter admitted difficulties "keep[ing] up with the volume of technical studies and NEPA process documents for this complex process." CNF advised that "[a]t this stage in the development of the DEIS, additional comments on technical reports will be considered between the Draft and Final EIS."

At the November 18, 2010, Cooperator meeting, the Department once again raised concerns about the missing tech reports. The Department's concerns were now heightened by the fact that over 100 *more* Rosemont-generated technical reports had been uploaded to the Rosemont EIS.us

website. At this meeting, CNF announced that, instead of its earlier plan to release the PDEIS on a chapter-by-chapter basis to Cooperating Agencies, CNF would release the entire 700-page document to Cooperators in mid-December for a 30-day review and comment period.

On November 23, 2010, the Department wrote a letter to CNF, repeating the Department's concern over the continued unavailability of technical reports, the lack of access to reports containing sensitive species information, the sheer volume of reports and the limited review times afforded to review them. In the letter, the Department requested more review time for the PDEIS in accordance with the MOU between the Forest Service and the Commission that required CNF to negotiate a reasonable amount of time for the Department's review of the internal DEIS. The Department pointed out that its comments on the PDEIS would be hampered by its inability to access and analyze relevant biological, hydrological and other reports.

On the same day November 23, 2010, the Department sent an email to CNF's biologist asking for two wildlife reports generated by Rosemont. The email reply, dated November 30, 2010, was as follows: "Sorry to not get back to you sooner. At this time none of the biology documents are to be released externally [*i.e.* to the Department] without permission from Reta Laford [Acting CNF Forest Supervisor] . . ."

The Department's November 23, 2010, letter was made available to Rosemont, which gave it to its counsel for review. Rosemont's lawyer's December 6, 2010, response, submitted to the CNF Forest Supervisor on December 9, 2010, suggested that the Department's expertise was "redundant." that the Department "may lack sufficiently knowledgeable or NEPA-experienced manpower and funding to fulfill its obligations under NEPA" and should withdraw as a cooperating agency, "rather than attempting to cause additional delays."

CNF announced on December 22, 2010, that the federal internal review of the PDEIS was taking longer than anticipated and that the DEIS would not be released to the public by the end of 2010. At the January 2011 Cooperators' meeting, CNF handed out a DVD with over 350 documents and reports, of which at least 150 were new documents and technical reports not previously posted to the website or made available to Cooperators. The biological reports that the Department had been seeking were not on the DVD nor posted to the Rosemont EIS.us website.

In an April 26, 2011, email, the Department asked CNF for the status of several missing biological reports. In response, CNF replied on May 3, 2011, that the reports were not ready for release to cooperating agencies.

CNF delivered the PDEIS to the Department on May 31, 2011, along with a CD-ROM containing all literature cited in the PDEIS, and gave the Department (and all other Cooperators) exactly 30 days to review and comment. This prompted the Director of the Department to write a formal letter to the CNF Forest Supervisor seeking 45 additional days to conduct its review in accordance with Section D.10 of the Memorandum of Understanding between the parties. The letter pointed out that the collaborative process between CNF and the Department contemplated by the MOU "never occurred" and that the Department was viewing the text of the PDEIS for the first time, along with the general public (the internal draft had been released by unknown

agents to local media). The Corps of Engineers concurred with the Director's request in a June 29 letter to the Forest Supervisor. The Department's request was denied by CNF in a June 21, 2011, letter to the Director, noting that the Department could also comment, along with the general public, during the public 90-day comment period. No reasons for the denial were provided. In response, the Director replied that the Department could as a result conduct only a limited review of the document.

The Department timely filed comments on June 30. Its cover letter listed over twenty chapters it was unable to review given the unacceptably short time frame. CNF granted 30 days additional review time to Cooperators on June 30, 2011. The Department filed additional PDEIS comments on July 29 with a cover letter stating that the Department was still unable to complete the review even with the extension. As suggested by the Forest Service, the Department is now submitting its comments during the formal public comment period.

The Department can only speculate that the unrealistic deadlines imposed upon Cooperating Agencies were a result of Rosemont pressuring CNF on its original commitment, made in the MOU between CNF and Rosemont, that the draft EIS would be made available for public review by March 2009, with the final EIS published in October 2009 and the ROD in November 2009.

Rosemont's position on DEIS-related delays was clearly articulated in an April 5, 2011, Declaration filed by the Senior Vice President for Corporate Development and Government Affairs for Augusta Resource Corporation, filed in the Arizona federal district court in the *Save the Santa Ritas et al, v. United States Forest Service*, et al, No. CV 11-00094-TUC-FRZ:

> "A substantial delay [in the NEPA process] will cause Rosemont to suffer significant injury. We have already invested more than $30 million in land acquisition and related costs. . . more than $20 million in connection with preparing the MPO, preparing other technical reports, studies and planning documents. . and spent over $40 million for the purchase of equipment and related expenses. Moreover, to date we have paid in excess of $5 million directly to the Forest Service and to their NEPA contractor, in accordance our MOU. . . Rosemont will have no opportunity begin to recover these costs and earn a return on its investment until the MPO has been approved by the Forest Service, and that cannot occur until the NEPA process has been completed."

The purpose of having Cooperating Agencies is to emphasize agency cooperation early in the NEPA process. 40 CFR 1501.6. The unavailability of technical reports to review, and the unrealistic deadlines imposed upon the Department for review and comment, has deprived the Department of a meaningful opportunity to participate as a Cooperating Agency. Rosemont's financial investment in the proposed project, along with its ready access to CNF personnel and SWCA during the DEIS development, may have compromised the objectivity of this DEIS.

Failure to Identify Meaningful Mitigation

The Department draw's the Forest's attention to the lack of identified mitigation for the project. NEPA provides the Forest ample direction to require the amount of mitigation necessary to

minimize impacts on the human environment. An EIS must include a discussion of the means to mitigate adverse environmental impacts -CEQ, 40 CFR 1502.16(h).
Meaningful mitigation alternatives were not analyzed in detail. For instance, it is our understanding that the proposed Resolution Copper mine near Superior will transport tailings to brownfield sites many miles from the mine to minimize impacts on the Tonto Forest. A similar alternative for Rosemont could potentially mitigate many impacts to public resources. The CNF declined to analyze in detail any similar alternative that transported waste rock and tailings off Forest lands. The Department believes such an alternative should have been studied in detail.

The Department notes an email dated May 7, 2010, from SWCA to CNF and the Senior Vice President for Corporate Development and Government Affairs for Augusta Resource Corporation, Rosemont's corporate parent. The email encloses a table labeled "Accepted Mitigation Measures Compilation" which "only includes mitigation measures that are 1) required by law, regulation or policy, 2) included in the MPO, 3) *Rosemont has reviewed and accepted*, and 4) need further clarification . . ." (emphasis added). The memo also referenced "our upcoming working group meeting."

CNF conducted a meeting with Cooperators on November 19, 2009, to discuss the criteria for compensatory lands for wildlife habitat and recreation. In response, the Department proposed the acquisition of mitigation lands in a December 15, 2009, letter to CNF.

A CNF employee began to map and collect information on possible mitigation land parcels. Her email was forwarded to Rosemont's Director of Environmental and Regulatory Affairs, who replied: "[t]his issue is far too complex and sensitive to 'discuss' on informal emails.. . . . .it appears predecisional, presumptive at least, and premature at best . . . Applicability of this term [compensatory lands] to mine plan operations review and NEPA is somewhat troubling to me. As of December 15, 2009, we are not there. Please include me on all communications related to impact mitigation and impact 'Compensation.'

On January 12, 2010, CNF conducted a Mitigation Lands working group meeting with Pima County, the Department, and the State Land Department to discuss the criteria for mitigation strategies for the Rosemont Copper project. A Rosemont representative attended. The Department followed the meeting with a letter dated January 13, 2010, with mitigation criteria.

No compensatory lands mitigation concepts appear in the DEIS, although compensatory lands is a recognized mitigation measure. CEQ, 40 CFR 1508.20. It appears that the only "mitigation" described in the DEIS is that which Rosemont was willing to offer to CNF.

CEQ guidance on NEPA reviews (2/18/2011) states:

> In developing mitigation, agencies necessarily and appropriately rely upon the expertise and experience of their professional staff to assess mitigation needs, develop mitigation plans, and oversee mitigation implementation. Agencies may also rely on outside resources and experts for information about the ecosystem functions and values to be protected or restored by mitigation, to ensure that

mitigation has the desired effects and to develop appropriate monitoring strategies. Any outside parties consulted should be neutral parties without a financial interest in implementing the mitigation and monitoring plans, and should have expert knowledge, training, and experience relevant to the resources potentially affected by the actions and—if possible—the potential effects from similar actions.

CNF should preserve and include all communications, including all emails, among Project Proponent, its consultants, SWCA and CNF staff into the Administrative Record to allow the public to review of CNF's Rosemont Project NEPA decisional process.

Please find additional detailed comments in the attached comment table, which contains three figures and one printed spreadsheet. We appreciate the opportunity to review and comment on the DEIS. If we can provide any additional information, please contact John Windes, Regional Habitat Program Manager, by phone at 520-628-5376, or by email at jwindes@azgfd.gov.

Sincerely,

Josh Avey
Habitat Branch Chief

JTA:jw

cc: Raul Vega, Region V Manager
John Windes, Region V Habitat Program Manager
Linda Pollock, Attorney General's Office
Cooperating Agencies (via email)
Jean Calhoun, Assistant Field Supervisor, USFWS

Enclosure(s)
Comment Table
Figure 1
Figure 2
Spreadsheet

Comment Location (Chapter/Section/Page/Line)	Comment / Rationale / Basis
	CORONADO NATIONAL FOREST PLAN
Ch 2 P 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 test 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. This statement 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 (2) economic impacts to affected residential, commercial and agricultural well owners, including the estimated costs of drilling deeper wells or experiencing loss of well production capacity; nor (3) 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 and 215	The text states: "Water needed to run the mine facility could reduce groundwater availability to private and public wells in the Santa Cruz Valley, specifically the communities of Sahuarita and Green Valley, Arizona. Household water availability may be reduced." "Furthermore, an inventory of all wells 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, which are public records. Although this database is not comprehensive, it is the official record of wells in the state. This database can form the basis for constructing a more detailed database in which individual well details can be added, such as well screen intervals and pump settings. Such databases are routinely constructed for regional water resource investigations, and can include more accurate location and elevation information, which are collected over time. Such a database should be constructed and maintained for this project to track and evaluate impacted wells and well owners and manage any mitigation efforts. **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 the wells impacted more specifically, including impacts over the estimated 140 years of groundwater drawdown in the Santa Cruz subbasin caused by the Rosemont Mine. The DEIS is required to accurately disclose all adverse impacts for public disclosure.
Ch. 3/215	The text states: "It is unlikely that any modification to the model—or any model—would be able to fully analyze impacts to individual wells. The model is still used to assess impacts, with the understanding that impacts to individual wells are not considered, except in a qualitative manner." This statement is true to the extent that detailed analysis at individual wells is not the outcome from a regional scale model; therefore, the regional scale model presented in the DEIS is not appropriate for analyzing detailed, comprehensive impacts to individual wells. If localized impacts are critical to assessing the appropriateness of the proposed action, than a more detailed, local-scale model should be constructed. It is also clear that seasonal changes in pumping rates are not simulated in the groundwater model, since the pumping is averaged over a year-long period. Seasonal impacts on individual wells may be greater than the average impacts suggested by the regional scale model. The model can be used to estimate the average drawdown rates and changes over time, based upon the distance from the Rosemont Water Supply wells. This is displayed in figures showing the drawdown cone-of-depression over 20 years (Ch. 3/ 246 to 250). Estimates could be compiled for various times and for individual wells to better evaluate possible impacts. Monitoring of water levels near the proposed pumping wells could assess seasonal changes (in the area) which may be expected from operation of other wells in the area. This analysis could then be used to estimate the range of impacts for specific wells. Once compiled, the well database could be used to evaluate energy cost and loss of well production.
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 Town of Sahuarita's concerns should be addressed in the DEIS.
Ch. 3/276	The text describes Rosemont's well protection plan for the residential water supply well owners in the Sahuarita Heights neighborhood. The plan addresses pump inspection, pump maintenance, pump replacement, well inspection, well maintenance, and well replacement if the Rosemont production wells affect their capacity. The DEIS should disclose that this protection plan covers only a small subset of well owners, and that the plan is effective only for the working life of the mine. The DEIS does not describe the impacts to these well owners after the mine closes, nor for the 140 years thereafter while the cone of depression caused by the Rosemont production wells continues to propagate.
Ch,2/228	The text notes that A.R.S. § 45-543 provides for transfer of water from an AMA to another basin, "subject to payment for damages". Payment of damages to well owners in the Santa Cruz subbasin who will suffer financial losses due to the stresses imposed on the water table by the mine for the life of the mine and the 100 to 140 years of the continued drawdown after the mine closes is an unexamined alternative that requires analysis as a mitigation measure, even though the alternative is outside CNF's jurisdiction. CEQ 1502.14.
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 communities in the Santa Cruz subbasin. 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. 3/234	The text states: "The Arizona Department of Water Resources publishes annual maps showing land subsidence in the Sahuarita and Green Valley area. The most recent map for the period from February 2009 through January 2010 is shown in figure 34; the map shows that subsidence of less than 0.2 inch occurred in a broad area north of East Sahuarita Road (west of Interstate 19) southward to near Whitehouse Canyon Road (Arizona Department of Water Resources 2010). Over that period, two limited areas near major supply wells subsided by 0.7 to 1.4 inches. Incremental additional subsidence is expected on an annual basis owing to future committed groundwater withdrawals in the area, including groundwater withdrawals associated with the mine water supply." Subsidence maps presented in the DEIS (page 235) show the area with the greatest measured subsidence is immediately adjacent to the proposed pumping location. Subsidence is a serious concern since it can damage structures and alter surface flow directions for groundwater. Subsidence can be simulated in a groundwater flow model, and should be further evaluated to determine whether significant risks are present.
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 140-150 years.
	SANTA CRUZ SUBBASIN WATER QUALITY
Ch. 3/245	The text states: "In addition to drawdown, potential changes in groundwater flow direction are a potential impact from mine water supply pumping. Water level elevation contours, which indicate the direction of groundwater flow, after 20 years are shown in figure 39 (with both mine water supply pumping and other groundwater pumping) and figure 40 (without mine water supply pumping, only other groundwater pumping). No significant changes in flow direction are expected to occur owing to mine water supply pumping. The gradient of the water table will change slightly, from 8.1 feet per thousand feet without mine water supply pumping, to 9.4 feet per thousand feet with mine water supply pumping." Currently, a plume of groundwater with elevated sulfate concentrations originating from the Sierrita Mine tailings is being managed as part of a mitigation plan for public and private water supply wells in the Green Valley area. **Figure 3** shows the most recent available sulfate information compared to the cone of depression from proposed pumping for Rosemont Mine water supply. Based on the change in gradient which results from the pumping for water supply, an analysis of the potential impact on the location and transport of the sulfate concentrations should be provided in the EIS. As of 2011, the sulfate concentrations have not impacted many of the public supply wells. Pumping for the Rosemont mine water supply may alter the management of the sulfate impacted groundwater, and must be evaluated in the EIS.

Ch. 3/229	The text states: "The calibration appears to be within acceptable range. Although it was not entirely successful on the west side of the model, errors in predicted water levels at this location are not expected to change the overall impact assessment." The western side of the model was simulated using general head boundaries, which were placed over the spine of the Santa Rita Mountains in the Santa Cruz River Valley. The proximity of the pit to the groundwater divide between the Cienega Creek and Upper Santa Cruz subbasins is a concern because the presence of the boundary can influence the predictions of the model. This is evident in Figure 8-13 of the Tetra Tech report. The model prediction 1,000 years after the end of mining shows that the drawdown extends up to the western edge of the model domain. The overall shape of the drawdown cone is clearly influenced by the presence of the boundary – it is oval-shaped with the long axis parallel with the western boundary. M&A explained that the domain boundary on the western side of the model was selected to coincide with the edge of the upper Santa Cruz basin where unconsolidated basin fill sediments abut bedrock comprising the Santa Rita Mountains. This construct prevents the model from predicting what, if any, impact mining would have on water levels in the upper Santa Cruz basin. This condition is true for all three of the groundwater models constructed to represent the impacts of the open pit mine; the M&A model, the Tetra Tech model, and the model developed by Dr. Myers for Pima County. In the case of Dr. Myers' model, the boundary condition is even more of a factor because his model places a no-flow boundary along the hydraulic divide that runs along the crest of the Santa Rita Mountains. The open pit lies immediately adjacent to the hydraulic divide, therefore the no-flow boundary in Dr. Myers' model prevents any flow of water from west of the hydraulic divide to migrate to the pit. This suggests that there will be no impact from the open pit on groundwater levels in the upper Santa Cruz basin side of the hydraulic divide. The presence of the open pit will cause the hydraulic divide to shift to the west toward the upper Santa Cruz basin. This was not adequately investigated by any of the models developed for this DEIS.
	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" (Emphasis added). The Arizona Department of Water Resources maintains a database of registered wells and 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 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). The EIS is required to analyze the effects of groundwater drawdown on these wells in more detail.

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. Household water availability may be reduced." 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. Vague statements such as "household water availability may be reduced" 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)	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 in the model reports to define impacts to individual wells. Impacts to the Singing Rock and Hilton Ranch Road residential areas have not been defined or addressed other than to note that they fall within the 5 foot impact contour. These impacts need to be more clearly quantified, showing expected impacts to wells to more accurately define the extent and timing of adverse conditions for well owners within the vicinity of the pit. In contrast, the text states: "Groundwater drawdowns of 10 to 100 feet are modeled to occur in the vicinity of the residential neighborhood along Singing Valley Road west of State Route 83 and Hilton Ranch Road east of State Route 83. Little is known about the domestic wells in these areas, but groundwater availability is highly likely to be affected by the drawdown from the mine pit". The discrepancy in reports groundwater impacts to the Singing Wind residential subdivision should be clarified with more accurate disclosure and better modeling drawdown contours at intervals of 20, 50, 150 and 1000 years. The EIS is required to inform the public of all significant impacts to the quality of the human environment.
Ch. 3/220	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). 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 DEIS is required to analyze all cumulative effects of groundwater usage, including future foreseeable effects. *See* Comment *infra*.

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 could be higher than estimated (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 underestimated, and hence the impacts to wells may have been under-represented. **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 annual water usage, and future water usage within the model domain should be more clearly presented and analyzed in the EIS.
	No alternatives or mitigation is proposed for the households in the Cienega Basin which may experience groundwater drawdowns below their well casings. The DEIS does not describe the interrelated economic effects of a significant drop in the water table (such as the costs of drilling deeper water wells) for these residences as required in CEQ, 40 CFR 1508.14. CNF is obligated to study, develop and describe alternatives to recommended courses of action which involves unresolved conflicts concerning alternative uses of available resources. CEQ, 40 CFR 1507.2.
Ch. 3/220 Ch. 3/223 Ch. 3/237 Vol. 2/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 <u>and</u> 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. 3/216	The text states: "The modeling process for Errol L. Montgomery and Associates consisted of first constructing a steady-state model; a steady-state model assumes that the basin being modeled is in equilibrium, with no significant changes in water inflow, outflow, or storage over time. The steady-state model was constructed and then calibrated to the observed present-day water levels. Once calibrated, the model was modified to include the removal of groundwater caused by the proposed mine pit, and the resulting changes in groundwater levels are simulated over time (1,022 years in this case). The model is executed using the computer code MODFLOW-SURFACT." The Davidson Canyon and Cienega Creek area for the Rosemont Mine are considered in "steady-state", that is the water levels in the basin are not trending up or down over the long-term. These basins have limited pumping of groundwater, since there are few large scale developments or irrigation areas. For this reason, the groundwater model was constructed and calibrated as a steady-state flow model, to match current (and presumably) past water levels in the basin. Steady-state modeling ignores (does not simulate) changes in stored groundwater, so the nature of the storage properties for the aquifer are not evaluated. The transient simulations then covered the period of mining out 1,000 years into the future. On Page 222, the following statement is made (specifically with regard to the Tetra Tech model): *"A range of aquifer storage parameters was analyzed. Aquifer storage parameters had a large effect on the extent of drawdown over the first 200 years of modeling. Higher storage values resulted in drawdown receding 3 miles toward the mine pit, while lower storage values resulted in drawdown advancing an additional mile beyond the mine pit."* Based on this statement, it appears that the Tetra Tech model is very sensitive to aquifer storage properties, and presumably the M & A model is also very sensitive to these parameters. Although storage parameters were analyzed as part of the individual aquifer tests conducted for the project, the regional scale storage parameters have not been evaluated. For this reason, the transient simulations to define impacts have not been evaluated and are speculative. Further analysis of this issue is warranted to assess possible impacts.
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." 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. Because there are also questions about the model's western boundary condition (general head in M&A model, constant head in Tetra Tech Model), the model recharge changes should be re-evaluated with respect to this issues.

Ch 3 P 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 states that baseflows in Davidson Canyon "may" be affected by seasonal variations. This does not constitute an adequate analysis of other, cumulative effects.
	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 [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/p.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 DEIS text 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 significant adverse effect on groundwater and surface water quality for the future. 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. 3/287-9	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 DEIS 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 DEIS 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 Vol. 2, 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 Appendix 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 DEIS 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 DEIS 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 DEIS 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. 3/342	SRK's review of Tetra Tech's modeling for waste rock characterization (Technical Review of *Infiltration, Seepage, Fate and Transport Modeling Report-Revision1, Part 2, Geochemical Fate and Transport Modeling)* contains the following critique: "Tetra Tech did not respond to SRK's concern about using dilute leachates from laboratory tests directly without scaling for arid conditions at the site except to acknowledge: "There is much debate about the proper scale up methods applied to this type of data, and there is currently not enough information to implement any type of adjustment." SRK agrees there is a debate but notes that analog site data provides a basis for determining whether small scale tests are providing relevant source terms. SRK provided a reference that can serve as a basis for the comparison. During the call on March 10, 2011, Tetra Tech indicated additional analysis had been done on the topic and this would be provided to SRK for review". The Department cannot locate any technical memorandum from Tetra Tech in the RosemontEIS website that reported on additional analysis to scale for arid conditions. The Department is concerned that the use of small-scale tests involving dilute leachates will not accurately reflect field conditions over time of the 596 million-ton waste rock storage area located in the Barrel Canyon drainage. The DEIS should report the results of the testing using arid scale conditions as recommended by SRK Consulting.
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 3/297	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 DEIS 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 DEIS text 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. 2/341	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 p34 and 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 DEIS 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 2/69 "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 occurred at the inactive tailings at Freeport McMoran Mine in Morenci and the Tyrone Mine in New Mexico, resulting in significant mortalities. Unless alternatives are described in the DEIS, this situation will exist in perpetuity. Describe this forseeable event in the DEIS
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, 398, 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/ 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.
Ch 3/ 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/ 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	The Department reiterates our PDEIS comment: There will be permanent habitat loss for some talussnail populations within the proposed mine footprint and project area, although

topminnow, longfin dace	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 DEIS 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. P.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.
P. 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 P 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 Vol1 – page 69: Plant and Animals section	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 3rd paragraph	"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 page 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 DEIS text should analyze this possibility.
Ch 2 P. 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 P.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 3/320-321 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 3/320-321 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 P. 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.
P 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 3/276-278 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	"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. We expect 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. 3/75 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. 3/75 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. 3/73 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	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.
Ch 3/744 Recreation and Tourism	The Department reiterates our comment relative to economic losses as a result of losses to hunting: 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 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.

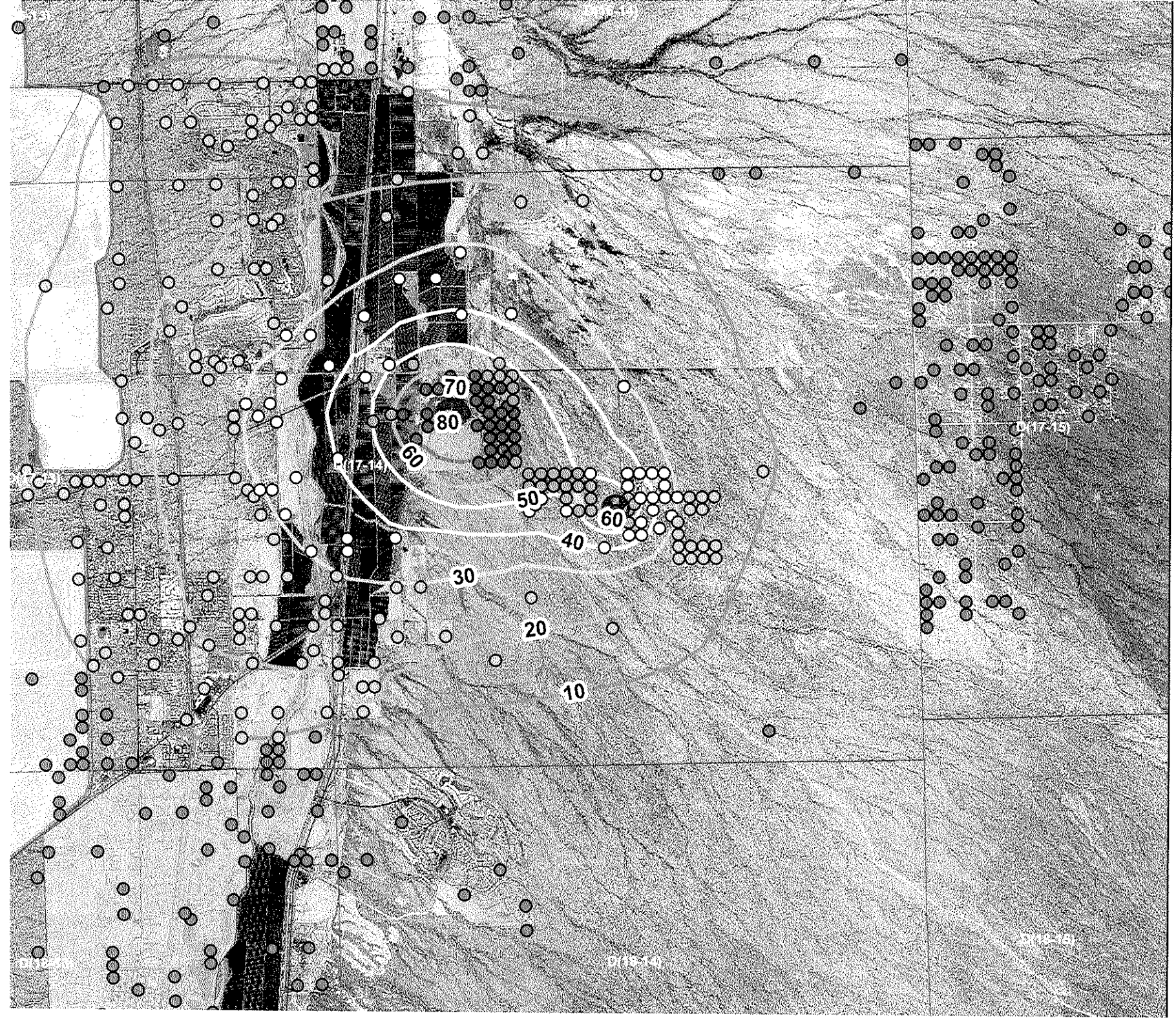
	This calculation is only for direct losses associated with the footprint of the mine over 25 years. As is stated on page 551 "it would take decades or centuries before the project footprint is no longer apparent. Even when vegetation is established during reclamation efforts, the composition of plan 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, 3 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".



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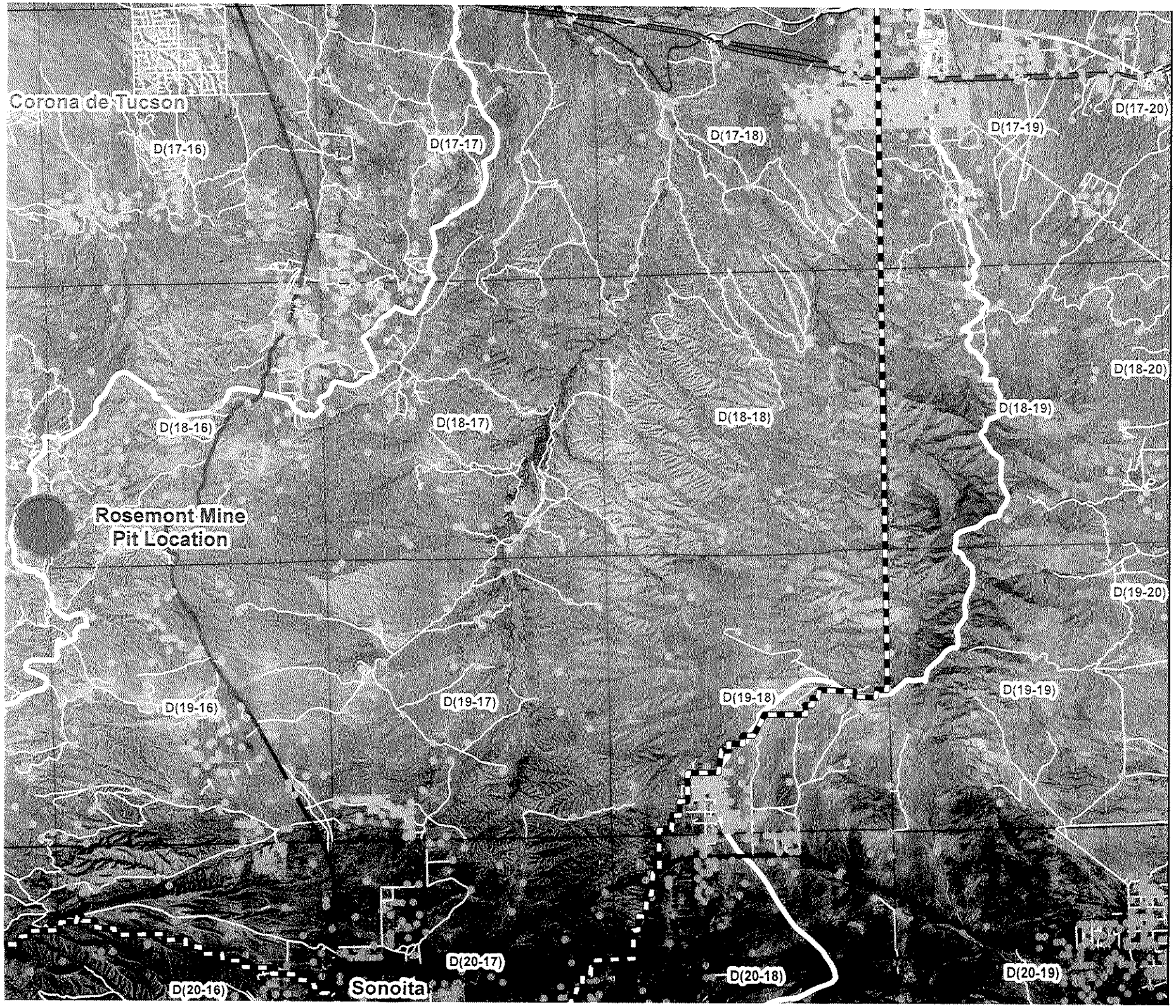

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United States Department of the Interior

U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:
02EAAZ00-2012-CPA-0015
22410-2009-FA-0104
22410-2009-R-0389

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Arizona Game & Fish Department
Region V

January 19, 2012

Ms. Marjorie E. Blaine, Senior Project Manager
Arizona Branch, Regulatory Division
U.S. Army Corps of Engineers
5205 East Comanche Street
Tucson, Arizona 85707

Reference File: SPL-2008-00816-MB

Dear Ms. Blaine:

Thank you for Public Notice (PN) SPL-2008-00816-MB posted December 6, 2011, which we received the same day. We are also in receipt of the associated Draft Environmental Impact Statement, Draft 404(b)(1) Alternatives Analysis, and the Proposed Mitigation Concept. This review was prepared under the authority of and in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended U.S.C. 661 *et. seq.*) and is based on interagency communication, field investigations, literature research, and information contained in our library and files.

The PN indicates that the Rosemont Copper Company (applicant) has applied for a U.S. Army Corps of Engineers (Corps) permit under section 404 of the Clean Water Act (CWA) for activities proposed to occur on a site approximately 30 miles southeast of Tucson, Arizona within portions of Sections 17, 20, 21 and 25-35, T17S, R14E; portions of Sections 31-35, T17S, R15E; portions of Sections 1, 2 and 12, T18S, R14E; portions of Sections 1, 2, 7, 10-15, 17, 18, 20-25, 35 and 36, T18S, R15E; portions of Sections 6-8, 14-23 and 27-33, T18S, R16E; portions of Sections 1 and 2, T19S, R15E; and portions of Sections 4, 5 and 6, T19S, R16E in Pima County, Arizona,

A detailed description of the proposed project is contained in a draft Environmental Impact Statement (EIS) that has been prepared by the U.S. Forest Service (USFS), Coronado National Forest. A Notice of Availability of the Draft EIS was published by the U.S. Environmental Protection Agency (EPA) in the Federal Register on October 21, 2011 (76 FR 65509). The applicant has submitted a Section 404 permit application for the so-called Barrel-only Alternative (Alternative 4 under the aforementioned Draft EIS), which has been identified as the

preferred alternative in the Draft EIS. Additional detail on the original proposed action, preliminary Mining Plan of Operation (MPO), as well as other alternatives considered, is also provided in the Draft EIS.

The PN contains an overview of proposed project activities. In brief, the proposed Rosemont Copper Project will utilize conventional open-pit mining techniques. Waste rock will be blasted and transported by haul truck to the waste rock storage area. Ore will be blasted and either transported by haul truck to the leach pad and processed by leaching (if it is oxide ore), or crushed and loaded onto a conveyor for transport to the mill for processing by conventional sulfide milling (if it is sulfide ore). Tailings will be stored using a dry stack tailings technique minimizing airborne releases and water seepage. The placement of waste rock will be initiated with perimeter buttresses, including placement on the perimeter of the dry-stack tailings storage areas to provide structural and erosional stability of the tailings pile.

The copper concentrates from the milling operations will be shipped off-site to a smelter. Leach ore (oxide material) will be placed on the heap leach pad. Solutions from the pad will be collected in a solution pond and then processed through the solvent extraction-electrowinning (SX/EW) plant. Copper cathodes generated from the SX/EW plant will be transported off site for further processing. The proposed project will involve the construction and operation of various mine features, associated structures, and anticipated infrastructure necessary to support these facilities. These constructed features include: the mine pit, waste rock storage areas, heap leach area, dry-stack tailings facility, ancillary facilities and structures, mine haul roads, access roads, and off-site water and power transmission lines. The nature of the activities associated with each of these mine features are discussed further in the PN and Draft EIS.

The PN states the proposed project area is located in the Semidesert Grasslands biotic community and transitions into a Madrean Evergreen Woodland vegetation association on the higher slopes of the Santa Rita Mountains within and adjacent to the proposed project area. Xeroriparian mixed scrub vegetation is present along Barrel Canyon, its tributaries, and in the smaller, unnamed washes within the proposed project area. The upland and riparian plant communities are described in greater detail in the PN.

The primary drainage in the proposed project site is Barrel Canyon, with its main tributaries being Wasp Canyon, McCleary Canyon, and Scholefield Canyon. Barrel Canyon drains into Davidson Canyon on the east side of State Route (SR) 83. Davidson Canyon Wash is tributary to Cienega Creek, tributary to Pantano Wash, tributary to the Rillito River, tributary to the Santa Cruz River which is a Traditionally Navigable Water. Several seeps and springs are present within the proposed project site, including Scholefield Spring (which supports a potentially jurisdictional wetland) located in the north portion of the proposed project site and Rosemont Spring northwest of Rosemont Camp within the Project.

The PN states the proposed project would impact Barrel Canyon and associated tributaries including Wasp Canyon, McCleary Canyon, Trail Canyon, and other unnamed ephemeral washes. The PN also states that development of the waste rock storage area and dry stack tailings facility is anticipated to result in reduced flows in Barrel Canyon downstream to its confluence with McCleary Canyon and that the potential waters of the United States (WUS) in

this reach will be indirectly affected. The PN further states that potential WUS will also be impacted by excavation of the mine pit. Potential WUS will also be impacted by construction of the heap leach pads and associated stormwater ponds, the dry stack tailings facility, stormwater diversion channels and other stormwater-related features, the plant site (including the associated realignment of McCleary Canyon), the construction of access and haul roads, and other proposed project features. Lastly, the PN states that construction of both the water supply pipeline and electrical transmission line will also affect WUS, though we note that not all affected WUS are necessarily within the Cienega Creek watershed. These discharges will directly impact 38.6 acres, indirectly impact 2.5 acres, and temporarily impact 0.75 acre of potential WUS.

We believe the proper scope of analysis should consider impacts at all sites proposed to be involved with mine activities, as described above. These areas include both uplands in which mine facilities will be placed as well as adjacent upland and downstream ephemeral and perennial riparian areas indirectly impacted by said activities. We further believe downstream areas should include both those impacted by altered surface hydrology as well as those affected by groundwater impacts. We therefore believe the total impact of the activity which would be authorized by your agency should be assessed, including secondary and cumulative effects as defined by the 404(b)(1) Guidelines (CFR 40 part 230.11) and indirect effects as defined by National Environmental Policy Act (NEPA) regulations (40 CFR, Parts 1502.16 and 1508.8).

Upland Impacts

We are concerned with the relatively large areas of uplands that will be impacted as a result of the placement of dredged materials into adjacent WUS. These uplands provide foraging resources for the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*). Furthermore, a day roost for this species is present within the project area (Rosemont Copper 2010), which may also support the non-listed Mexican long-tongued bat (*Choeronycteris mexicana*). Townsend's big-eared bats (*Corynorhinus townsendii*) and fringed myotis (*Myotis thysanodes*) roost within the project area. We note that all bats are protected by State regulations.

The jaguar (*Panthera onca*) and ocelot (*Leopardus pardalis*), both endangered, are known from areas near the proposed project site. Our concerns for these wide-ranging species relate to disturbance, displacement, impacts on corridors, and increased risk of vehicle strikes.

Sonoran desert tortoise (*Gopherus morafkai*) is listed as a species of Wildlife of Special Concerns by the Arizona Game and Fish Department (AGFD) and is also a candidate for Federal listing. This species is known from the region, especially at lower elevations, such as portions of the water and power line alignments.

The project site contains talus slopes inhabited by the Rosemont talussnail (*Sonorella rosemontensis*), a candidate for Federal listing. We are concerned that this species will be negatively impacted by construction of the mine.

The endangered Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*) can be found within relatively close proximity to portions of the proposed project site, and is likely present

within the alignments for water and power lines. We have additional concerns that the Coleman's coral-root (*Hexalectris colemanii*), a plant species which has been petitioned for Federal listing, will be affected by the proposed project. The salvage-restricted (as defined by Arizona Department of Agriculture rules) San Carlos wild buckwheat (*Eriogonum capillare*) and needle-spined pineapple (*Echinomastus erectocentrus* var. *erectocentrus*) also occur in the vicinity.

Terrestrial animals listed as Wildlife of Special Concern by AGFD are known to occur in or near the proposed project site, including the Northern gray hawk (*Buteo nitidus maxima*) and the aforementioned Mexican long-tongued bat.

Another general subject of concern is the potential for nonnative grasses to invade the proposed project site. Currently, nonnative grasses are not readily apparent in all areas of the watershed in and downstream from the project site; however, the appreciable surface disturbances inherent in the proposed project are likely to disrupt native vegetation in favor of invasive species. Further, increased traffic due to the transport and hauling of mined materials could increase the chances of these species invading the proposed project area, as seeds can be conveyed easily by vehicles traveling through areas where invasive grasses are present. Invasive grasses could severely alter the watershed by excluding native plants, altering wildlife habitat, and increasing the risk of wildfire.

Ephemeral Stream Impacts

As stated above, impacts to the respective WUS will be accompanied by an even greater area of impacts to the adjacent uplands. We are concerned that such direct and indirect impacts in upstream watershed areas will, in turn, negatively impact ephemeral streams to a greater degree than the PN's statements regarding affected acreage of WUS indicate.

In arid and semi-arid regions, ephemeral and intermittent streams provide much of the ecological and hydrological connectivity in a landscape, contributing important sources of sediment, water, nutrients, seeds, and organic matter for downstream systems (Levick *et al.* 2008). The disturbance or loss of ephemeral and intermittent streams can have dramatic physical, biological, and chemical impacts throughout the entire watershed (Levick *et al.* 2008), and can lead to the degradation of downstream ecosystems.

Perennial Stream Impacts

The direct and indirect impacts to uplands and ephemeral channels will result in further impacts to perennial reaches downstream, again, in greater degrees than the acreage of affected WUS in the PN would indicate. We also note that any groundwater withdrawal from within the mine area, as well as the interception of regional groundwater by the mine pit upon discontinuation of dewatering, has the potential to further impact streams. We are particularly concerned with the proposed action's impacts to the perennial or riparian areas of Davidson Canyon Wash and Cienega Creek, which are situated downstream.

The Arizona Department of Environmental Quality has designated Davidson Canyon Wash as an Outstanding Arizona Water downstream of the proposed project area. Davidson Canyon Wash is a tributary to Cienega Creek, which is also designated as an Outstanding Arizona Water. Resources of significant ecological value occur within Davidson Canyon Wash and the Cienega Creek watershed, including springs, perennial stream stretches, and riparian areas. These resources provide habitat for a diversity of fish and wildlife species, including two endangered fish, the Gila topminnow (*Poeciliopsis occidentalis occidentalis*) and Gila chub (*Gila intermedia*), as well as critical habitat for the chub. The endangered Huachuca water umbel (*Lilaeopsis schaffneriana* ssp. *recurva*) is also present in Cienega Creek. A reach of Cienega Creek has been proposed as critical habitat for the endangered southwestern willow flycatcher (*Empidonax trailii extimus*); the candidate yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is known from the stream as well. Lastly, both Davidson Canyon Wash and Cienega Creek support breeding populations of numerous species of Migratory Birds (as listed under the Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712 40 Stat. 755, as amended), including sensitive riparian obligate species including species of current or potential conservation concern such as Lucy's warbler (*Vermivora luciae*), brown-crested flycatcher (*Myiarchus tyrannulus*), northern beardless-tyrannulet (*Camptostoma imberbe*), Bell's vireo (*Vireo bellii*), yellow warbler (*Dendroica petechia*), rufous-winged sparrow (*Aimophila carpalis*), Abert's towhee (*Pipilo aberti*), and summer tanager (*Piranga rubra*) (Latta *et al.* 1999).

Arizona Game and Fish Department Wildlife Species of Special Concern that are associated with streams in the Cienega Creek watershed include the Gila longfin dace (*Agosia chrysogaster chrysogaster*), the lowland leopard frog (*Lithobates yavapaiensis*) and the northern Mexican gartersnake (*Thamnophis eques megalops*). The latter species is also a candidate for Federal listing. We must also note that sites in and near the project site, aside from the Cienega Creek watershed, support metapopulations of the threatened Chiricahua leopard frog (*L. chiricahuensis*); we are concerned about impacts to this species as well.

Protection of riparian areas is a significant concern to the U.S. Fish and Wildlife Service (Service) due to the regional scarcity of these ecosystems within the desert southwest, especially the State of Arizona. Wetland and riparian ecosystems provide essential wildlife habitat functions disproportionate to their occurrence within the landscape. Unfortunately, riparian ecosystems have suffered significant adverse impacts over the past century. Lofgren *et al.* (1990) states that according to most estimates, over 90 percent of the native riparian areas along Arizona's major desert watercourses have been lost, altered, or degraded as a result of human activities. Webb *et al.* (2007) demonstrates that substantial natural perennial flow miles have been lost in Arizona, at least in part due to human groundwater use.

Summary of Impacts

Individually and cumulatively, these direct losses of channels and alterations of the uplands would modify storm water flow and runoff events, as the condition of the upland is integral to the hydrologic function of the watershed (Barnett *et al.* 2002, as cited in Levick *et al.* 2008). The amount of precipitation that immediately runs off the land surface - and that which infiltrates into the soil to either be used for plant growth or to recharge ground water - is dependent on this

critical interface. Because of the deficiency of water, terrestrial arid and semi-arid ecosystems do not recover quickly from human-imposed disturbance (Levick *et al.* 2008). We are concerned that the impacts of the proposed project in the watershed of Cienega Creek could alter or degrade this watershed, affecting ecosystem function and, ultimately, compromising the value of this unique resource.

Policy Determinations

Also at issue is the importance of the Cienega Creek watershed to the local community at large. As previously mentioned, parts of Davidson Canyon Wash and Cienega Creek are designated as Outstanding Waters by Arizona Department of Environmental Quality. The lower reaches of Cienega Creek are the principal feature of Pima County's 4,100-acre Cienega Creek Natural Preserve. We note that Pima County has acquired lands in this area, in part, to mitigate future effects to threatened, endangered, and sensitive species and to support the county's application for an Endangered Species Act section 10(a)(1)(B) permit from the Service. Moreover, within Pima County, all of Davidson Canyon Wash and Cienega Creek are considered Important Riparian Areas by Pima County's Sonoran Desert Conservation Plan (SDCP). The SDCP guides "regional efforts to conserve the best lands and most precious resources for future generations of Pima County residents to enjoy" [http://www.pima.gov/cmo/sdcp/index.html, accessed January 13, 2011 2009]. Important Riparian Areas were designated because of their high water availability, vegetation density, and biological productivity. The proposed project also falls within the Biological Core of the SDCP, which is an area defined as crucial for the conservation of specific native floral and faunal species of special concern within Pima County. As exemplified by these numerous designations, the Cienega Creek watershed (including Davidson Canyon Wash) is widely recognized as a unique and irreplaceable resource by the local community. It is for the reasons delineated in the prior narrative that Davidson Canyon Wash and Cienega Creek have been determined to be Aquatic Resources of National Importance.

Additionally, the 404(b)(1) Guidelines provide that no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem or WUS. We believe the PN has not demonstrated the proposal is the least environmentally damaging practicable alternative. Davidson Canyon Wash and Cienega Creek contain significant resources, including riffle and pool complexes, which are special aquatic sites as defined by the 404(b)(1) Guidelines (CFR 40 part 230.45). In regard to discharges into special aquatic sites, the 404(b)(1) Guidelines state (40 CFR Part 230.10):

> Where the activity associated with a discharge which is proposed for a special aquatic site (as defined in subpart E) does not require access or proximity to or siting within the special aquatic site in question to fulfill its basic purpose (i.e., is not ``water dependent''), practicable alternatives that do not involve special aquatic sites are presumed to be available, unless clearly demonstrated otherwise. In addition, where a discharge is proposed for a special aquatic site, all practicable alternatives to the proposed discharge which do not involve a discharge into a special aquatic site are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise.

The PN states, on page 11, "...the basic project purpose of the proposed Rosemont Copper Project is copper mining, which is not water dependent." Therefore, it can be presumed that a less environmentally damaging, practicable alternative (or alternatives) not involving special aquatic sites is available.

Mitigation

The PN further states that the applicant is required to provide a Habitat Mitigation and Monitoring Plan in conformance with the Corps' mitigation rule prior to a permit decision, and that a preliminary mitigation concept has been previously submitted to the Corps. The final mitigation plan must conform to the Corps' and the EPA's "Final Rule for Compensatory Mitigation for Losses of Aquatic Resources" (33 C.F.R. Parts 325 and 332 and 40 C.F.R. Part 320; published in 73 Fed. Reg. 19594-19705) hereinafter referred to as the 2008 Mitigation Rule. Components of the final plan are listed below (33 CFR § 332.4(c)).

Corps/EPA mitigation rules include a specific order in which five general classes of compensatory mitigation options must be considered: 1) mitigation banks, 2) in-lieu fee programs, 3) permittee-responsible mitigation under a watershed approach, 4) permittee-responsible mitigation through on-site and in-kind mitigation, and 5) permittee-responsible mitigation through off-site and/or out-of-kind mitigation. The PN states that Rosemont has considered these five general classes of compensatory mitigation when developing the preliminary mitigation plan, and has determined that only mitigation strategies 4 and 5, as described above, are practicable. These options are further characterized as follows:

<u>Permittee-responsible mitigation through on-site and in-kind mitigation</u> - The Corps mitigation rule states: "On-site means an area located on the same parcel of land as the impact site, or on a parcel of land contiguous to the impact site." Rosemont is currently evaluating the potential for contiguous offsite Rosemont-owned parcels to offer compensatory mitigation for impacts to the impacted potential WUS. The functions and services of the ephemeral drainages on these mitigation parcels would be anticipated to be comparable to those proposed to be impacted by the proposed Rosemont Copper Project. Rosemont anticipates that mitigation credit for these parcels will be available through preservation with either a restrictive covenant or conservation easement placed over the mitigation lands. The mitigation ratio that will be available for these mitigation lands will be determined as the mitigation plan is further developed.

<u>Permittee-responsible mitigation through off-site and/or out-of-kind mitigation</u> - Rosemont is evaluating additional offsite parcels for their potential to provide compensatory mitigation opportunities. While the location and nature of the sites is currently confidential, all of the parcels being considered are within the Santa Cruz River watershed and offer varying opportunities for preservation or restoration of surface water resources.

We believe demonstration of a Least Environmentally Damaging Practicable Alternative should precede acceptance of a mitigation plan. Accordingly, we request the opportunity to review the alternatives analysis and mitigation plan.

Summary of U.S. Fish and Wildlife Service Review

Based on the concerns addressed in this review and the ecological importance of the Cienega Creek watershed, we believe that compliance with the 404(b)(1) guidelines and development of the least environmentally damaging practicable alternative need to be definitively demonstrated prior to issuance of a permit that would impact Davidson Canyon Wash and/or Cienega Creek.

In accordance with the 1992 404(q) Memorandum of Agreement between the Department of the Interior and the Department of the Army, Part IV, paragraph 3(a), we are advising you that the project, as proposed, may have significant and unacceptable impacts to these Aquatic Resources of National Importance. We request you send copies of your written response to our recommendation to the office of the Regional Director, Region 2, U.S. Fish and Wildlife Service, P.O. Box 1306, Albuquerque, New Mexico 87103.

We are available to meet with you to discuss these issues. If we can be of further assistance, please contact Jason Douglas at (520) 670-6150 (x226) or Jean Calhoun at (520) 670-6050 (x223).

Sincerely,

for Steven L. Spangle
Field Supervisor

cc:

Regional Director, U.S. Fish and Wildlife Service, Albuquerque, NM (Attn: Denise Baker)
Field Supervisor, U.S. Fish and Wildlife Service, Phoenix, AZ (Attn: Mike Martinez)
Assistant Field Supervisor, U.S. Fish and Wildlife Service, Tucson, AZ
Director, Water Division, Environmental Protection Agency, San Francisco, CA
Supervisor, Wetlands Regulatory Office, Environmental Protection Agency, San Francisco, CA
Manager, Environmental Review Office, Environmental Protection Agency, San Francisco, CA
Forest Supervisor, Forest Service, Coronado National Forest, Tucson, AZ

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ (Attn: John Windes)
Rosemont Copper Company, Tucson, AZ (Attn Kathy Arnold)

W:\Jason Douglas\USFWS 404(q) re PN SPL-2008-00816-MB - Rosemont Copper Mine.docx:cgg

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Michelle Black

From: John Windes
Sent: Monday, February 13, 2012 4:02 PM
To: Jason_Douglas@fws.gov
Subject: Atwood Paper Quote

Jason, this is what I believe is the strongest argument for impacts to Jaguar based on the need for that species to move back and forth across the border and fully utilize the sky island habitat in the U.S. What may be the biggest flaw in the modeling design of these corridors is the assumption that "wildland blocks" will continue to be such. The Rosemont Mine will significantly damage the integrity of that wildland block, fragmenting that corridor, and may make migration between the Whetstones and Mexico less viable.

"we believe that conservation efforts aimed at protecting corridors within the Nogales– Sierra Vista–Tucson triangle should be prioritized. This area contains relatively high quality corridors linking wildland blocks (e.g., Tumacacori, Santa Rita, and Patagonia–Huachuca; Fig. 2) that either extend into Sonora, Mexico, or are immediately adjacent to Sonora wildland blocks (e.g., Sierra Cibuta, Sierra Pinito, and Sierra Chivato), thus providing the best opportunity for trans-border movement."

John Windes
Wildlife Habitat Program Manager
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Rosemont Copper Project
Draft Biological Assessment Review

Meeting Agenda
Tuesday, February 14, 2012
9:30 AM-?
Coronado National Forest, Federal Building
300 West Congress, Basement A Conference Room
Tucson, Arizona 85701

Introductions:

- U.S. Fish and Wildlife Service
- Coronado National Forest
- Bureau of Land Management
- Arizona Game and Fish Department
- Rosemont Copper
- WestLand Resources
- SWCA Environmental Consultants

Meeting Objectives:

- Review and discuss 10 species protected by Endangered Species Act (ESA) that may be affected
- To identify and/or answer questions related to the draft Biological Assessment (BA)

Items for Discussion:

- Project Overview
- Project Action Area and Project Description
- Environmental Baseline
- Federally Listed Species and Designated or Proposed Critical Habitat
  - Chiricahua leopard frog – Shedl
  - Gila chub – Clay Crowder
  - Gila topminnow – Ross
  - Huachuca water umbel
  - Jaguar – Tim
  - Lesser long-nosed bat – Tim
  - Mexican spotted owl – Edwin
  - Ocelot – Tim
  - Pima pineapple cactus
  - Southwestern willow flycatcher – Edwin

Dave Weedman
Ingaldi

- Effects Analysis
  - Impacts to Biological Resources in Addition to the Direct Impacts Resulting from Mining Activities
    - Difficulty in assessing impacts to threatened and endangered species due to
      - Uncertainty of water models regarding actual impacts over long time frame
      - Potential for, but undocumented, occurrences of large-ranging species such as jaguars and ocelots and interpretation and application of ESA
  - Species
    - Conservation Measures
    - Direct, Indirect, and Cumulative Effects
    - Effects Determinations

Schedule:

- For submitting BA to U.S. Fish and Wildlife Service to initiate formal consultation

Lunch is on-your-own for one hour if we go beyond noon.

Rosemont Copper Project
Draft Biological Assessment Review

Meeting Agenda
Tuesday, February 14, 2012
9:30 AM-?
Coronado National Forest, Federal Building
300 West Congress, Basement A Conference Room
Tucson, Arizona 85701

Introductions:

- U.S. Fish and Wildlife Service
- Coronado National Forest
- Bureau of Land Management
- Arizona Game and Fish Department
- Rosemont Copper
- WestLand Resources
- SWCA Environmental Consultants

Meeting Objectives:

- Review and discuss 10 species protected by Endangered Species Act (ESA) that may be affected
- To identify and/or answer questions related to the draft Biological Assessment (BA) 25K COMMENTS

Items for Discussion:

- Project Overview
- Project Action Area and Project Description
- Environmental Baseline
- Federally Listed Species and Designated or Proposed Critical Habitat
  - Chiricahua leopard frog Possible
  - Gila chub -
  - Gila topminnow -
  - Huachuca water umbel -
  - Jaguar 4-6
  - Lesser long-nosed bat Possible
  - Mexican spotted owl
  - Ocelot
  - Pima pineapple cactus
  - Southwestern willow flycatcher - ?

AQUATICS

- Effects Analysis
  - Impacts to Biological Resources in Addition to the Direct Impacts Resulting from Mining Activities
    - Difficulty in assessing impacts to threatened and endangered species due to
      - Uncertainty of water models regarding actual impacts over long time frame
      - Potential for, but undocumented, occurrences of large-ranging species such as jaguars and ocelots and interpretation and application of ESA

SENSITIVE NON-LISTED SPECIES?

CUMMULATIVE EFFECTS

  - Species
    - Conservation Measures
    - Direct, Indirect, and Cumulative Effects
    - Effects Determinations

Schedule:

- For submitting BA to U.S. Fish and Wildlife Service to initiate formal consultation

Lunch is on-your-own for one hour if we go beyond noon.

2/14/12 Rosemont BA Meeting

Rick - Norm James - Fennemore Craig

- Adequacy of DBA
- Does Service have enough info to initiate consultation
- "typically we consult informally before we initiate formal consultation
- AZGF - Statutory Authority
- What mtg is not - NOT going line by line (SPP by SPP)
  - Not a forum to re-hash DEIS
- "We would like to initiate consultation ASAP"

Jean - Summarize main issues we need to address
- Action Area
  - Still needs to go downstream farther - would encourage additional modelling
- ESA - action area = where we see effects on SPP

Chris - Modelling
- 3 models - Groundwater Flow
- Mod Flow
- 3 Mont, tet Tech,

Fairly extensive Peer Review

RPM - Reasonable Prudent Measures

Provide Comments on BA
- Groundwater Modelling doesn't reflect "worst case scenario" for Gila chub and Cienega Creek spp.

Scott - Conservation Measures - No mitigation
- word "mitigation" doesn't occur

Jean - Reasonable + Prudent Alternatives

Scott - "Offsetting" Measures included "up front"
- (in project description)

Jason - We could find

Rick - Conservation Measures

- Mitigation Plan Should be available prior to EIS.

11:00 Rosemont 3A

Rick - Uncertainty
- Wide Ranging spp
- F.S. - Suitable = St. Rita - Recent Records
- fundamentally - approach we are taking -
Adverse effects - Not defined for ESA

Jean - have to drop back to "take"
- No Q spp could occur -
- Jean - assuming St. Ritas occupied -
- suitable Habitat
- 5000 ac + - will impede mov't -

Rick - "I believe we are right where you say we are"
-

Kathy Arnold - ?

Norm - "Proposed Critical Habitat"

Jason "Risk should not be borne by the listed spp"

- Uncertainty was not our friend on Ft. Huachuca

- Climate Δ - @ this time scale does act on it

Jason

— Worse Case Scenario —

Jean — Ft. Huachuca
— must consider recovery and survival
—

Larry — "There's nothing directionwise for BA in F.S. RE: climate Δ"

Jan — Take Regional models + scale down
— Vulnerability analysis
— SAVS — Coronado — Vulnerable spp
—

Rick — So we do need to address climate Δ

Jason — Multiplied uncertainties multiplies effects

Tress — "Background of uncertainty"
• NOT — Take being climate Δ + Project Take
—
•

Jason — Environmental baseline is a "movie"
— $\frac{\Delta}{\text{Time}}$ = Baseline

• Adaptive Mgt. + Monitoring

2/14/12 Rosemont BA

Jean – must be at least likely to adversely affect.

- You'll be much better off w/an incidental take statement
- Front load your effects -
-

Rick – Chiricahua L. Frog
- Need additional info on cons. Measures
- Assuming impact on dispersal on N. St. Ritas
- Cons Measures

Jean – Aquatics –
Analysis does not support the effects

- looking @ likely –

Rick – Effects might not occur for 70 yrs

Jeff – Why does timeline matter?
-

- USFWS Needs cons measures handed to them
And will likely incorporate it

- Proposal from Rosemont - Additional Ideas from biologists for Conservation Measures

- Rosemont is worried about a Connected action

- We need a Conservation measures report

Rosemont EA

2/14/12 Rick

-

Scott
- More discussion to be had on Rut kind of things
- how are E.S. sensitive spp being handled?

-

Action Items
- Rosemont will come up w/ conceptual/ cons measures
- Cross Reference Cons Measures - What is whole proj.?
- AGFD will provide conceptual/ Cons measures to Rosemont and USFWS/ E.S.

- SPP leads - Capture in writing specific concerns

- Jason is lead

- Provide Rationale for expanding effects on Cienega Creek

- Consideration of Climate Δ

Looking @ impacts @ beginning of operation –
- Notion - looking @ annually – low flow vs. Annual flow
- Pt. pumps water / all water not conserved creates deficit
- Once water has pumped it sits in the baseline – must measure against that baseline
-

Mitigation Team 2/15/12

- Deliverables

phase 2 — TAKE - critter loss

Phase 1 — Habitat → policy

phase 3 — Rec

Michelle Black

From: John Windes
Sent: Friday, February 17, 2012 5:12 PM
To: Clayton Crowder; Michael Sredl; Ross Timmons; Dave Weedman; Mike Ingraldi; Tim Snow; Edwin Juarez; Tom Jones
Cc: Eric Gardner; Jeff Sorensen; Josh Avey; Raul Vega; Linda Pollock; John Windes
Subject: Rosemont Mine Biological Assessment Meeting Outcome and Next Meeting Date

Importance: High

Hello all,

NUTSHELL AND UPSHOT:

- Forest/SWCA/Rosemont is revising BA to address Chiricahua Leopard Frog, Gila Chub, Topminnow, Jaguar, LLN Bat, Mexican Spotted Owl, and SW Willow Flycatcher
- Rosemont is writing mitigation/conservation measure plan and will present to FWS at next meeting MARCH 7th
- I would like spp experts (those of you in the To line) to examine the BA and provide me Conservation Measures for these spp so we can meet with FWS to suggest our ideas I THINK THEY ARE VERY OPEN TO OUR IDEAS!
- I will send the pertinent sections to each spp lead and a doodle link for a meeting with FWS. At this point I don't want to put anything down in writing but just meet with them. All spp leads are invited and encouraged to attend this meeting. Also please feel free to email Jason Douglas directly (address attached) with your concerns/ideas.

Jason Douglas.vcf

THE REST OF THE STORY:

I attended a meeting with the FWS and the Coronado Forest to discuss the Draft Biological Assessment for the Rosemont Mine on Tuesday Feb 14th. Jeff Sorenson, Tim Snow, Mike Ingraldi, and myself represented AGFD. We were mostly there as consumers and didn't contribute much to the meeting. Jean Calhoun and Jason Douglas represented the FWS. Jean is the assistant field supervisor for the Tucson ecological services office and Jason is a biologist who is lead for this geographic area. Rosemont reps Jamie Sturgess, Kathy Arnold, and Norm James (attorney) were there as well as Westland (Rosemont's consultants) and SWCA (contracted to write the BA). BLM staffers also attended.

An underlying theme of the meeting was Jason's recent experience with groundwater issues in dealing with Ft. Huachuca so he is very aware of the various pitfalls associated with groundwater and the limits of modeling.

FWS told the Forest that it would be unlikely that they would concur with the document as written, particularly for Jaguar, Ocelot, and fish spp (? – Jeff I don't have a note on that but I think they said fish as well – help me out). They specifically said that for Jaguar they must come with a finding of <u>at least</u> "likely to adversely affect" given the location of the project relative to movement corridors (thank you very much). For Chiricahua Leopard Frog they want to see additional info on conservation measures and assume impact on dispersal on the north end of the Santa Ritas. For all the aquatics they don't feel the analysis supports the effects. They are looking at "likely to adversely affect" there. They said they'd like to see more discussion on effects on bats.

Overall I thought it went very well from our perspective as many of the concerns echoed concerns we expressed in our comments on the DEIS and I don't think they read our comments to any great extent.

There was much talk about the inherent uncertainty of the water modeling. Jason stated that "uncertainty was not our friend at Ft. Huachuca". FWS stated that the Action Area needs to go farther downstream on Cienega Creek and that they would like to see additional modeling. They said that the groundwater modeling doesn't reflect the "worst case scenario" for Gila Chub and Cienega Creek. Jeff Simms from BLM stated that he thought that the effects associated with groundwater should be multiplied by 3 orders of magnitude to achieve the "worst case scenario" situation.

FWS also said they needed to see more on cumulative effects that looked at climate change.

FWS also stated they would like to see Reasonable and Prudent alternatives and that "offsetting" measures should be included "up front" in the project description. They wanted to see the mitigation plan that has been referred to very vaguely by Rosemont and the Forest. Rosemont stated that they have been wary of including any mitigation because they didn't want to create any additional "connected actions" –but they said they had been busy buying up properties. I THINK they mentioned Sonoita Creek at Monkey Springs but it might have been an auditory hallucination –Jeff help me out.

Rosemont will be working on their "conservation measures (=mitigation plan) and will provide this to FWS prior to MARCH 7TH which is the date set for the next meeting. They will come up with conceptual conservation measures.

John Windes
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Arizona Game & Fish Department
Tucson Regional Office
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(ph) 520-388-4442
(fax) 520-628-5080

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Michelle Black

From: John Windes
Sent: Thursday, April 05, 2012 11:33 AM
To: 'Jason_Douglas@fws.gov'
Subject: RE: Atwood Paper Quote
Attachments: Black Bear Connectivity_BioCons_2011.pdf

Sorry, this email got buried when I was on leave. Here is the Atwood paper. I do still intend to send USFS a letter with recommended Conservation Measures which I will cc you.

John Windes
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From: Jason_Douglas@fws.gov [mailto:Jason_Douglas@fws.gov]
Sent: Thursday, March 22, 2012 3:31 PM
To: John Windes
Subject: Re: Atwood Paper Quote

John,

I'm going back through the AGFD/USFWS interactions to help draft a letter to the FS wherein we make some conservation recommendations. I'll route it by you and the other attendees once I have it in a reviewable form.

Anyway, do you have a copy of the actual Atwood paper from which you got the quote, below?

If so, thanks!

=Jason=

"John Windes" <JWindes@azgfd.gov>

02/13/2012 04:09 PM

To <Jason_Douglas@fws.gov>
cc
Subject Atwood Paper Quote

Jason, this is what I believe is the strongest argument for impacts to Jaguar based on the need for that species to move back and forth across the border and fully utilize the sky island habitat in the U.S. What may be the biggest flaw in the modeling design of these corridors is the assumption that "wildland blocks" will continue to be such. The Rosemont Mine will significantly damage the integrity of that wildland block, fragmenting that corridor, and may make migration between the Whetstones and Mexico less viable.

"we believe that conservation efforts aimed at protecting corridors within the Nogales- Sierra Vista-Tucson triangle should be prioritized. This area contains relatively high quality corridors linking wildland blocks
(e.g., Tumacacori, Santa Rita, and Patagonia-Huachuca; Fig. 2) that either extend into Sonora, Mexico, or are immediately adjacent to Sonora wildland blocks (e.g., Sierra Cibuta, Sierra Pinito, and Sierra Chivato), thus providing the best opportunity for trans-border movement."

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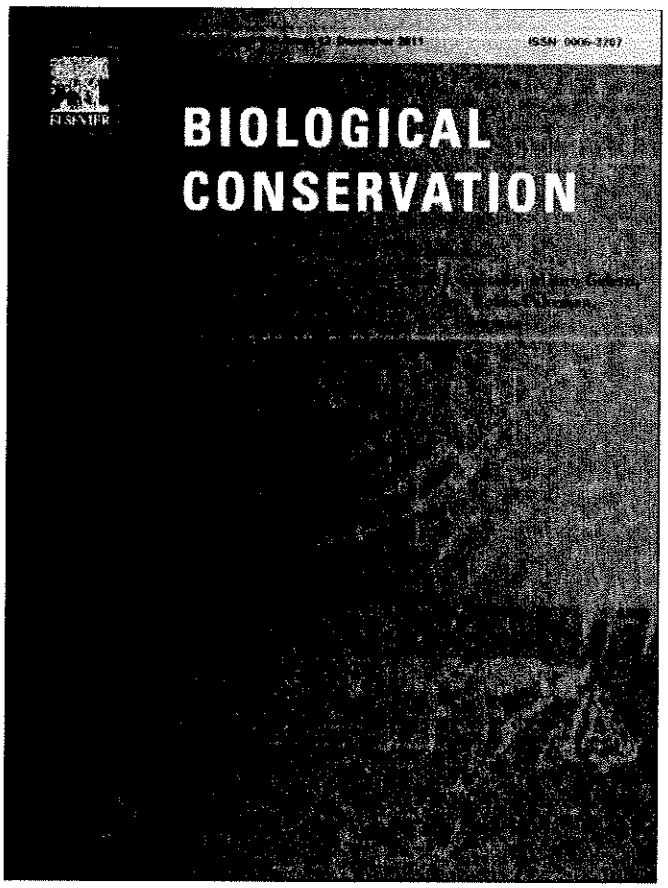

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Modeling connectivity of black bears in a desert sky island archipelago

Todd C. Atwood [a,b,*], Julie K. Young [c,d], Jon P. Beckmann [e], Stewart W. Breck [b], Jennifer Fike [f], Olin E. Rhodes Jr. [f], Kirby D. Bristow [a]

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ABSTRACT

Landscape features such as rivers, mountains, desert basins, roads, and impermeable man-made structures may influence dispersal and gene flow among populations, thereby creating spatial structure across the landscape. In the US–Mexico borderland, urbanization and construction of the border fence have the potential to increase genetic subdivision and vulnerability to isolation in large mammal populations by bisecting movement corridors that have enabled dispersal between adjacent Sky Island mountain ranges. We examined genetic variation in black bears (*Ursus americanus*) from three regions in central and southern Arizona, US, to assess genetic and landscape connectivity in the US–Mexico border Sky Islands. We found that the three regions grouped into two subpopulations: the east-central subpopulation comprised of individuals sampled in the central highland and high desert regions, and the border subpopulation comprised of individuals sampled in the southern Sky Islands. Occupancy for the border subpopulation of black bears was influenced by cover type and distance to water, and occupancy-based corridor models identified 14 potential corridors connecting border Sky Island habitat cores with the east-central subpopulation. Biological quality of corridors, defined as length:width ratio and proportions of suitable habitat within corridors, declined with Sky Island dispersion. Our results show that black bears in the border subpopulation are moderately isolated from the east-central subpopulation, the main population segment of black bears in Arizona, and that connectivity for border bears may be vulnerable to anthropogenic activities, such as those associated with urbanization and trans-border security.

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1. Introduction

Habitat connectivity across a landscape is important to ensuring the persistence of populations through the maintenance of gene flow (Vos et al., 2001), metapopulation dynamics (With et al., 1997), and demographic rescue (Tallmon et al., 2004). Without connectivity, habitat fragmentation constrains animal dispersal and threatens biological diversity (Johnson et al., 1992; Woodroffe and Ginsberg, 1998). Through time, habitat fragmentation yields small isolated populations with elevated extinction probabilities (Lande, 1988; Hanski, 1999). This is particularly true in landscapes where geography leads to spatial structuring of populations, such as large carnivores in the Sky Island (i.e., montane mountain ranges) region of the Sonoran and Chihuahuan deserts of southwestern US and northern Mexico.

In human-dominated landscapes, connectivity is often maintained through corridors (Beier and Noss, 1998). Yet corridors may not be sufficient to facilitate population viability if they do not maintain both structural and functional connectivity. Structural connectivity describes the degree to which habitat patches are contiguous or physically linked to one another (With et al., 1997; Tischendorf and Fahrig, 2000), while functional connectivity explicitly incorporates the behavioral responses of animals to describe how both habitat and non-habitat (i.e., matrix) patches influence movement (Taylor et al., 1993; Wiens, 2001). Decreases in patch size and increased isolation may decrease structural connectivity, but if the newly-created matrix patches do not discourage movement, then functional connectivity may remain high (Baguette and Van Dyck, 2007). By contrast, a landscape may be characterized by a high degree of structural connectivity but have diminished functional connectivity as a result of being bisected by a feature that limits movement by creating exceptional risk of

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crossing (e.g., roads, rivers) or acts as a physical impediment (e.g., a fence) (Proctor et al., 2005; Hayward and Kerley, 2009). Detailed information on structural and functional connectivity of corridors is important for predicting their efficacy to conserve wildlife (Beier and Noss, 1998), especially in areas where species already occupy fragmented habitats.

Arizona's desert Sky Island mountain ranges encompass one of the most biologically diverse regions in the United States. Suitable habitat for many of the region's large carnivores, including black bears (*Ursus americanus*), mountain lions (*Puma concolor*), and jaguars (*Panthera onca*) is found in oak woodland and montane habitats separated by lowland desert. Rapid urbanization and the construction of the US–Mexico border fence have the potential to drive genetic subdivision in large mammal populations by severing corridors that historically enabled dispersal between Arizona and Mexico Sky Island ranges (Flesch et al., 2010). Black bears in the region rely heavily on food resources found in these higher elevation montane habitats. The spatial dispersion of montane habitat has likely served to historically subdivide black bear populations, creating detectable genetic structure driven by infrequent, long-distance movements across desert basins (McRae et al., 2005; Onorato et al., 2004). Thus, desert black bears are an ideal candidate for modeling connectivity.

In this study, we integrated landscape genetics with occupancy modeling to assess landscape connectivity for black bears in southern Arizona's desert Sky Islands. Our objectives were to (i) assess genetic connectivity between black bears along the border with Sonora, Mexico, and the main population segment in east-central Arizona, and (ii) identify potential corridors linking core black bear habitats in the border Sky Island ranges. For the former objective, we hypothesized that bears along the border were genetically isolated from east-central bears. For the latter objective, we expected corridor quality to decline as the distance between linked core habitats increased.

2. Methods

2.1. Study areas

We sampled black bears from several sites in east-central and southern Arizona (Fig. 1). East-central sites were located in the central highlands north of the Mogollon Rim and the high desert immediately south of the Rim, where black bear habitat is relatively continuous (Fig. 1). The central highlands site was contained mostly within the White Mountains of the Apache-Sitgreaves National Forest, approximately 230 km east of Phoenix, Arizona (Fig. 1). The area was characterized by rugged terrain with steep slopes and deep canyons, an elevational gradient ranging from 1300 to 3000 m, and Rocky Mountain montane and subalpine habitat associations (Brown and Lowe, 1974). Areas above 1700 m were predominantly comprised of Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*). Douglas fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), and blue spruce (*Picea pungens*) associations between 2400 and 2750 m; ponderosa pine (*Pinus ponderosa*), Gambel oak (*Quercus gambelii*), and aspen (*Populus tremuloides*) occur at lower-elevations (<2400 m). The central highlands encompassed a major portion of the watershed providing water to the Phoenix metropolitan area (population 4,192,887) via the Salt and Gila rivers. Yearly precipitation averaged 192 cm, most of which came during the winter as snowfall. Average daily temperatures ranged from 28 °C in July to −12 °C in December (NOAA, Western Regional Climate Center). Predominant land use within the area included timber production, livestock grazing, and recreation. Human population density for the area was 2.39/km^2, and housing density was 1.08/km^2 (http://quickfacts.census.gov/qfd/states/04000.html; accessed 29 June 2011).

The site south of the Mogollon Rim (hereafter referred to as the Tonto site) was located almost entirely within the Tonto National Forest (Fig. 1). The Tonto site was approximately 81 km east of Phoenix and 18 km west of Globe (population 7532), the nearest urban center. Elevations in the area ranged from 700–2300 m, with lower elevations characterized by gently sloping terrain and higher elevations having steep, rocky topography with slopes >45° (Cunningham et al., 2003). Primary vegetation at lower elevations was desert scrub and grassland (<900 m) and interior chaparral (900–1850 m) (Brown and Lowe, 1974). Madrean evergreen woodland (e.g., Gamble oak, Emory oak [*Quercus emoryi*], and ponderosa pine) occurred at higher elevations (>1850 m; Brown and Lowe, 1974). Yearly precipitation averaged 63 cm, most of which came during the summer (July and August) monsoons. Average daily temperatures ranged from 37 °C in July to −1 °C in December (NOAA, Western Regional Climate Center). Predominant land use within the area included livestock grazing and recreation. Human population and housing densities were 4.17/km^2 and 2.28/km^2, respectively, for the greater area (http://quickfacts.census.gov/qfd/states/04000.html; accessed 29 June 2011).

At the southern site (hereafter referred to as the border site), samples were collected from six Sky Island mountain ranges (i.e., Patagonia and Huachuca [wildland block 3], Whetstone [wildland block 4], Rincon [wildland block 9], Galiuro [wildland block 11], and Chiricahua [wildland block 7] mountains; Fig. 2), north of the border with Sonora, Mexico, and mostly located within the Coronado National Forest. The border site was mostly southeast of the Tucson metropolitan area (population 980,263); the most intensive sample collection occurred in wildland block 3, 83 km southeast of Tucson and directly adjacent to the town of Sierra Vista (population 43,044) and Fort Huachuca military base (Fig. 1). Elevations at the border site ranged from 1300 to 3000 m, with the lowest elevations (<1370 m) characterized as desert basin primarily comprised of catclaw acacia (*Acacia greggii*), creosote (*Larrea tridentata*), and mesquite (*Prosopis glandulosa*) (Wallmo, 1955). Desert shrub and grassland associations occurred at elevations between 1370 and 1524 m, oak woodlands occurred between 1524 and 2130 m, depending on specific site characteristics, and Madrean evergreen woodland generally occurred at elevations >1800 m (Wallmo, 1955). Yearly precipitation averaged 39 cm, most of which came during the summer (July and August) monsoons. Average daily temperatures ranged from 35 °C in July to 0.5° C in December (NOAA, Western Regional Climate Center). Predominant land use for the area includes livestock grazing and recreation. The distribution of black bear habitat at the border site was discontinuous and constrained to Sky Island mountain ranges (Fig. 1). The human population (9.62/km^2) and housing densities (3.85/km^2) for the greater border area were the highest of the three sampling sites (http://quickfacts.census.gov/qfd/states/04000.html; accessed 29 June 2011).

The Patagonia–Huachuca and Tumacacori (i.e., wildland block 1; Fig. 2) wildland blocks straddled the Arizona–Sonora border, while all other wildland blocks included in connectivity analyses occurred entirely within Arizona. The Patagonia and Huachuca mountains extended approximately 31 km and 4 km, respectively, into Sonora, with the Patagonia Mountains separated by 7 km from the northern extent of the large (≈5396 km^2) Sierra Mariquita-Sierra de los Ajos mountain range complex (Fig. 2). The Tumacacori wildland block extended 5 km into Sonora and the southern-most extent was within 7 km and 19 km, respectively, of the Sierra Cibuta and Sierra de Pinitos mountains (Fig. 2). Vegetation in northern Sonora mirrored that of southern Arizona, with shrub and grassland associations at lower elevations, oak woodlands at mid-elevations, and Madrean evergreen woodlands at higher elevations (Brown, 1994; Bahre and Minnich, 2001). Predominant land use in northern Sonora was livestock grazing (Vasquez-Leon and Liverman, 2004). The international boundary between Arizona and So-

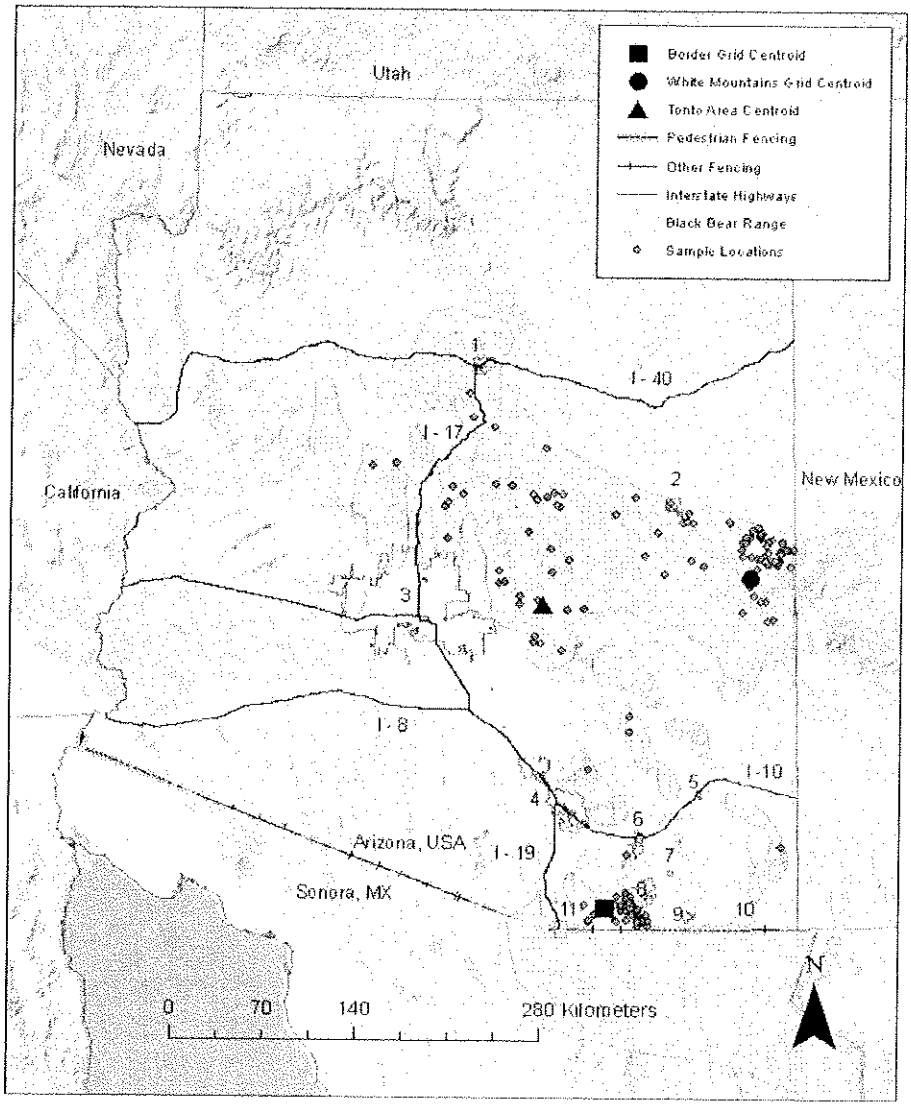

Fig. 1. Distribution of black bear samples collected opportunistically and from hair-snag grids relative to [a]urban centers and major transportation corridors. The Tonto sampling area and White Mountains grid were located in the central highlands region and the border grid was located in the Huachuca and Patagonia mountains. [a]Arizona cities and metropolitan areas: (1) Flagstaff, (2) Show Low, (3) Phoenix metropolitan area, (4) Tucson metropolitan area, (5) Willcox, (6) Benson, (7) Tombstone, (8) Sierra Vista and Ft. Huachuca, (9) Bisbee, (10) Douglas, and (11) Nogales.

nora, Mexico, spans nearly 600 km, approximately 70% of which was fenced. The type of fence structure varies along the border (Fig. 1). Some segments were ≥4 m tall with either no openings or vertical gaps 5–10 cm wide and thus impermeable to most medium- and large-bodied mammals, while other sections consisted of 4–6 strands of barbed wire coupled with "Normandy style" cross-bar vehicle barriers (United States Customs and Border Protection, 2009), and were relatively permeable.

2.2. Black bear distribution and status in Arizona and Sonora, Mexico

In Arizona, black bears were classified as a game species and were hunted during the spring and fall. Season lengths and harvest limits varied by game management unit (GMU), with all units being closed for the season when the female harvest approximated 10% of the estimated female population in the unit. For GMU in the border sampling area, harvest limits were conservative and generally range from 1–3 females/GMU/yr. Black bears in Mexico were classified as "endangered of extinction" in 1986, and hunting seasons were closed indefinitely (Doan-Crider and Hellgren, 1996). Over the last several decades, the historical distribution of black bears in Mexico is believed to have been reduced by 20% due to habitat loss, poaching, and illegal trade (Doan-Crider and Hellgren, 1996; Sierra-Corona et al., 2005). Relatively little is known about the status of black bears in Sonora. Sierra-Corona et al. (2005), working in the Sierra de San Luis in northeastern Sonora (Fig. 2; wildland block 21), found that bear density was low compared to similar areas on either side of the border (e.g., Coahuila, Mexico: Doan-Crider, 1995; east-central Arizona: LeCount, 1982), but did not comment on possible reasons.

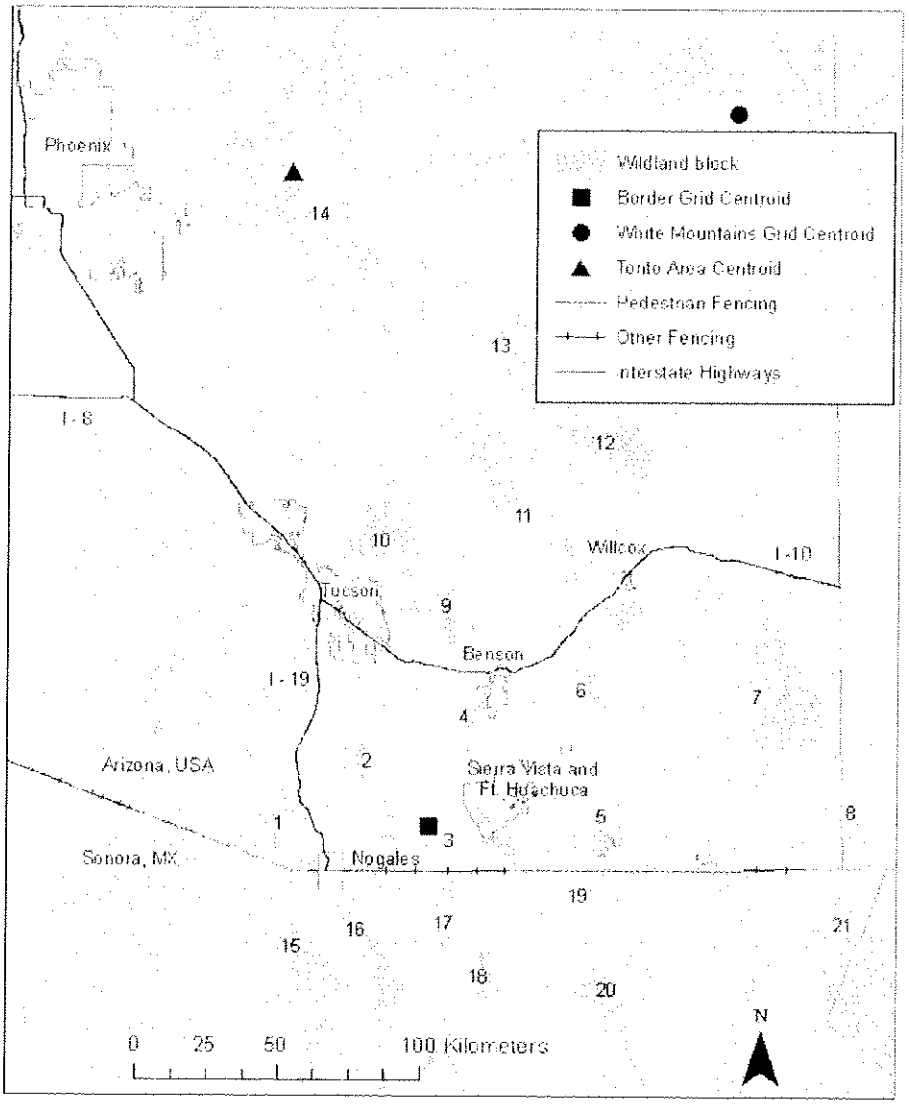

Fig. 2. Sky Island wildland blocks spanning from northern Sonora, Mexico, to the east-central Arizona. Wildland Blocks: (1) Tumacacori, (2) Santa Rita, (3) Huachuca-Patagonia, (4) Whetstone, (5) Mule, (6) Dragoon, (7) Chiricahua, (8) Peloncillo, (9) Rincon, (10) Santa Catalina, (11) Galiuro-Winchester, (12) Pinaleno, (13) Gila, (14) Pinal, (15) Sierra Cibuta, (16) Sierra Pinito, (17) Sierra Chivato, (18) Sierra Elenita, (19) Sierra San Jose, (20) Sierra Los Ajos, and (21) Sierra San Luis.

2.3. Sample collection and genetic analyses

We collected hair samples from black bears using hair-snags and hair and tissue from mandatory hunter check-in. We deployed two hair-snag sampling grids, one at the border site in the Huachuca and Patagonia mountains (i.e., Huachuca–Patagonia grid; wildland block 3), and one in the central highlands (i.e., White Mountains grid) (Fig. 1). The Huachuca–Patagonia and White Mountains grids consisted of 67 and 74 grid cells (4 × 4 km), respectively. Sixty-three percent of the Huachuca–Patagonia grid was comprised of evergreen habitat associations, 23% was desert shrub and grassland, and the remaining 9% was oak woodland. For the White Mountains grid, 79% was comprised of evergreen habitat associations, 13% was montane shrub and grassland, and the remaining 8% was deciduous woodland. In each cell, we built a hair-snag "corral" by running a single strand of barbed wire at a height of approximately 45 cm around several trees (Woods et al., 1999). We chose hair-snag locations based on black bear sign, natural travel routes, and forage availability, and maintained a minimum distance of 2 km between hair-snags located in adjacent cells. We baited the center of corrals with 1 L of aged fish oil, and ran 3, 10–14 d capture sessions from May through September. The use of a single lure and a standard volume should control for lure-induced heterogeneity in habitat-specific detection probabilities (MacKenzie et al., 2006). We used forceps to collect hair samples from barbs, stored individual samples in tooth envelopes, and flamed barbs to prevent cross-contamination. Samples also were obtained at the high desert site from hair-snags located in the Tonto National Forest that were independently deployed and operated by Arizona Game and Fish Department (AGFD) personnel (Fig. 1). The Tonto hair-snags were deployed opportunistically rather than in a grid-design, which precluded their use in estimating a site density.

We extracted DNA from samples using a Qiagen DNeasy Blood and Tissue Kit (Qiagen) employing an ammonium acetate protocol (modified from the PUREGENE kit; Gentra Systems). We used a set

of 11 microsatellite loci known to amplify in black bears (G10J, G10M, G10X, G10B, G10H, G10C, G10L, G1D, G1a, UarMu50, UarMu59; Paetkau et al., 1995, 1998) grouped into three sets based on product size and primer label. Each set of loci was amplified together in the same Polymerase Chain Reaction (PCR) in 10 μL PCRs using a Master-cycler ep gradient (Eppendorf) and 3 μL of template DNA, 0.2 mM of each dNTP, 0.2 M to 0.4 M of each primer pair, 1 U of *Taq* DNA polymerase (NEB), 1.25 mM $MgCl_2$ and 2× reaction buffer (10 mM Tris–HCl, 50 mM KCl, 0.05 mg/mL BSA). Amplification conditions were 94 °C for 2 min, then 94 °C for 30 s, 60 °C for 30 s, 72 °C for 30 s for 35 cycles, then 72 °C for 10 min and a final extension at 60 °C for 45 min. Multiplexed reactions were combined with an internal lane size standard and electrophoresed through a capillary gel matrix using an ABI 3730 Automated DNA Sequencer. Allele sizes were determined for each locus using GeneMapper software v3.7 (Applied Biosystems).

We ran positive and negative controls within each genotyping set and included an individual of known genotype at each locus within every sample set analyzed to maximize quality and consistency of genotyping. Each sample was amplified repeatedly until 3 matching genotypes were obtained at each locus within each individual, or until we ran out of DNA, to avoid errors associated with DNA collected with non-invasive methods (Taberlet et al., 1996, 1999; Kohn and Wayne, 1997). This resulted in the generation of at least three multilocus genotypes for each sample.

For sex determination, a fragment of the amelogenin gene was amplified using the primers SE47 and SE48 (Ennis and Gallagher, 1994). The amplification conditions were similar to those used for the microsatellites except the annealing temperature was 64 °C and the annealing and extension times were decreased to 15 s per cycle. PCR products were run on a 2% agarose gel stained with ethidium bromide. Samples were scored as female if they exhibited one band and males if there were two bands. DNA samples extracted from the tissues of known-sex harvested black bears were used as controls for our sexing assessments.

The program GIMLET (Valiere, 2002) was used to generate a consensus multilocus genotype for each sample and to identify matching multilocus genotypes among samples. Samples with genotypes for at least 6 loci were retained in the dataset; loci that did not have three matching genotypes were scored as "missing data." Only unique multilocus genotypes were included in subsequent analyses of basic population genetic parameters for the overall dataset. We calculated the number of alleles per locus, observed heterozygosity (H_O), and expected heterozygosity (H_E) for each locus using GDA (version 1.1, Lewis and Zaykin, 1999). Tests for linkage disequilibrium and deficiencies of heterozygotes relative to Hardy–Weinberg expectations for each locus and globally were performed using the program GENEPOP (version 3.4; Raymond and Rousset, 2000). We employed two Bayesian clustering software programs, STRUCTURE (version 2.2, Pritchard et al., 2000) with the ΔK method (Evanno et al., 2005) and GENELAND (version 3.1.4, Guillot et al., 2005b), to infer the number of subpopulations in our dataset and assign individuals to those subpopulations. All samples with unique multilocus genotypes were used in the STRUCTURE analysis, whereas only those samples with both unique multilocus genotypes and spatial coordinates were used in the GENELAND analysis.

In STRUCTURE we performed five runs at each value of K (the number of subpopulations) from $K = 1$ to $K = 10$. Each run consisted of 100,000 replicates of the MCMC after a burn-in of 30,000 replicates. We used the admixture model and allowed the allele frequencies to be correlated among subpopulations. To assign individuals to subpopulations, a final run (100,000 burn-in and 500,000 replicates) at the inferred K was performed. The values of q, which are indicative of the proportion of an individual's genome characteristic of each subpopulation, were used to assign individuals. Individuals were considered unambiguously assigned to a subpopulation when q values were greater than 0.75. When q values were less than 0.75, assignments of individuals were distributed among multiple subpopulations. To infer the number of subpopulations (K) in GENELAND, we first varied the number of subpopulations from 1 to 5 using 5000 stored MCMC iterations (200,000 iterations, thinning = 40). We set the maximum rate of the Poisson process to 100 (a value close to the number of individuals in our data set) and the maximum number of nuclei to 300 (3 × maximum rate as suggested by Guillot et al., 2005a). We ran the GENELAND MCMC 10 times with the level of uncertainty attached to our spatial coordinates set to 2 km. We used the mode of the distribution of K as a point estimate of K. The assignment of individuals to subpopulations was performed in a separate run as suggested by Guillot et al. (2005a). For this run, K was set to the inferred number of subpopulations and all other parameters were similar to those runs with variable K. The posterior probability of subpopulation membership was computed for each pixel of the spatial domain (50 × 50 pixels), using a burn-in of 1000 iterations. Individuals with a posterior probability of population membership of greater than 0.75 were unambiguously assigned to that subpopulation.

For each subpopulation inferred in either STRUCTURE or in GENELAND, levels of genetic diversity were estimated by calculating the average number of alleles per locus, observed heterozygosity (H_O), expected heterozygosity (H_E), fixation index, and the number and frequency of unique alleles using GDA. We estimated the levels of genetic differentiation among the inferred subpopulations by calculating F_{ST} in GDA. Significance of each F_{ST} value was based on 95% confidence intervals determined by bootstrapping across all loci, where confidence intervals bracketing zero indicate no evidence of genetic variance partitioning between sample subset pairs. Average relatedness of individuals within each subpopulation was assessed using Wang's (2002) estimator in SPAGeDi (Hardy and Vekemans, 2002).

The program CAPWIRE (Miller et al., 2005) was used to estimate population size within the Huachuca–Patagonia and White Mountains grids. We set the maximum population size to 100 for the Huachuca–Patagonia grid and 400 for the White Mountains grid, and used the likelihood ratio test (LRT) to determine which capture probability model was most accurate. Two capture models are available: the even capture probability model (ECM) where every individual is equally likely to be captured and the two innate rates model (TIRM) where individuals do not display equal capture probabilities. The appropriate model, based on LRT, was then used to estimate population size for each of the two grids.

2.4. Occupancy and landscape modeling

For occupancy analyses, our objective was to determine if bear occupancy (ψ) at the border hair-snag grid (i.e., Huachuca and Patagonia mountains) differed relative to habitat type and landscape covariates. We used the occupancy model option in program MARK (White and Burnham, 1999) to estimate occupancy relative to land cover (Madrean evergreen woodland [MEW], mixed conifer woodland [MXC], semi-desert grassland [DG], plains and Great Basin grassland [GBG], and oak woodland [OW]), slope (°), aspect, elevation (m), and distances to permanent water and roads (m). We used point extraction and Euclidean distance routines in a 30-m resolution (i.e., USGS Seamless Server NED data) GIS to collect information on land cover and landscape covariates for hair-snag locations. We tested for collinearity among potential variables by examining tolerance and variance inflation factors (VIF) using weighted least squares regression, and excluded variables with tolerance scores <0.4 from analyses (Allison, 1999).

We formulated 12 models and kept the detection probability (p) constant, assuming it did not vary across time or habitat types and was not influenced by individual covariates. We modeled occupancy (ψ) with and without a habitat effect (i.e., group effect) or individual covariates. We used the variance inflation factor (i.e., c-hat in MARK) to guard against overdispersion and the small sample size correction of Akaike's Information Criterion (QAICc). C-hat was calculated using the median c-hat procedure in program MARK. In addition to reporting model selection results, we also reported the beta parameter and 95% confidence interval for the covariates and evaluated whether or not the beta parameter overlapped zero and used this as further evidence of the significance of each individual covariate for modeling occurrence of bears. We calculated model-averaged occupancy values and 95% confidence intervals for the model averaged parameters following procedures in program MARK.

Corridor modeling involved four steps: (i) creating a habitat suitability model; (ii) identifying breeding- and population-size patches within Sky Island wildland blocks (i.e., polygons estimating the areal extent for each Sky Island range; Fig. 1); (iii) creating a cost surface representing the grid cell resistance to movement; and (iv) applying a cost-distance routine to identify pixel swaths (i.e., corridors) linking wildland blocks. We used the results of the border occupancy model to parameterize a habitat suitability model (HSM) for the composite sampling region (i.e., 15 mountain ranges [four of which were combined into two wildland blocks] comprising the sky island complex and 1 mountain range [Pinal Mountains; wildland block 14] representing the southern extent of the high desert sampling region; Fig. 2). The HSM was comprised of grid layers representing land cover, elevation, aspect, slope, distance to water, and distance to road. For all grids we reclassified pixel values using the results from the occupancy models. Distances to road and water were weakly correlated (i.e., tolerance <0.4), but because it has been documented that bears avoid roads (e.g., Brody and Pelton, 1989), we included a reclassified road grid in our HSM.

We reclassified the land cover grid by collapsing 35 landcover classes from the 2001 National Landcover Data (NLCD) set (e.g., Encinal oak woodland) into five broader categories (e.g., oak woodland) and assigning the latter a value from 0 (absolute non-habitat) to 100 (optimal habitat) based on detection probabilities scaled from occupancy models (Table 1). For the elevation, aspect, and distances to water and roads grids, we created 5, 4, 3, and 3 evenly-spaced bins, respectively, and assigned values (0–100) based on probabilities of occurrence at hair-snag stations (Table 1). Slope often is modeled as a discrete value for individual grid pixels. While convenient, that practice may fail to capture neighborhood permeability thresholds that can occur in a rugged landscape, such as the Sky Island region. Accordingly, we used a moving window analysis in a GIS where we characterized the topographic position of a given pixel relative to adjacent pixels found within a 200-m radius. Using this method, we classified pixels as canyon bottom if the focal pixel elevation was at least 12 m less than the neighborhood average, a ridge-top if the pixel elevation was at least 12 m greater than the neighborhood average, a gentle slope if the pixel was neither a canyon bottom nor a ridge-top and had a slope <6°, and a steep slope if the pixel was neither a canyon bottom nor a ridge-top and had a slope >6°. The resulting topographic position index (TPI) grid was then reclassified following the method used for the elevation grid but using three bins. Finally, we combined the six individual grids using a weighted geometric mean algorithm (Table 1) where individual grid weighting factors were scaled to their proportional contribution based on the model-averaged Akaike weights.

We used the HSM to identify contiguous areas of suitable habitat that could function as breeding- and population-size patches within wildland blocks. Based on previous black bear work conducted in Arizona, we selected a minimum breeding patch size of 50 km^2 and extrapolated a minimum population patch ($n = 50$ bears) size of 300 km^2 (LeCount, 1982). We used a moving window analysis (200-m radius) in a GIS to group together pixels with a suitability value of ≥ 60 into the breeding and population patches. We chose the 200-m radius to depict suitability relative to the landscape pattern and the spatial requirements and perceptual ability of black bears (Vos et al., 2001). The Sky Island landscape is relatively patchy in nature, owing to the basin and range topography, and the window analysis must be fine enough to detect changes in patch quality at a scale that bears are likely to perceive (Lima and Zollner, 1996). Cunningham and Ballard (2004) found that the home ranges of female black bears in central Arizona's Sky Islands averaged 13 km^2. Our 200-m radius equates to a 12.6 ha neighborhood, which is approximately one-tenth the area of the average female home range, and should represent a patch size that bears can detect.

We converted the HSM into a cost surface by calculating cell resistance (i.e., travel cost; cell resistance = 100 – pixel suitability) for the entire grid. The resulting cost surface grid was comprised of pixel values that reflected the cost of (or resistance to) movement through each individual grid cell, with increasing cell values representing increasing resistance to movement. We then applied a moving window analysis (200-m radius) to generate corridor models (pixel swaths) that connected habitat cores while minimizing resistance to movement. We selected the best biological corridors (e.g., Bennett et al., 1994) based on the pixel swath that minimized within-swath gaps, maximized within-swath habitat suitability, and reduced edge effects by maintaining a minimum width equal to the radius of an estimated home range (LeCount, 1982; Cunningham and Ballard, 2004). All habitat and corridor modeling was done using the CorridorDesigner package for ArcGIS (Majka et al., 2007).

Table 1
Grid layers and variables, reclassified grid cell values, weighting factors used to assemble the habitat suitability model for the Arizona border Sky Islands.

Variable	Reclassified cell value	Weighting factor
Land cover type		0.50
Madrean evergreen	100	
Mixed conifer	68	
Oak woodland	84	
Semi-desert grassland	56	
Plains and Great Basingrassland	1	
Distance to water		0.35
<500 m	100	
500–1000 m	50	
>1000 m	25	
Distance to roads		0.05
<500 m	25	
500–1250 m	50	
>1250 m	100	
Aspect		0.04
North	80	
East	35	
South	100	
West	25	
Elevation		0.03
>763 m	20	
163–1219 m	37	
1220–1981 m	100	
1982–2591 m	81	
2592–4000 m	63	
Topographic position		0.03
Canyon bottom	50	
Gentle slope	100	
Ridge top	25	

Table 2
Characterization of the 11 microsatellite loci used in genetic analyses of black bears sampled at central highlands and border sites in Arizona, 2007–2008. Number of samples genotyped (N), number of alleles per locus (A), expected (H_E) and observed (H_O) heterozygosities and the fixation index are reported.

Locus	N	A	H_E	H_O	f
G10J	157	7	0.679	0.637	0.062
G10M	155	5	0.692	0.587	0.152[a]
G10X	157	6	0.548	0.580	−0.057
G10B	151	7	0.559	0.556	0.072
G10H	157	10	0.484	0.510	−0.052
G1D	158	7	0.743	0.684	0.081[a]
UarMu50	157	3	0.126	0.083	0.343[a]
G10C	156	4	0.329	0.346	−0.051
G10L	157	8	0.815	0.790	0.031
G1A	156	6	0.192	0.186	0.034
UarMu59	148	6	0.663	0.635	0.042
All	155.36	6.27	0.534	0.508	0.048

[a] Significant heterozygote deficiency ($\alpha = 0.05$).

3. Results

3.1. Genetic connectivity

Samples for genetic analyses were distributed over ≈31,250 km^2 in the east-central region and collected from six Sky Island mountain ranges (Fig. 1). For the White Mountains hair-snag grid, samples were collected from 43% of grid cells, with 35% of those hair-snags yielding samples from ≥2 capture sessions. Similarly, samples were collected from 40% of grid cells at the border hair-snag grid, with 46% of those hair-snags yielding samples from ≥2 capture sessions. We were able to obtain usable multilocus genotypes for 189 of the 258 samples. Of these 189 multilocus genotypes, 158 were identified by GIMLET as being unique. Of these 158 individuals, 52 were female and 96 were male (10 of unknown sex). For the pooled sample, the overall number of alleles per locus ranged from 3 (UarMu50) to 10 (G10H) and observed single locus heterozygosities ranged from 0.083 (UarMu50) to 0.790 (G10L) (Table 2). Global tests of the pooled dataset revealed an overall significant deviation from Hardy–Weinberg equilibrium ($P = 0.003$) and significant deficiencies of heterozygotes at three individual loci were observed, which is not unexpected if there is underlying population subdivision within the pooled dataset (Table 2). Linkage disequilibrium was observed between three pairs of loci (G1D-G10B, G1D-G10L and G1D-G10J) after a sequential Bonferroni correction ($\alpha = 0.00019$). Assuming matching multilocus genotypes indicate re-captures, 138 bears were captured only once, 13 bears were captured twice, four were captured three times, two were captured four times, and one was captured five times. In each instance where the data indicated that a bear was recaptured multiple times, all recaptures for that individual occurred within the same grid used for population estimation or within the set of individuals that could not be assigned to a grid. In only four instances did the multilocus genotypes of pairs of unique individuals differ at less than three loci.

STRUCTURE and the ΔK measure indicated the most likely number of subpopulations (K) was 3 (Fig. 3a); however at $K = 3$ few individuals were assigned to any of the three subpopulations with high certainty. When $K = 2$, most individuals were unambiguously assigned to one of two subpopulations (Fig. 3b). These two subpopulation groupings roughly corresponded to the east-central ($n = 102$; 62 males, 38 females, 2 unknown sex) and border ($n = 33$; 17 males, 11 females, 5 unknown sex) regions. Twenty-

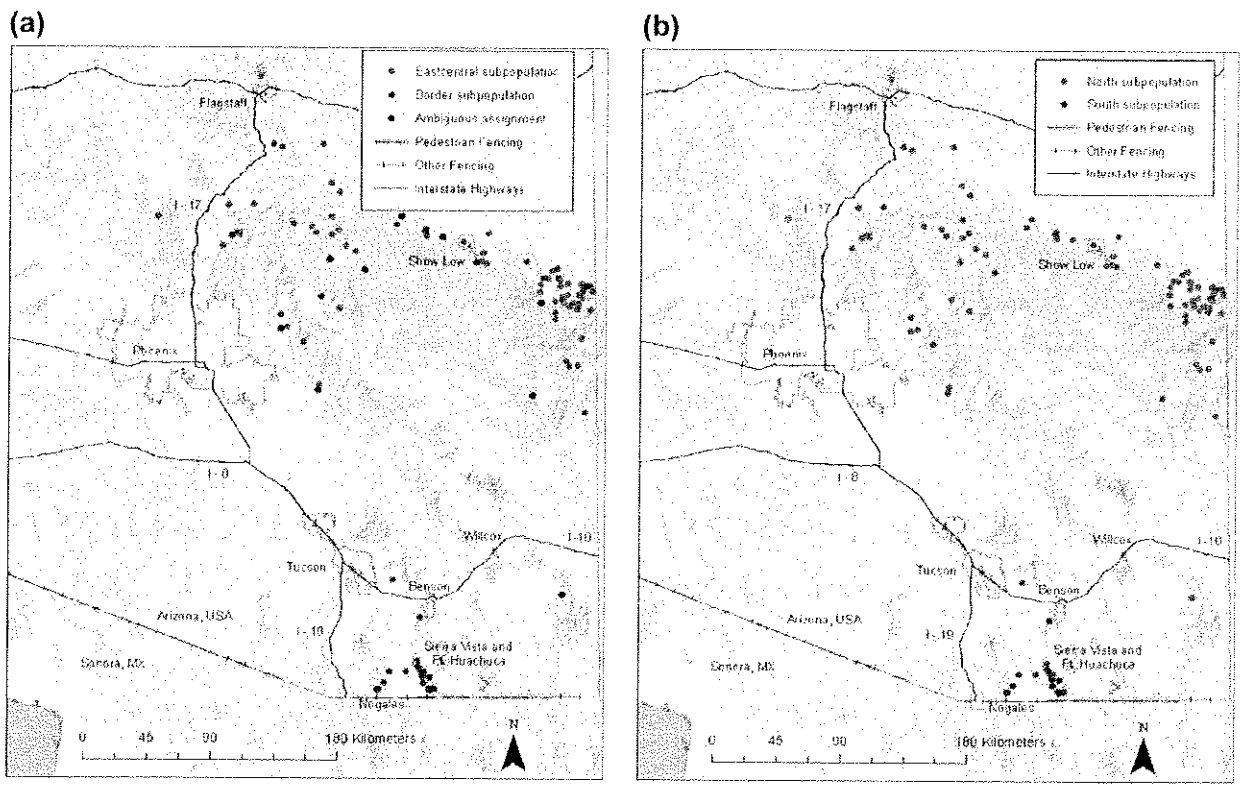

Fig. 3. (a and b) Subpopulation assignments of black bears sampled in Arizona. Assignments were based on genetic information using the programs structure (a) and Geneland (b).

Table 3
Estimates of genetic diversity for the two subpopulations identified from black bears sampled at central highlands and border sites in Arizona, 2007–2008. Number of samples genotyped (N), average number of alleles per locus (A), expected (H_E) and observed (H_O) heterozygosities, fixation index (f) values, and (F_{ST}) are reported.

Population	N	A	H_E	H_O	f	F_{ST}
Overall	158	6.3	0.534	0.508	0.048	NA
East-central[a]	102	5.8	0.541	0.538	0.006	0.111
Border[a]	33	4.3	0.432	0.422	0.023	
East-central[b]	113	6.2	0.540	0.534	0.011	0.113
Border[b]	28	3.9	0.411	0.401	0.024	

[a] Subpopulations assigned by STRUCTURE. Twenty-three bears with ambiguous assignments were removed from the dataset.
[b] Subpopulations assigned by GENELAND.

three individuals (17 males, 3 females, 3 unknown sex) were assigned to both subpopulations (q values less than 0.75): 19 of the individuals were from the central highlands area, 3 were from the high desert area, and one was from the border area. These ambiguously assigned individuals were not included in the subsequent genetic or demographic analyses of the inferred subpopulations. Similar levels of genetic diversity were observed within each of the two subpopulations defined by STRUCTURE (Table 3). There were large numbers of unique alleles in the east-central subpopulation ($n = 22$) compared to the border subpopulation ($n = 5$). Most unique alleles were at low frequency, however at 1 locus (G1D in the border subpopulation) a unique allele was observed at a frequency of 41%. Significant genetic differentiation was observed between the two inferred subpopulations ($F_{ST} = 0.111$; 95% CI: 0.056–0.156; $n = 135$; Table 3). Average relatedness estimates of individuals within subpopulations were 0.16 and 0.37 in the central highlands and border subpopulations, respectively.

The GENELAND analysis indicated that the most likely number of subpopulations was 2. Through the incorporation of spatial coordinates, GENELAND was able to identify a northern subpopulation ($n = 113$, 70 males, 37 females, 6 unknown sex) and a southern subpopulation ($n = 28$, 15 males, 10 females, 3 unknown sex) which corresponded to the east-central and border regions of our study. All individuals were unambiguously assigned to one of the two subpopulations. Similar levels of genetic diversity were observed within each of the two subpopulations defined by GENELAND (Table 3). There were large numbers of unique alleles in the east-central subpopulation ($n = 26$) compared to the border subpopulation ($n = 1$), however most unique alleles were at low frequency. Significant genetic differentiation was observed between the two inferred subpopulations ($F_{ST} = 0.113$; 95% CI: 0.051–0.167; Table 3). Average relatedness estimates of individuals within subpopulations were 0.16 and 0.41 in the east-central and border subpopulations, respectively.

Table 5
Occupancy (ψ) estimates of black bears in different habitat types at Border study site in Arizona. Estimates were generated in program MARK by model averaging values of ψ over the suite of candidate models presented in Table 4.

Habitat type	ψ	SE	Lower95% CI	Upper95% CI
Madrean evergreen (MEW)	0.72	0.10	0.50	0.87
Mixed conifer (MXC)	0.55	0.17	0.25	0.83
Desert grassland (DG)	0.45	0.25	0.10	0.86
Great Basin grassland (GBG)	0.10	0.23	0.001	0.94
Oak woodland (OW)	0.71	0.14	0.39	0.90

The LRT in CAPWIRE identified the TIRM as most appropriate capture probability model for data from the White Mountains grid and estimated the population size to be 252 bears (95% CI: 137–396). The ECM was identified as most appropriate capture probability model for data from the Huachuca–Patagonia grid and population size was estimated to be 69 bears (95% CI: 39–82).

3.2. Occupancy and connectivity modeling

For the border data set we estimated probability of detection to be 0.79 (SE = 0.04) and found strong evidence that occupancy differed between habitat types and that distance to water (disw) from hair-snags influenced estimates of occupancy (ψ). Models with a habitat effect (group effect) accounted for 85% of the weight (Table 4) and the individual covariate "disw" was in the top two models (accounting for 61% of the model weight), and was the only covariate whose 95% confidence interval around the beta value did not overlap zero (Table 4). Occupancy estimates ranged between 0.72 and 0.10 between habitat types with occupancy highest in MEW followed by OW, MXC, DG and GBG (Table 5). Variance was highest for DG and GBG indicating high levels of uncertainty in our estimates of occupancy for these habitat types. The relationship between distance to water and occupancy was negative.

The habitat suitability model identified population- and breeding-size patches of suitable and optimal habitat in all Sky Island wildland blocks (Fig. 4). Along the border, the greatest area of population- and breeding-size patches was found in the Chiricahua block (block 7; 923 km^2), followed by the Huachuca–Patagonia (block 3; 831 km^2), and Santa Rita (block 2; 481 km^2) blocks (Fig. 4). The Dragoon Mountains block was the smallest and had the least amount of suitable habitat (Fig. 4, block 6; 307 km^2). Isolation of wildland blocks generally increased from west to east, with the shortest nearest neighbor distances occurring between the Huachuca–Patagonia and Santa Rita blocks followed closely by the Huachuca–Patagonia and Tumacacori blocks.The structural and qualitative characteristics of potential corridors connecting

Table 4
Models of black bear occupancy for the Border grid (Huachuca and Patagonia mountains) in southern Arizona. We held detection probability constant [$p(\cdot)$] and modeled occupancy (ψ) with and without a group effect (i.e., differences between habitat types) and with five site specific covariates (aspect, distances to water [disw] and roads [disroad], elevation [elev], and slope). We present all models, QAICc, model weight, number of parameters (k), and beta values of individual covariates with corresponding 95% confidence intervals. Cells shaded gray had beta values with 95% confidence intervals not overlapping zero, providing evidence of significance.

Model	QAICc	Model weight	k	Covariate beta value	Lower95% CI	Upper95% CI
p(·) ψ{(group) + (water)}	198.7	0.45	7	0.003	0.006	0.0001
p(·) ψ{(·) + (water)}	200.8	0.16	3	0.004	0.006	0.001
p(·) ψ(group)	200.9	0.15	6	n/a		
p(·) ψ{(group) + (road)}	202.3	0.08	7	0.001	0.001	0.002
p(·) ψ{(group) + (aspect)}	202.5	0.07	7	0.003	0.003	0.009
p(·) ψ{(group) + (slope)}	203.3	0.05	7	0.005	0.086	0.075
p(·) ψ{(group) + (elev)}	203.3	0.05	7	0.00002	0.002	0.002
p(·) ψ(·)	210.2	0.00	2	n/a		
p(·) ψ{(·) + (road)}	210.4	0.00	3	0.0006	0.0003	0.002
p(·) ψ{(·) + (elev)}	211.3	0.00	3	0.0004	0.0004	0.001
p(·) ψ{(·) + (aspect)}	212.2	0.00	3	0.001	0.004	0.006
p(·) ψ{(·) + (slope)}	212.2	0.00	3	0.013	0.051	0.076

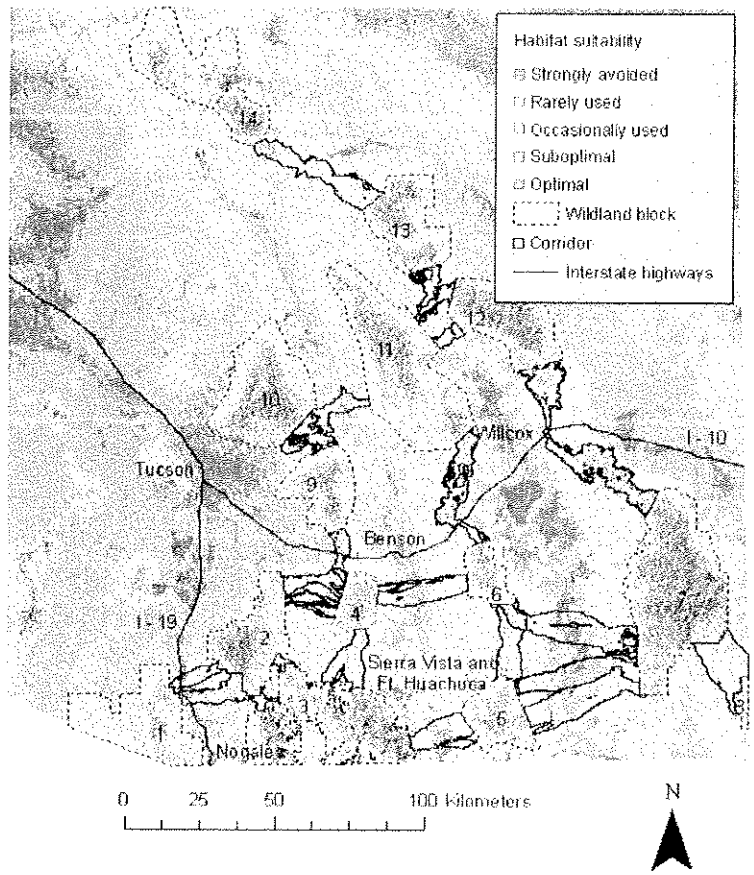

Fig. 4. Habitat suitability map for the area encompassing the Arizona Sky Island wildland blocks and corridors.

the eight border Sky Islands (wildland blocks 1–8; Fig. 5) differed greatly, but generally the western-most wildland blocks (i.e., Tumacacori [1], Santa Rita [2], Huachuca–Patagonia [3], and Whetstone [4] blocks) were connected by higher quality corridors. For these corridors, length to narrowest width ratios averaged ≤4.4:1 (range: 1.11:1–9.0:1; SE = 0.95), with ≥1 corridor within each of the individual linkages containing ≥57% suitable (either optimal or suboptimal) habitat (Fig. 4). By contrast, the mean length to width ratios of the corridors connecting the eastern-most wildland blocks (i.e., Mule [5], Dragoon [6], Chiricahua [7], and Peloncillo [8] blocks) was 6.8:1 (range: 1.2:1–12.1:1; SE = 1.11), and only 1 linkage (Dragoon–Mule mountains corridor) contained >57% suitable habitat (Fig. 4). The linkages connecting the Huachuca–Patagonia and Mule, Whetstone and Mule, Dragoon and Chiricahua, and Mule and Chiricahua blocks all contained <57% suitable habitat and spanned 23–44 km over desert basin habitat (Fig. 5). Corridors connecting the northernmost wildland blocks (blocks 9–14; Fig. 5) were generally of similar suitability to the western-most border wildland blocks in that all contained >57% of optimal or suboptimal habitat (Fig. 4), but length to width ratios were more variable ($\bar{x}$ = 4.7:1; range: 1.0:1–17.0:1; SE = 2.08).

4. Discussion and conclusions

Our study revealed several important findings regarding black bear genetic and landscape connectivity in Arizona. First, we detected significant genetic differentiation between black bears sampled in the border region and those sampled in the high desert and central highlands regions. Second, based on density estimates derived from the White Mountains and Huachuca–Patagonia hair-snag grids, the border subpopulation density (0.06 bear/km^2) was substantially lower than the east-central subpopulation (0.21 bear/km^2). Although our grid-based density estimates relate only to the area covered by the grids, the bio-physical characteristics of grids were very similar to their respective regions (Brown, 1994). Accordingly, we believe the estimated grid densities approximate densities across sampling regions. Finally, while the border Sky Island mountain ranges do provide adequate amounts of suitable habitat to support black bears, there is wide variation in the biological quality of corridors that connect them. While black bears are not a species of concern in US, they are in Mexico, which represents the southern extent of their historic and current range (Pelton et al., 1998). Given the above, black bear persistence in the US–Mexico border Sky Islands may be particularly vulnerable to further loss of habitat due to urbanization and border security activities.

Black bear populations in Arizona exhibit a north–south spatial structure in which the border sub-population is isolated from, and less genetically diverse than, the main population segment in east-central Arizona. These patterns are likely the result of both historic and contemporary impediments to individual movement and thus gene flow (McRae et al., 2005). For example, the harsh environment and dispersion of suitable montane habitat patches in a desert basin matrix have previously been implicated as historic impediments to large mammal gene flow (Onorato et al., 2004; McRae et al., 2005), and likely are complicit in the isolation we detected between the border and east-central subpopulations. Addi-

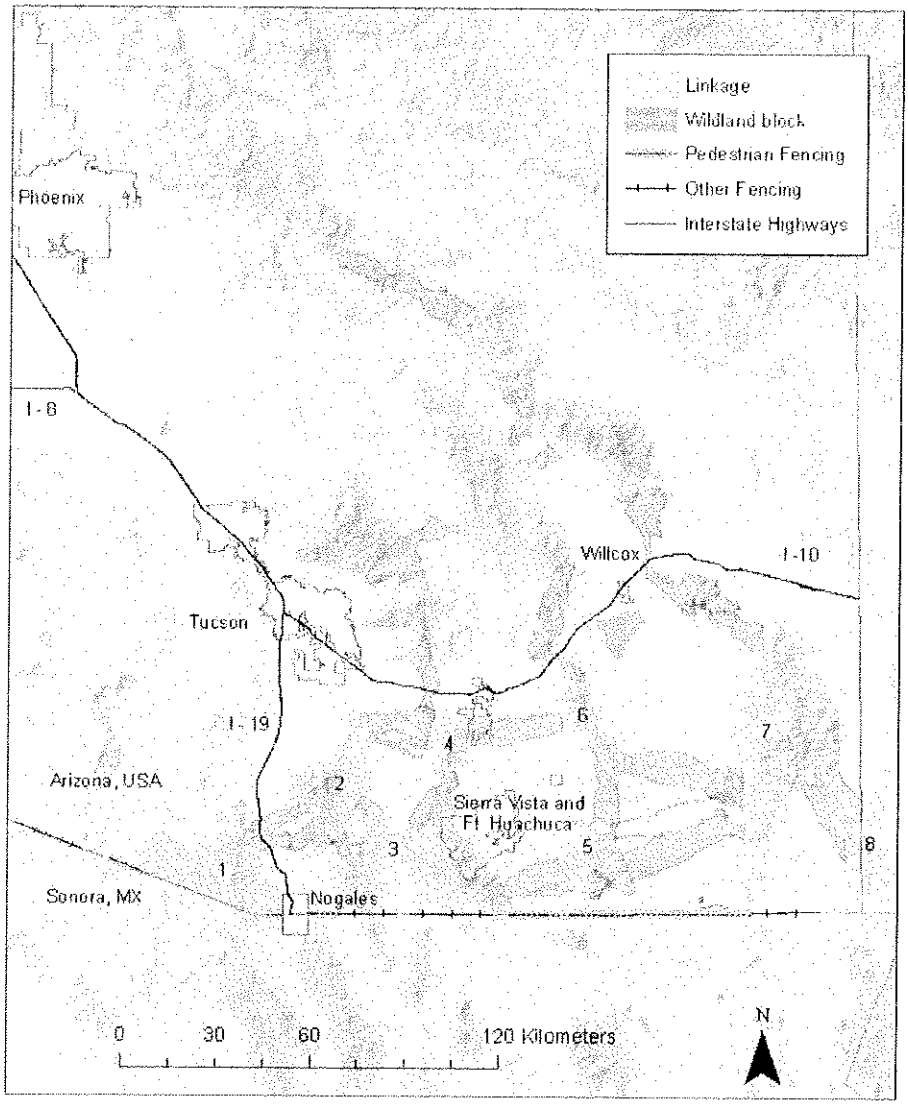

Fig. 5. Linkage design for the southern Arizona Sky Islands. The design represents land that, if conserved, should enhance the ability of black bears to move between wildland blocks.

tionally, it is feasible that Interstate Highways 10 and 19, the expanding human footprint near Tucson and other urban areas in southeastern Arizona, and the US–Mexico border fence represent contemporary impediments to movement and function to hasten genetic isolation of black bears in the border region. Indeed, there is a growing body of research indicating that urbanization and linear anthropogenic barriers can drive spatial structure in bear and other large carnivore populations (e.g., Kyle and Strobeck, 2001; Proctor et al., 2005; Burdett et al., 2010). Thus, while the desert basin has likely historically limited bear gene flow between the high desert and border regions, it is also likely that landscape fragmentation due to anthropogenic activities, including border security, has further limited gene flow.

Large carnivores are highly vagile, require a large amount of area to maintain a viable population and, as a result, are often highly vulnerable to habitat fragmentation (Weaver et al., 1996; Burdett et al., 2010) and loss of connectivity (Beckmann et al., 2010). Over the last few decades, central and southern Arizona has experienced rapid human population growth (Primack, 2006); urban expansion in the Tucson metropolitan area alone is expected to increase by 22% over the next decade (Pima Association of Governments: www.pagnet.org/regionaldata/population/populationestimates/tabid/582/default.aspx). Our linkage design (Fig. 5) for Arizona's border Sky Islands provides a template for land-use managers and planners to prioritize conservation efforts where future development is most immediate and likely to adversely affect landscape connectivity. For example, we believe that conservation efforts aimed at protecting corridors within the Nogales–Sierra Vista–Tucson triangle should be prioritized. This area contains relatively high quality corridors linking wildland blocks (e.g., Tumacacori, Santa Rita, and Patagonia–Huachuca; Fig. 2) that either extend into Sonora, Mexico, or are immediately adjacent to Sonora wildland blocks (e.g., Sierra Cibuta, Sierra Pinito, and Sierra Chivato), thus providing the best opportunity for trans-border movement. Urbanization and additional stretches of the impermeable pedestrian fence along the international border have the po-

tential to threaten connectivity in an area that may be critically important in facilitating trans-border dispersal, ultimately predisposing segments (i.e., the more isolated Sky Island mountain ranges) of the low density border black bear subpopulation to localized extinction.

Populations of black bears in the southwestern US and northern Mexico appear to display a metapopulation structure (Onorato et al., 2004), thus a significant step in ameliorating effects of habitat fragmentation will be to maintain or restore landscape connectivity within the system. The results of our analyses identified opportunities and challenges to maintaining connectivity among border Sky Islands and to the high desert region. A central challenge is that structural connectivity (based on length:width and% suitable habitat metrics: Bennett et al., 1994) between border region wildland blocks varied considerably. Moreover, several adjacent wildland blocks that appear to benefit from sound structural connectivity also appear to be vulnerable to compromised functional connectivity due to increasing infrastructure. For example, the Tumacacori–Santa Rita corridor is bisected by Interstate Highway 19 (Fig. 5), which may degrade functional connectivity and reduce the likelihood of migrants from Sonora moving into the Sky Islands east of the interstate. Similarly, three other corridors (Whetstone–Rincon, Dragoon–Pinaleno, and Chiricahua–Pinaleno) potentially important in facilitating gene flow between the border and high desert regions, are bisected by Interstate Highway 10 (Fig. 5). These highway-corridor intersections would be ideal areas to target for road mitigation projects (e.g. road crossing structures designed specifically for black bears and other large mammals, see Beckmann et al., 2010) that enhance functional connectivity.

The US–Mexico borderland is one of the most biologically diverse and ecologically vulnerable regions in the United States (Cordova and de la Parra, 2007). Because rapid urbanization and border security activities threaten to alter the spatial structure of trans-border wildlife populations (Flesch et al., 2010), it is important to identify opportunities to maintain or restore borderland connectivity. We identified suitable habitat and movement corridors for black bears in the Sky Island mountain ranges of southern Arizona, information that can help inform systems-level approaches to land-use planning and conservation (Moilanen et al., 2005). Currently, in the western US, there is opportunity to integrate connectivity conservation with land-planning (Western Governor's Association, 2008). For example, land-use planners in the Tucson metropolitan area have developed a regional conservation plan with a specific focus on maintaining wildlife linkages and increasing the permeability of transportation corridors (see Campbell and Kennedy, 2010). The information we present here, if incorporated into land-use planning, may aid in ameliorating the adverse effects of inevitable urbanization and border security activities. If connectivity can be maintained, there is greater likelihood of the long-term persistence of species such as black bears, mountain lions, and jaguars along the US–Mexico border.

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6 April 2012

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Re: Conservation Measures for Threatened and Endangered Species and further coordination on specific issues identified in comments on the Draft Environmental Impact Statement.
Dear Mr. Upchurch:

The Arizona Game and Fish Department (Department) has attended two meetings between the Coronado National Forest (Forest) and the U.S. Fish and Wildlife Service (Service) regarding the Draft Biological Assessment (BA) for the Rosemont Copper Project and needed conservation measures for species listed under the Endangered Species Act (ESA). We would like to thank the Forest for coordinating our participation in these meetings under our Memorandum of Understanding with both the Forest and with the Service. This level of coordination provides us the most meaningful opportunities to provide input.

We also thank the Coronado for the invitation at our coordination meeting on April 3rd and 4th to participate in further review of issues identified via comments on the Draft Environmental Impact Statement (DEIS). We will contact you soon to discuss opportunities to participate on issue-specific teams formed to address concerns with wildlife and habitat.

It is our understanding that the wildlife species on which the Service will issue a Biological Opinion (BO) are the Chiricahua leopard frog (*Lithobates chricahuensis)*, Gila chub (*Gila intermedia*), Gila topminnow (*Poeciliopsis occidentalis*), jaguar (*Panthera onca)*, lesser long-nosed bat (*Leptonycteris cursoae*), Mexican spotted owl (*Strix strix*), ocelot (*Leopardus pardalis*), Southwest willow flycatcher (*Epidonax traillii extimus*), and Northern Mexican garter snake (*Thamnophis eques megalops*).

The Department provides the following suggestions for potential conservation measures that may benefit or promote the recovery of the listed species that are an integral part of the proposed action.

Conservation Measures
We provide the following suggestions for conservation measures that will minimize impacts to the species analyzed in the BA. We include only wildlife in our suggestions:

Conservation Measures Applicable to all Species

- Compensation Lands
  Wildlife habitat purchased for conservation and protection purposes is not new land, it is merely land that has changed ownership. In any discussion of "compensation" lands, it is important to understand that no new habitat is being created through change of ownership. Wildlife currently utilizing these lands therefore are not an added value to the greater population or to the public trust of which they were already a part, these wildlife are merely offered greater potential for increased protection. Only through enhancement of the habitat on these and other lands will there be an additive effect on the population or species level, i.e. if more habitat is created, or degraded habitat is restored, more individuals will exist; compensating for individuals lost to the effects of the mine.

  Lands purchased from private sources to provide greater protection for wildlife and habitat are valuable inasmuch that they minimize impacts to species at the population and species level. Conservation lands purchased should have a demonstrably beneficial effect on species analyzed in the BA.

  Conservation lands should compensate for wildlife values lost at equal to or greater than the 100% level. For example 100 acres of high quality amphibian habitat can only be replaced by creating 100 acres of NEW amphibian habitat where it did not formerly exist or protecting habitat in perpetuity that is in imminent danger of being lost or negatively impacted. This might be done by creating new wetlands that will support a similar sized population to that which was lost. Moreover a population that is lost may have been connected to a larger population, and may have served a critical function to that larger population, such as being located in an area less vulnerable to stochastic extinction events or serving as a linkage between two populations. All these types of characteristics must be accounted for in analyzing compensation lands purchased for a given species.

  Attempting to compensate for 100 acres of habitat lost to the mine by purchasing 100 acres of existing habitat and transferring the ownership of that habitat to a public trust agency still results in a 100 acre net loss of existing habitat. Therefore, the Department suggests that compensation lands be purchased at a higher than 1:1 acreage and come with a funded plan to enhance habitat that will achieve 100% replacement value for the species for which this conservation measure is intended to minimize the impact of the mine.

  The injury to the listed species must be fully described in ecological terms and quantified in such a way that conservation measures can be weighed in terms of their value in minimizing those impacts. When impacts to species cannot minimize or avoid 100% of the impacts of the mine, and a decision that the proposed action shall proceed, the Department supports offsetting impacts to listed species through the transfer of ownership of lands to conservation ownership, however transfer alone is unlikely to discernibly offset the impact to the injured species. Conservation lands *must*

unquestionably offset the quantified injury to those species by demonstrating no net loss of wildlife values through higher benefits such as funded habitat enhancement activities, activities increasing ecological integrity, or actions that increase viability for species.

- Funding of Habitat Enhancement Projects
  When impacts cannot be 100% avoided or minimized, remaining impacts for lost wildlife resources should include funding of projects that restore wildlife values at a 100% level, in perpetuity. For example, there are significant impacts to species and substantial habitats lost –between 63-84 springs will be directly impacted with unknown losses on many more. How will the lost value of those springs to imperiled species be compensated? Rosemont has stated vaguely that they will replace lost water developments but they have not said the same for natural springs. Surely springs should be compensated for as they provide habitat for numerous species, including Chiricahua leopard frog (CLF).

- Wildlife Connectivity
  In our comments on the DEIS, the Department commented extensively on the foreseeable effect the project will have on wildlife movement and habitat connectivity. Please refer to those comments. Briefly, the Santa Rita habitat block is central to the viability of wildlife populations in adjacent habitat blocks. The Forest has not adequately described the impact resulting from loss of connectivity between sky islands. The project severs the habitat in the south from the northernmost area 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 new 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.

  Funding crossing structures is a reasonable conservation measure for species impacted by the degradation and loss of major, previously modeled wildlife linkages. Highway 83 is a significant obstacle to many species including jaguar. The project footprint will be a major habitat fragmenter for numerous species including CLF, jaguar, and ocelot. These impacts have not been adequately identified and conservation measures have not adequately addressed this fragmentation. The Department has much experience in

reducing mortality and increasing permeability. Crossing structures and fencing should be part of any conservation measures identified for species suffering population fragmentation.

Species Specific Conservation Measures

The Department provides the following bulleted list of potential conservation measures. These measures are not intended to replace onsite best management practices that minimize and avoid impacts. These measures are intended to be conceptual in nature, details require identification and analysis of the impacts which they may minimize or offset. Without impacts to species adequately described and quantified, the value of these measures in minimizing those impacts cannot be determined. In all cases, it is helpful to think in terms of the species affected – the value of a jaguar is another jaguar and the reproductive viability of that other jaguar, that is, it's contribution to the continued viability to the population. If that contribution is lost, it must be regained through conservation measures that replace that contribution. Conceptually, the loss of a population linkage may disrupt the entire population and thus reduce that entire population's viability. Rather than quantifying the number of jaguars affected, the loss of the corridor itself is more easily remediated to its previous function, or that function regained through enhancement of another area to provide the same ecosystem functions.

Jaguar/Ocelot:

- Crossing structures I-10, 83, 82
- Purchasing land for prey, enhancing for prey on those lands
- Monitoring and adaptive management
- Maintain connectivity with the Whetstone Mountains
- For ocelots – maintain connectivity to the Empire mountains

Lesser long-nosed bat:

- Re-routing the AZ trail away from identified roost
- Purchase properties with current roosts – Montezuma Mine in the Coal Mine area, others?
- Conservation easements or otherwise protect roosts in Patagonia mountains.
- Use of agaves onsite during construction to enhance agave production and use for erosion control.
- On currently owned properties and on Forest, enhance agave densities through planting and water harvesting.

- If there are other sensitive bats there, prioritize those areas over single spp. sites.
- Use monitoring and adaptive management to determine effectiveness of mitigation measures.
- Build artificial roosts.

Native Fish:

- Strategy is 1) protect the stream 2) create refugia and breeding facilities (Fish health assessment funding will be costed into re-establishment project).
- Purchase land and water rights (including conservation easements) to suitable habitat in vicinity of the project that will support extant and reintroduced populations of native fishes, ranid frogs, gartersnakes, and springsnails (ESA-listed, candidate, and AZ Species of Greatest Conservation Need); these lands and water rights should be turned over to the AGFC to manage. Areas of preference include land and waters along upper Sonoita Creek, Sonoita Creek Ranch, Monkey Springs, Cienega Creek, etc.
- Create new (or improve existing) long-term captive refuge populations and habitat for Cienega Creek-lineage native fishes at the AZ-Sonoran Desert Museum or other Dept-approved holding facility, including covering costs for operations and maintenance of those refuge populations and habitat.
- Install a flow gage and water contaminants test well in Davidson Canyon near the confluence of Cienega Creek, and fund USGS to monitor and maintain this flow gage and test well.
- Seal or cap any areas with faults or unstable soils within the open pit mine that may allow contaminants to seep into groundwater.
- Supplement water in Cienega Creek by purchasing water rights and adding the water.
- Patagonia mountain creek remediation in Flux, Mansfield, Harshaw Canyons and re-establishment of species.
- Purchase and transfer additional water rights in Santa Cruz Basin.
- Native fish rearing facility on Cienega Creek or San Pedro River (AGFD Property).
- Health Assessment for native fish in the region or Gila River Drainage
- Sonoita Creek property purchase, enhancement and management activities.
- Fund habitat enhancements on Cienega Creek.

- Enhance/restore natural wetlands or construct new artificial wetlands.
- Acquisition/enhancement/monitoring of native fish habitat and water rights in unprotected habitats.
- Acquisition/enhancement of property between Patagonia Lake and Coal Mine Property (Sonoita Creek Natural Area) on Ash Creek downstream of George Weiss Spring.
- Enhance Bog Hole for frogs and fish and eradicate non-natives. This should include measures such as ensuring that Bog Hole is perennial (it has dried a number of times) by drilling a well and adding a solar pump, piping water from established wells or purchasing water rights from permittees in the area and allocating them for the upper Santa Cruz.
- Acquisition/enhancement of specific parcels in Red Rock Canyon to include maintenance and monitoring of any enhancement projects.

Chiricahua leopard frogs:

- The Department recognizes that the BA identifies many impacts to the CLF. However, many of the impacts on springs (and Cienega Creek) are not listed. Also, the scale of impact is overlooked or ignored.
- Compensate for lost habitat by funding a project to remove bullfrogs from a large watershed such as San Rafael or San Pedro to restore those habitats to truly habitable conditions for CLF.
- Mitigation measures within footprint of the mine or within northern Santa Rita Mtns.
- Earthen cattle tanks – create an aquatic system above and beyond livestock watering – i.e. line tanks, supplement water, repair berms for water permanency.
- Reduce sediment inputs.
- Non-native species removal primarily bull frogs with a systematic approach. Potentially crayfish removal.
- Acquisition/enhancement/monitoring of additional habitats contributing to recovery goals, and habitat enhancements to increase viability of existing metapopulations: Gardner Canyon – Apache Springs or Ranch purchase, West Sawmill – potential renovation of sites to make them viable reproductive sites, Gardner, Cave, Box Canyon – building strong core populations and strategic stepping stones – landscape level through

multiple small frog enhancements (pools etc., channel modifications, sediment traps into pools, or landscape scale sediment trap projects, watershed infiltration enhancement).

- Strategic creation of new tanks or habitats to increase connectivity within or between existing metapopulations.
- Purchase mining claims from hobby miners to prevent impacts from hobby mines.
- Direct support of recovery projects in that area.
- Fund a position that develops safe harbor agreements on private lands in this and other recovery areas.
- All springs have potential to be important stepping stone habitat for leopard frogs. –direct mitigation for loss of springs.

Northern Mexican garter snakes:

- All conservation measures listed for fish are applicable to the snake.
- Acquisition/enhancement/monitoring of existing and potential habitat.
- Engineer a solution to the dewatering problem.
- Invasive species removal, including crayfish and bullfrogs (see above).

We reiterate that these ideas are preliminary and require further analysis. The Department desires to coordinate closely with the Forest as the consultation progresses and would like to meet with the Forest to discuss these ideas further as the BA is revised and conservation measures are added. If we can provide any additional information, please contact John Windes by phone at 520-628-5376 or by email at jwindes@azgfd.gov

Sincerely,

John Windes, Habitat Program Manager

JDW:jw

cc: Jim Upchurch, Coronado Forest Supervisor
John Windes, Region V Habitat Program Manager
Raul Vega, Region V Manager

Eric Gardner, Habitat Branch Chief
Josh Avey, Habitat Branch Chief
Jean Calhoun, Assistant Field Supervisor, USFWS ES Office Tucson

Cooperating Agency Meeting, Proposed Rosemont Copper Mine

Agenda

Conservation and Mitigation Measures for Impacts to Plants and Animals

11 June 2012
Arizona Game and Fish Department, Tucson

We will plan to meet all day, with a lunch break at 1130. If it can be wrapped up by 1200, we will adjourn at that time. Fish and Wildlife Service (not a cooperating agency) is also invited because of overlap with ESA species requiring conservation measures. The extended round robin is a chance for the Forest Service, Fish and Wildlife Service, and cooperating agencies to discuss where the agencies would like to go with conservation measures (mitigation and monitoring) for the proposed Rosemont copper mine.

0900 Introduction and round robin

- Introductions and sign in
- Ground rules
- Extended round robin:
    - Forest Service (Jones/Roth)
    - Arizona Game and Fish Department (Windes)
    - Pima County (Fonseca/Powell)
    - Fish And Wildlife Service (Douglas)
    - Other (as appropriate)

1015 Break

1030 State of Conservation Measures

- Review round robin (Roth)
- Overview of species, habitats, and status of Conservation Measures (Jones)

1130 LUNCH

1230 Direction on Monitoring Plans and Biological Monitors (Jones)

1400 BREAK

1415 Putting it all together (Roth)

- Summary
- Assignments and follow-up

1600 ADJOURN

1. Glad we're finally having this mtg should
2. have been doing this from the beginning

We've been asking for these types of mtgs since 2008.

Sec. 1508.20 Mitigation.

"Mitigation" includes:

(a) Avoiding the impact altogether by not taking a certain action or parts of an action.

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(e) Compensating for the impact by replacing or providing substitute resources or environments.

Potential Mitigation Measures from Cooperating Agencies, Biological Resources, Proposed Rosemont Copper Mine

DRAFT DELIBERATIVE FOR CO-OP AGENCIES, FWS, and SWCA (26 June 2012 DRAFT)

N/F	Threat/Loss	Habitat	Species	Mitigation	RCC	Reference	Notes
?	Loss of 200,000-300,000 agaves	grassland, woodland	LLNB	?		16 May 2012 Letter p. 2	Large-scale mitigation required for large-scale loss
F	habitat lost	all	all	Mitigation-compensatory lands/water rights/easements		various	
F	habitat lost	all	all	Fund habitat enhancement projects		6 April 2012 Letter, p. 3	
F	other habitat altered by mines	terrestrial	all	Purchase mining claims from hobby miners		6 April 2012 Letter, p. 7	
F	aquatic habitat	aquatic	aquatic	Support breeding facilities		6 April 2012 Letter, p. 5	e.g., ASDM
F	population viability loss/information gap	oak drainages	HECO	Surveys in other areas to document occurrence of other populations		early discussions	
F	habitat lost	all	Jaguar/Ocelot	Fund recovery actions		16 May 2012 Letter p. 4	
F	food resource lost	terrestrial	LLNB	Increase agave density		6 April 2012 Letter, p. 4	
F	mortality	desert, grassland	PPC	In-lieu payment to PPC mitigation bank		16 May 2012 Letter p.5	
F	habitat lost	Madrean encinal woodland, semi-desert grasslands	terrestrial	Fund restoration projects in these two habitat types identified as being out of HRV by CNF IVMPT		6/11/2012 meeting	
F	habitat lost	grassland	terrestrial	Fullerton Ranch Land Acquisition	X	P. 102 BA	
F	habitat lost	grassland	terrestrial, PPC	Helvetia Ranch North Land Acquisition	X	P. 102 BA	
F	habitat lost	terrestrial, riparian, aquatic	terrestrial, riparian, aquatic	Sonoita Creek Ranch Land Acquisition	X	P. 102 BA	AGFD concurs with value as mitigation land
N	failure, noncompliance	all	all	Performance bonds 100 yrs into perpetuity		6/11/2012 meeting	
N	contamination, drawdown	aquatic, riparian	aquatic, riparian	Seal faults in mine pit		6 April 2012 Letter, p. 5	
N	various	oak drainages	HECO	Fence and monitor populations		Early discussions	

N	population decline	oak drainages	HECO	Develop conservation agreement		early discussions	
N	agaves lost	grassland, woodland	LLNB	Grow , plant, monitor agaves	X	p. 114 BA	AGFD concurs
N	mortality	terrestrial	PEIM	complete pre-survey, avoid		early discussions	
N	mortality	desert, grassland	PPC	Minimal ground disturbance	X	P. 119 BA	
N	mortality	desert, grassland	PPC	Pre-survey, avoid, transplant PPC	X	P. 120 BA	
N	loss of talus	talus slopes	talussnails	protect talus slopes from mining activities		Early discussions, also 16 May 2012 Letter p.10	
N/A	?	?	CLF?	Fund a position for developing safe harbor agreements		6 April 2012 Letter, p. 7	
NF	population decline	oak drainages	HECO	Avoid populations with largest possible no-touch buffer on-site and other Santa Rita population		early discussions	
NF	population viability loss/information gap	oak drainages	HECO	Camera monitoring to determine herbivory causes and pressure		email to CNF	
NF	population viability loss/information gap	talus slopes	talussnails	Fund to research genetic/anatomical relationships of talussnails in Santa Ritas		early discussions	Extensive sampling required
V	light pollution	all	all	Low lighting levels (Lighting Plan)	X	p. 114 BA	
V	fragmentation, road mortality	terrestrial, riparian	all; esp. Jaguar, Ocelot	Roadway crossing structures		AGFD/FWS letters	FWS letter with recommended specs, p. 4 5
V	groundwater drawdown	aquatic, riparian	aquatic, riparian	Install, monitor Cienega/Davidson flow gauge for flow, contaminants		FWS, AGFD, some verbiage in BA	Lots of input on this issue, but nothing refined, designed
V	drawdown, drought	aquatic, riparian	aquatic, riparian	Supplement water in Cienega Creek		6 April 2012 Letter, p. 5	
V	drawdown, drought	aquatic, riparian	aquatic, riparian	Cienega Creek conservation project funding		6 April 2012 Letter, p. 5	
V	groundwater drawdown	wetland	CAUL	Salvage, transplant into restored wetland nearby			Population(s) expected to be lost in vicinity (Scholefield Spring, ?)

V	aquatic habitat	earthen stock tank	CLF	Greaterville Tank management	X	p. 104 BA	
V	aquatic habitat	earthen stock tank	CLF	Pipeline to West California Gulch Tank	X	p. 104 BA	
V	aquatic habitat	earthen stock tank	CLF	Manage 2 tanks on Rosemont Ranch	X	p. 104 BA	
V	die-off, drought	earthen stock tank	CLF	Monitor frog populations	X	p. 105 BA	
V	invasive species	earthen stock tank	CLF	Manage/monitor invasive species	X	p. 105 BA	
V	aquatic habitat	earthen stock tank	CLF	Redesign stocktanks to accommodate cattle and CLF		6 April 2012 Letter, p. 6	
V	drawdown, runoff	hydrology	CLF	Monitor ground, surface water	X	p. 105 BA	
V	aquatic habitat	wildlife waters	CLF, especially	Design frog ponds from redirected runoff downstream		Verbally proposed to RCC, previously	
V	poor water quality and quantity	aquatic	fishes	Fund AGFD to conduct a health assessent of native fish in area		16 May 2012 Letter p.7	
V	stream damage	streams	fishes	Protect streams		6 April 2012 Letter, p. 5	
V	offset aquatic loss	aquatic	HWU	Propagate Cienega Creek HWU and determine genetics of other populations		16 May 2012 Letter p.7	
V	invasive species	lotic	invasive fishes	Construct fish screen at the Del Lago Diversion Dam		16 May 2012 Letter p.7	
V	disturbance	adit	LLNB	Re-route Arizona Trail	X	P. 115 BA	AGFD letter concurs
V	loss of native plant diversity	all	native plants	Sample native vegetation		early discussions and 6/11/2012 meeting	
V	loss of native plant diversity	all	native plants	Use local seed sources		early discussions and 6/11/2012 meeting	
V	loss of native plant diversity	all	native plants	Seed, plant with all common species		early discussions and 6/11/2012 meeting	
V	altered habitat	riparian	riparian	Monitor and repair riparian habitat		16 May 2012 Letter p.6	
V	habitat lost	grassland	terrestrial	Rosemont Ranch Lands	X	p. 104 BA	
V	wetlands lost	wetland	wetland, CAUL, HWU	Enhance/restore/build wetlands		various	
V?	roosts lost	adits, caves	bats (?)	Build artificial roosts		6 April 2012 Letter, p. 5	

VF	ground disturbance, invasive species	all	all	Support invasive species eradication projects		various	
VF	habitat lost	all	all	RCC withdrawal of other mining claims		6/11/2012 meeting	
VF	aquatic habitat	aquatic	aquatic	Create refugia and breeding facilities		6 April 2012 Letter, p. 5	
VF	loss of wildlife recreation	all	game, watchable	?		6/11/2012 meeting	offset hunting, wildlife-viewing
VF	habitat lost	all	Jaguar/Ocelot	Fund for camera monitoring	X	p. 112 BA	Prob to U of A ongoing project

1 Large, overarching mitigations/design features generally not included
2 Does not (or minimally) overlap with the "Mitigation Table"
3 Does not include process or concept (e.g., "use adaptive management" and "prioritize species")
4 "Source" does not indicate priority or hierarchy; for tracking purposes only (hence, hidden)
5 Similar items may be lumped, such as several references to purchasing conservation land or water rights
6 Non-specific measures are not included, such as "include mitigation for species in footprint"

Code	Description
AGFD	Arizona Game and Fish Department
ASDM	Arizona-Sonora Desert Museum
BA	Biological Assessment, June 2012 (includes CNF)
CAUL	*Carex ultra*
CLF	Chiricahua Leopard Frog
CNF	Coronado NF
Coop	Topics brought up by a variety of cooperating agencies (may also include CNF, FWS, contractors, public, others)
FWS	US Fish and Wildlife Service
HECO	*Hexalectris colemanii* (Coleman's Coral-root)
HRV	Historic range of variability
HWU	Huachuca Water Umbel
IVMPT	CNF's Integrated Vegetation Management Planning Team
LLNB	Lesser Long-nosed Bat
N/F	On- (N) or Off- (F) site Mitigation V = vicinity (may include on-site); VF = onsite to offsite
PEIM	*Pectis imberbis*
PPC	Pima Pineapple Cactus
RCC	Rosemont Copper Company (X in column means RCC agreed to mitigation)

Conservation Measures for Listed Species in the Rosemont Copper EIS

Wildlife Species Affected	Pages in BA	AGFD Species Expert
Chiricahua Leopard Frog	pp 33-39, 78-80	Mike Sredl
Gila Chub	pp 40-43, 81-82	Clay Crowder
Gila Topminnow	pp 44-45, 82-83	Ross Timmons
Jaguar	pp 48-52, 84-85	Tim Snow
Lesser LN Bat	pp 53-56, 85-86	Tim Snow
Mex Spot Owl	pp 59-62, 87-88	Troy Corman
Ocelot	pp 62-65, 87-88	Tim Snow
SWIFL	pp 68-73, 89-90	Troy Corman

General Conservation Measure ideas:

Compensation lands

Rosemont provided us a view of several parcels that they purchased with a view to provide as conservation lands. They did not tell us how these lands mitigated or compensated for impacts to listed species except that one parcel had LLNB "foraging habitat" and one was for Pima pineapple cactus. The others on the east side filled in the forest boundary but are at the edge of the forest and may not have high wildlife habitat values. They told us that they have another one in the works that we are "going to be excited about".

I think compensation lands are key to mitigation for impacts to listed species, however the lands identified must make good on the injury to those species. So first of all, the Forest needs to identify the impacts to the species. This has not been done adequately. Second of all the compensation lands need to provide "new" habitat, or at minimum permanently protect important habitat that might not otherwise be protected.

The best outcome for the AZ Game & Fish Department would be not just one or two small parcels, but something on the order of an entire ranch that has multiple conservation values. These values would include at minimum compensation for impacts to the listed species and ability for enhancement. Riparian areas would be ideal for the aquatic species and SWIFL.

Funding of Habitat Enhancement Projects

The obvious mitigation for lost habitat is to fund projects that restore wildlife habitat above baseline conditions. There are some substantial habitats lost –between 63-84 springs will be directly impacted with unknown losses on many more. How will those be mitigated?

Wildlife Connectivity

Funding crossing structures is not impractical. 83 is a huge obstacle to many species including Jaguar. A structure over I-10 could be funded. Again, they must make the public trust whole again, regardless of the cost. The cost should be born by the proponent not the public trust.

Ideas I had were – transport tailings to brownfield site, pay for crossing structures across hwy 83 and I-10 to facilitate jaguar mov't, plant agaves for LLNB, purchase grazing leases in CLF habitat and exclude livestock from stock tanks, pay for a CLF recovery effort including habitat enhancement, purchase Monkey Springs and Sonoita Creek Ranch for topminnow, purchase land on the San Pedro for SWIFL habitat, purchase mineral rights in the Galiuros and deed those to a conservation entity, pay for a study to determine ocelot habitat suitability in the sky island region, purchase perennial stream habitat for Gila Chub, pay for a native fish hatchery at the Department's San Pedro River property. You must have some better ideas.

Call for a *Sky Island Corridor Initiative*

A White Paper prepared by Borderlands Restoration, L3C

The Madrean Sky Islands emerge from the high deserts and grasslands straddling the border states of Sonora, Chihuahua, Arizona and New Mexico. Also known as the Apachean montane outliers of the Sierra Madre Occidental, the Sky Islands and northern highlands of Sierra Madre Occidental massif form a globally-heralded center of biological diversity recognized by the International Union for Conservation of Nature (IUCN) and the World Wide Fund (WWF).

The Sky Island region, with an estimated 4,000 plant species, untold number of invertebrates including over 600 species of bees alone, and almost 500 species of vertebrates, remains one of the most biologically diverse semi-arid and subtropical eco-regions of North America despite 10,500 years of documented human history, including four centuries of Euro-American exploitation. This exceptional diversity results from the confluence of four great biogeographic domains and the intermingling of their unique floras and faunas. Because of the rugged topography and arid climate, much of the biological wealth of the region has remained mostly intact, but that is changing rapidly. Urban development, persistent drought, and disappearance of streams and riparian forests are resulting in highly fragmented landscapes and in increasingly isolated and imperiled wildlife populations.

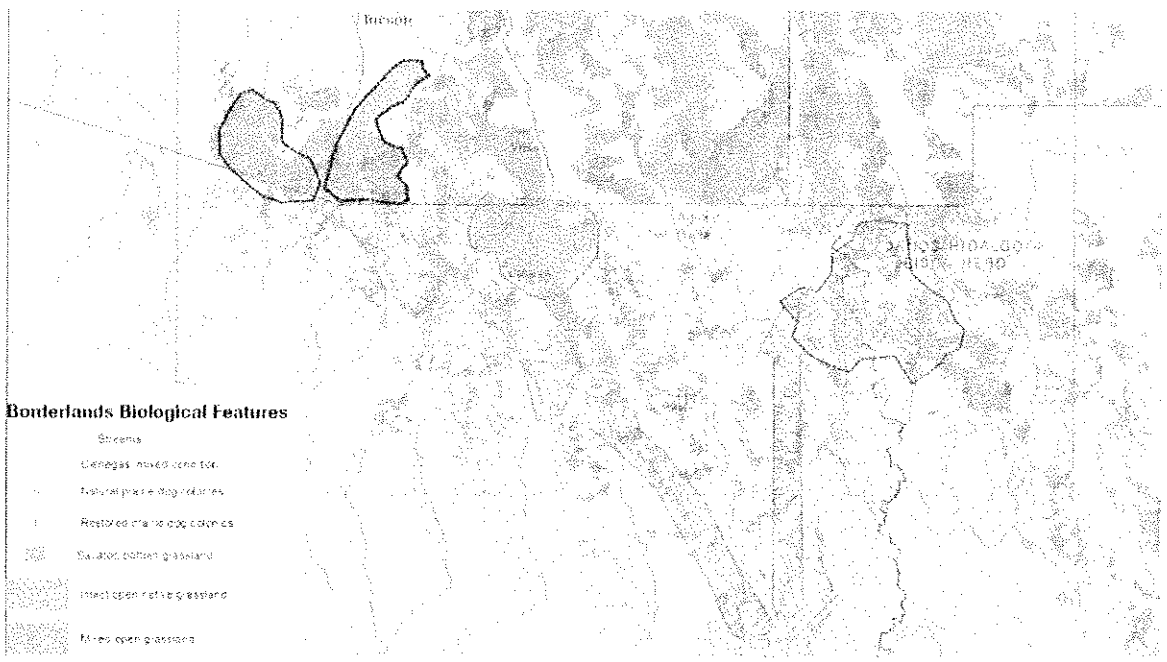
The key to ensuring the survival of the unique biological diversity of the Sky Islands region is protecting the migratory corridors linking the otherwise isolated mountain ranges. Predominately north-south oriented mountain ranges and their parallel river valleys form natural corridors of movement from northern Mexico into the United States for many animal species. Even plant species and many less mobile animals enter the U.S., albeit over intergenerational timescales, via a series of stepping stones connecting the Sky Islands to the Sierra Madre Occidental massif. In some cases, the rates of migration of less mobile species are so low and the periods of temporary connections between mountain ranges so infrequent, endemic taxa have been spawned by the repeated process of isolation and speciation. For the majority of species, however, the individual mountain ranges harbor small, isolated populations that are occasionally connected by gene flow and population rescue from nearby ranges.

Because they often exist as small populations on the edge of their geographic ranges and in isolated mountain ranges, an unusual proportion of Sky Island species are rare and many are considered imperiled. An analysis of the NatureServe Species at Risk (G1 to G3 and T1-T3 rankings) for every county in Arizona and New Mexico reveals that Santa Cruz County, Arizona has the highest density (species/area) of at-risk species and that neighboring Cochise County ranks second. In general, counties along the US-Mexico border have disproportionately more species, and those counties containing cross-border mountain ranges are especially rich in rare species.

This brief white paper makes the case for a major bi-national effort, tentatively called the *Sky Island Corridor Initiative*, to protect the unique biological diversity of southern Arizona and New Mexico and adjacent areas of northern Mexico by protecting two primary migratory corridors linking the Sky Islands to the northern Sierra Madre Occidental as well as a number of strategically selected secondary corridors linking the Sky Islands to one another. The Sky Island Corridor Initiative will require a substantial source of funding for land purchases, restoration, community engagement, and other conservation actions.

Biological Corridors and Community Connections

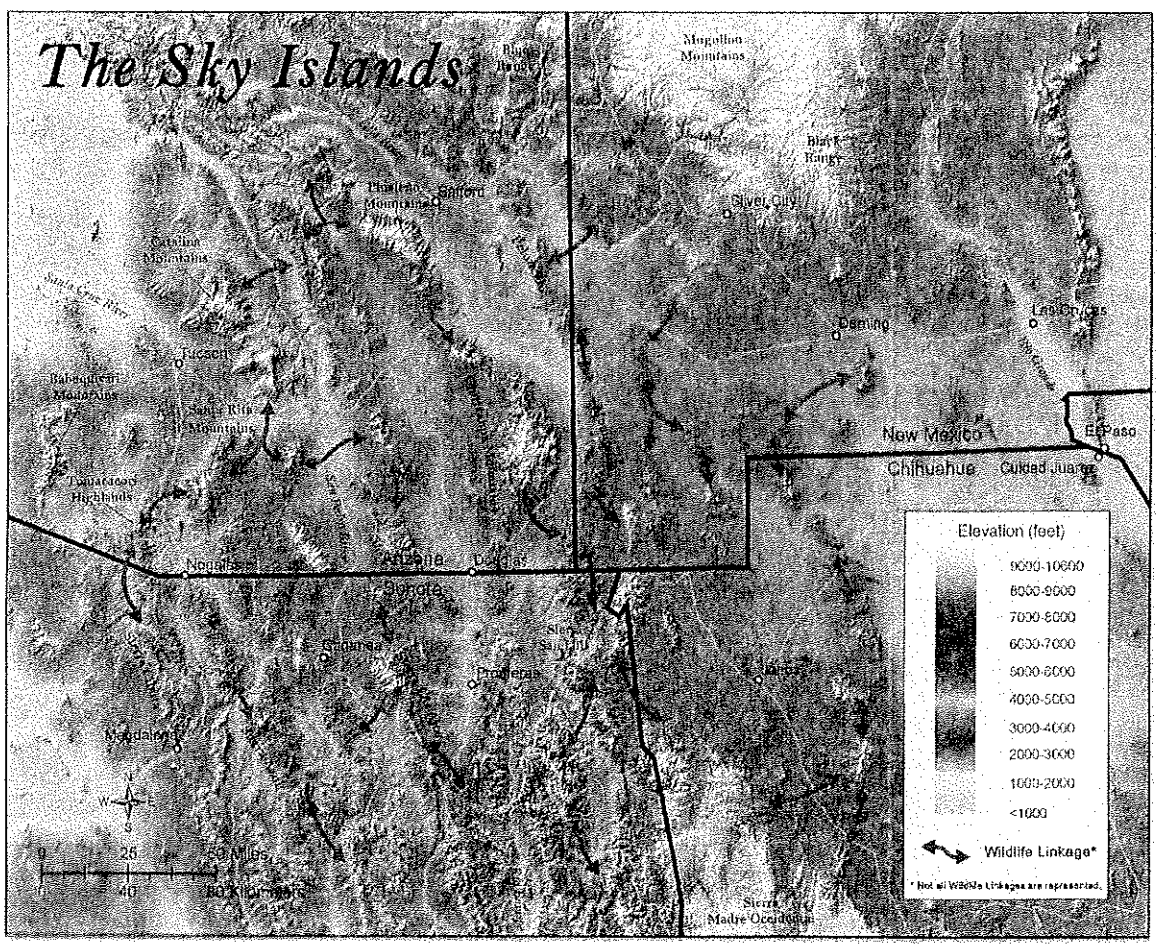
Biologists have long recognized the connections between the biological diversity of the Sky Islands and that of the Sierra Madre Occidental massif to the south and have repeatedly called for the protection of the corridors linking the Sky Islands to one another and to the Sierra Madre. No fewer than five regional plans, all with the same message, have been prepared by various conservation organizations seeking to protect the biological heritage of the region. The message of each plan is fundamentally the same: in order to protect the biodiversity of the region, linkages among the Sky Islands and between them and the highlands of the Sierra Madre must be protected.



The exceptionally high diversity of plants and animals of the U.S. Sky Islands results from natural corridors linking the isolated mountain ranges of southeastern Arizona and southwestern N.M. to the Sierra Madre massif. The map in the figure above, taken from the National Fish and Wildlife Foundation Sky Islands Grasslands Initiative Business Plan, shows two large-scale routes, referred to here as the *easterly* and *westerly macro-corridors*, originating in the Sierra Madre Occidental and trending northward towards the U.S. boundary. Although the map was

prepared to highlight important grassland areas and illustrate migratory movements of jaguar, the same routes are used by many other mobile animal species. The *easterly macro-corridor* originates in the headwaters of the Rio Bavispe and winds northward through the Sierra San Luis and Pelloncillo Mountains into the Chiricahua Mountains, and the *westerly macro-corridor* runs northward along the Sierra Los Ojos, reaching the U.S. in the Huachuca and Patagonia Mountains. In addition to these two macro-corridors, many secondary corridors stitch the landscape together, linking the various otherwise-isolated mountain ranges.

The second map (below), available from the Sky Island Alliance, identifies some of the important secondary linkages among the otherwise isolated mountain ranges. SIA has employed teams of volunteers to identify paths of animal movement by recording animal tracks along the routes between ranges. Other researchers have used genetic markers to identify important migratory corridors. The most extensive study of linkages between mountain ranges in Arizona was undertaken by Northern Arizona University. In a series of *Arizona Missing Linkages* reports, the NAU research team carefully considered the habitat requirements, dispersal, and demographic characteristics of 22 species and the physical barriers to their movement, and identified *biologically best corridors* for each species.



Many separate analyses have come to the same conclusion: the biological diversity of the individual mountain ranges is in peril if the migratory linkages among them are jeopardized. Given that many groups have come to the same conclusion and the most important linkages have been identified, one must ask why so little has been done to secure the corridors.

From Biological Knowledge to Conservation Actions

The beginnings of a Sky Island Conservation Corridor are already in place. The Ajos Bavispe and other federal reserves in northern Mexico, along with the Cuenca los Ojos properties along the easterly route and the Los Fresnos reserve along the westerly route, provide important linkages to the Sierra Madre Occidental. Several U.S. National Wildlife Refuges and designated Wilderness Areas plus additional Cuenca los Ojos ranches are isolated patches along the easterly macro-corridor into the northern Chiricahuas. Similarly, state and federally protected lands combined with various properties already under conservation easements in the San Rafael Valley and along the Santa Cruz watershed provide important bits and pieces of protected land along the westerly macro-corridor.

The existing protected areas constitute isolated pieces that need to be stitched together into a coherent whole. This need has been long recognized but progress toward the goal has been very slow. There are at least two major reasons for the lack of progress: 1) there has never been a major coordinated funding effort by the foundations and agencies at the scale necessary to address the needs of the region and 2) most of the efforts to protect land in the region have focused more on the biological issues and have not paid significant attention to the economic and cultural issues that impede conservation.

Good science is a necessary but not sufficient ingredient for good land conservation. The Sky Islands are fortunate in having attracted the scientific expertise necessary to identify the best biological corridors for connecting the isolated mountains in the region. For some corridors, the biological analysis is more or less complete, and what needs to be done now is to agree on a conservation strategy, identify sources of funding, and work at the local level to bring about concrete conservation actions. The conservation actions required will vary from location to location, but the options include engaging local citizens in local corridor planning, purchasing or acquiring easements on sensitive land, restoring wildlife habitat, mitigating barriers to wildlife movement, monitoring wildlife populations, controlling access and uses of land, easing regulatory burdens that discourage conservation, and educating the public about the importance of wildlife corridors.

Experience with large landscapes and diverse collaborative groups suggests that addressing two types of issues– values and threats – provides an explicit framework for prioritizing, in a clear and transparent manner, conservation actions. Values determine conservation targets; that is, what it is that we wish to protect. Once both values and threats are identified, strategies can be devised to protect the conservation targets in light of the threats to them. Conservation actions that are seen by group members to most effectively address the threats to the conservation targets are ranked as highest priority actions.

This framework provides a structured process for identifying areas of agreement and areas of disagreement among group members. Members may agree on values but disagree on strategies and actions or they may fundamentally disagree on values and therefore on what should and should not be protected. Such efforts often lead to greater understanding and the identification of an explicit "zone of agreement" within a diverse group with distinct values and desires for the future, and such increased understanding can lead to convergence of priorities.

The Sky Islands Corridor Initiative can sponsor both a regional Corridor Oversight Group to establish priorities among corridors and multiple local Corridor Design Groups to implement actions in the highest priority linkages. At both levels, priority-setting workshops can be used to identify joint priorities that will simultaneously drive conservation actions and inspire the confidence of all members of the collaborative groups. This does not mean that everyone must agree on every priority – it is highly likely that different members and their constituencies will have different values, different objectives, and thus somewhat different priorities. However, if the collaborative groups adopt a transparent process that all have agreed to, prior to explicitly determining all priorities, the process and its outcomes provide a foundation for agreement that is able to endure specific differences of opinion that inevitably appear.

Respecting both Science and Cultural Values

The prioritization approach outlined above is simple in concept but quite involved in execution. One of the reasons for difficulty of execution is that the discussions often become overly focused on the biophysical dimensions of the problem and ignore the social and cultural differences of the participants. The approach rarely succeeds unless diverse values, ideas, and points of view are brought to the table for respectful deliberation. Biological information and an interactive mapping capacity can provide a common ground for initiating discussion, but ultimately other values and points of view must be brought to the table and respected. A process that brings conservation practitioners together with local stakeholders with a deep personal knowledge of the landscape provides one way forward.

The landscape prioritization process is most useful if multiple values and threats are identified from the start. To begin, when considering a specific corridor design, scientists, planners, and local residents can all be asked what it is that should be protected and what the threats are to the things that need protection and what are the risks or threats associated with the potential management actions under consideration. The crucial step is allowing all participants to participate in identifying what is important to them and what the risks are. The result, as illustrated below, is almost always a list that goes beyond simply listing the biological values and threats to include diverse social and cultural values rarely considered by biologists.

What needs to be protected ?

- Rare species and habitat
- Landscape connectivity
- Recreational opportunities
- Access to public land
- Water resources
- Economic contributions
- Educational opportunities
- Health and spiritual renewal

What are the threats?

- Habitat degradation
- Loss of open spaces
- Species extirpation or extinction
- Water loss or diversion
- Loss of land/water productivity
- Hazards (fire, flooding)
- Intergenerational equity
- Regulations and legal battles

The process of identifying values and threats will bring more players to the table, lead to a wider array of management options, and can result in win-win solutions. For example, concerns that land acquisitions may limit recreational opportunities might be addressed by including access right away to public land or appropriate hiking and recreational opportunities on the acquired land. Reluctance of adjacent landowners to participate in joint management activities might be alleviated by forging Safe Harbor agreements and facilitating permits that assure landowners that their participation and success will not be punished for good behavior. Finally, appropriate agricultural and grazing uses, such as grass banking and leases for small scale farming on protected lands might result in more economic opportunities for local landowners and generate local support for long-term stewardship of the corridors.

Towards a Restoration Economy

The idea of conservation is continually evolving. Early proponents of wilderness advocated for protecting the last remnants of wilderness in the US, especially in the American West. This approach was partially successful, protecting vast acreages of pristine land and resulting in a network of National Parks and Wilderness Areas second to none. In addition to federal and state programs that created a network of protected lands, conservation organizations bought and protected large numbers of smaller sites of exceptional conservation value, often "fencing off" properties and limiting public access to protect rare habitat and species. As wilderness dwindled and the public voiced complaints that too much land was being tied up in conservation reserves, the conservation community continued to purchase and protect ecologically sensitive lands, but also began to reach out more to neighbors. The paradigm shifted to what is now known as community-based collaborative conservation. It promotes incentives for landscape scale conservation and restoration on privately-held lands as well as on publically-held protected areas. This approach too has seen many successes and resulted both in conservation of important habitat and in greater acceptance of conservation efforts.

Over the last decade, the notion of a "restoration economy" has been taking root among the community-based conservation alliances in the West. The restoration economy includes a wide variety of economic activities that heal the land and reconnect people to the natural world. Restoring streams, rivers, forest

and grasslands provides immediate jobs and prospects for more sustainable future uses. Enhancing grassland productivity helps ranchers stay in business, improves habitat for wildlife, and keeps open land open for scenic views and wildlife viewing. Restoring streams and streamside vegetation improves wildlife habitat, provides water for towns and farms, and enhances opportunities for hikers, bikers, birders and campers. Restoring degraded agricultural lands improves wildlife habitat, builds carbon- and water-holding capacity in arable soils and provides opportunities for small scale farms and nurseries at a time when rural economies are otherwise lagging.

The restoration economy goes far beyond restoring wildlife habitat *per se*. It enhances the natural landscape, making rural areas more likely destinations for tourists and retirees. The restoration economy attracts visitors and new residents who shop in local stores in refurbished historic buildings, stay in local bed and breakfast establishments, buy from local craftsmen and artists, eat at local restaurants, and purchase supplies, gas, and services from independently-owned businesses. Organic wastes from woodcutting, wine or food production or cross-border produce brokers are used to produce compost for farms and gardens, or biodiesel fuel for vehicles. Broadly defined, the restoration economy also includes a variety of health and healing activities that restore the minds and bodies of visitors and residents alike. Health spas, natural foods markets, spiritual retreats, recreational activities, and communing with nature are all part of an economy that restores people and their connections to the natural world.

The broader point is that conservation, in general, and protecting wildlife corridors in particular, can be seen as part of a broader goal of revitalizing rural economies, and restoration of habitat for both wildlife and people should be a vital part of every regional conservation plan. Of course, we should protect more land and occasionally even fence it off to protect rare and sensitive species and habitat, but we cannot let that alone define what conservation is. Conservation, including protection of wildlife corridors, is an essential part of a bigger effort to restore rural economies, to reconnect people to the land, and to provide habitat for wildlife and people.

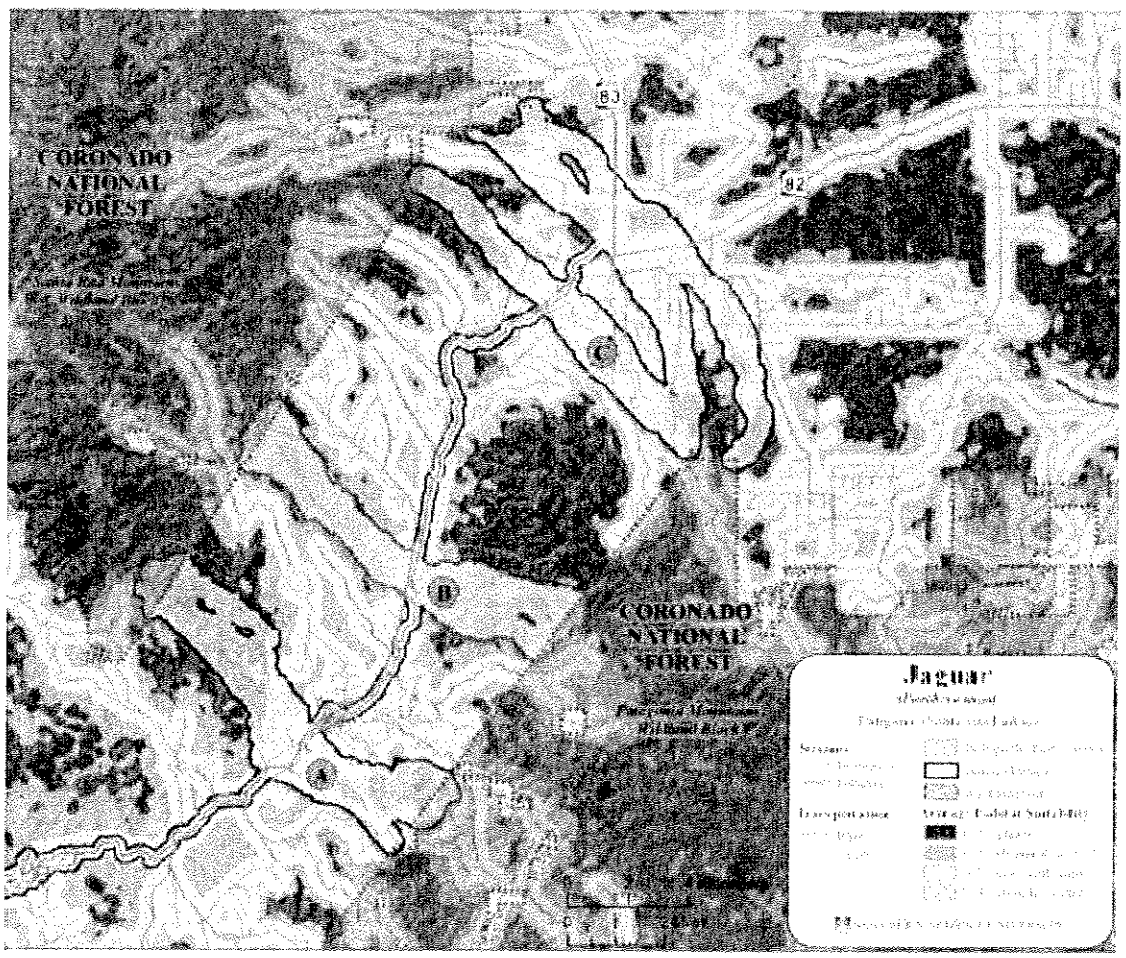
Building Corridors One Link at a Time: The Patagonia-Santa Rita Linkage

Several land trusts and conservation organizations are actively acquiring land and establishing conservation easements in the Sky Islands region. Working closely with county, state, and federal agencies, these organizations have already protected important conservation areas of considerable size. However, the protected areas are not always those of highest conservation concern and collectively, they do not necessarily form a logical corridor of protected areas.

A Conservation Lands Workshop was held November 13, 2012 in Patagonia, Arizona. The meeting was convened by Borderlands Restoration, L3C, and the attendees included the Trust for Public Land, the Arizona Land and Water Trust, the Sonoran Institute, the Sky Island Alliance, Arizona Game and Fish Department, and a number of local ranchers and other citizens. The workshop had two primary

purposes: to consider general criteria for prioritizing conservation acquisitions and easements in the upper Santa Cruz watershed, and to determine the interest in purchasing a specific parcel of land, the Sonoita Creek Ranch, that had already been identified as one of highest priorities of several state agencies and conservation groups.

The Patagonia-Santa Rita linkage is one of 16 priority corridors thoroughly analyzed by the NAU Arizona Missing Linkages program. The NAU study compared alternatate routes linking the Patagonia and Santa Rita mountains (see map below) and thoroughly analyzed the value of each route as a wildlife corridor. As with many other important linkages, the Patagonia-Santa Rita linkage has been thoroughly analyzed but little has been done, so far, to protect the corridor. We now need to move from scientific analysis to conservation action.



The 1125 acre Sonoita Creek Ranch occupies a strategic position linking the Patagonia Mountains to the Santa Rita Mountains encompassing of the East side of Corridor B in the map above. The property abuts Forest Service land to the east and it shares frontage on AZ 82 with an existing conservation easement that adjoins Forest Service land to the west. The property has abundant wildlife, three federally-listed endangered or threatened species and a large number of candidate and other species at risk. The property is one of the last remaining un-subdivided

tracts between Sonoita and Patagonia and has very low housing density. The property has 544 acre feet of water rights to Monkey Springs, one of the largest freshwater springs in southeastern Arizona. A portion of the land is irrigated for farming, and the land has high value as grazed pasture and for small scale agriculture and could be an important recreational site and provide access to nearly Forest service land for hunters, hikers, and wildlife viewers. At the meeting, several groups expressed strong interest in finding a way to purchase the land under a conservation easement, and those discussions are continuing with the next step being a design charette planned for early 2013.

The focus on the Sonoita Creek Ranch at the Patagonia meeting had several purposes. First and foremost, it led to discussions that may culminate in the protection of a critical wildlife corridor that is currently under serious threat. A subdivision is currently under construction immediately to the north, lots are already for sale in a subdivision immediately to the south, and the Three Canyons subdivisions across highway 82 is moving out of bankruptcy and beginning to reorganize. The northern end of the Three Canyons Subdivision already has over 600 acres of undeveloped land under a conservation easement and together with Sonoita Creek Ranch provides the prospect of an unbroken corridor linking the Patagonia Mountain Wildland Block of the Coronado National Forest to the Santa Rita Wildland Block of the Forest.

Secondly, the Sonoita Creek Ranch illustrates that what is best corridor for one species is not necessarily best for all species and that land acquisition is not always the best option for protecting corridors. The NAU Arizona Missing Linkages study the identified the species most likely to use each of the corridors shown on the map, concluding, for example, that corridor B is the best biological corridor for jaguar A in the Patagonia –Santa Rita linkage but that linkage A is the best biological corridor for Coue's white tailed deer and badger. This means that acquiring the Sonoita Creek Ranch alone is not enough and a comprehensive strategy is needed to prioritize appropriate conservation actions in all of the alternative corridors. Corridors A and C are much more populated with homes than Corridor B, and outright acquisition of the corridors is not a viable option. However, most of the landowners in the affected area are conservation minded, some are already volunteers for local habitat restoration projects, and others have expressed strong interest in participating in a corridor planning effort. The setting is right for establishing a Patagonia-Santa Rita Corridor Design Group and for crafting a strategy that protects the wildlife corridors while being respectful of the values and threats seen by the local landowners.

The collective group attending the November meeting in Patagonia has a strong interest in acquiring the Sonoita Creek Ranch as the centerpiece of a Patagonia-Santa Rita Corridor but none of the participating groups has the ability to move quickly despite the eminent threats. This is, of course, in part due to the high price of the land and the fact that each group is already pursuing other conservation acquisition and easement opportunities that are tying up their resources. The owners of Sonoita Creek Ranch previously had it on the market for $6.2M, and with the need to purchase some adjacent property and establish a comprehensive corridor strategy, the deal could easily require $7M to $8M+ to

complete, not including the costs of restoration, operations, and management after acquisition. The participants in the meeting all expressed interest in a more comprehensive approach to regional conservation planning that identifies high priorities for conservation acquisitions and provides bridge funding for immediate acquisition of high priority lands under immediate threat.

The Sonoita Creek Ranch also provides a potential model for both acquiring conservation land that contributes to the local restoration economy and for pioneering new ways to finance landscape scale conservation. The water rights associated with the land provide an opportunity to restore a highly degraded habitat that once was home to many now threatened and endangered species. Stream restoration provides an opportunity to acquire acquisition and restoration funding from mitigation funds associated with section 404 permits under the Clean Water Act. Water rights to Monkey Springs combined with upstream water harvesting projects that slow runoff and favor infiltration can provide water to reconstruct up to several miles of meandering stream, where a channelized, flood-prone dry stream bed now occurs.

A study has been initiated by USGS scientist Dr. Laura Norman to quantify surface flows and sediment deposition in the drainages that converge on the Sonoita Creek Ranch. The study will permit identification of upstream restoration sites that will be most effective at promoting water infiltration and bringing surface flows back to Sonoita Creek. The Borderlands Habitat Restoration Initiative, sponsored in part by Borderlands Restoration, L3C, is already working on three restoration sites on private land in the Sonoita Creek watershed and is prepared to initiate many more habitat restoration and water harvesting projects in the watershed.

An increase in surface and ground water from water-harvesting projects upstream from Sonoita Creek Ranch combined with the re-purposed water from Monkey Springs will improve wildlife habitat while providing water for small scale crop production and grass banking for local ranchers. Income from leasing water, farm, and grazing rights will provide a permanent source of income for the maintenance and operation of the ranch under a permanent conservation easement.

We are currently analyzing the financing options for the acquisition and operations of the Sonoita Creek Ranch. Preliminary analysis suggests the feasibility of approximately 1/3 from philanthropy, 1/3 from "slow money" equity investors or foundation program related investments (PRIs), and 1/3 from mitigation funds. An initial "slow money" investment of $2M could return a 4 to 5% annual dividend to investors. A document outlining the potential income from farm and ranch income activities is under preparation.

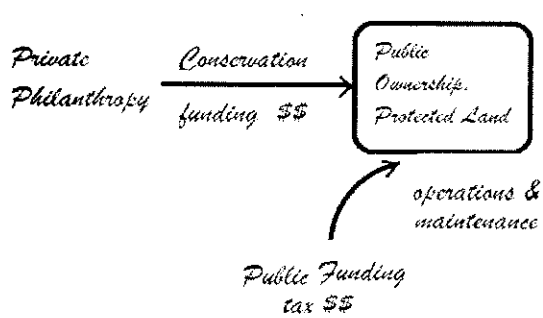
A Collaborative-Conservation Partnership: The Sky Island Corridor Initiative

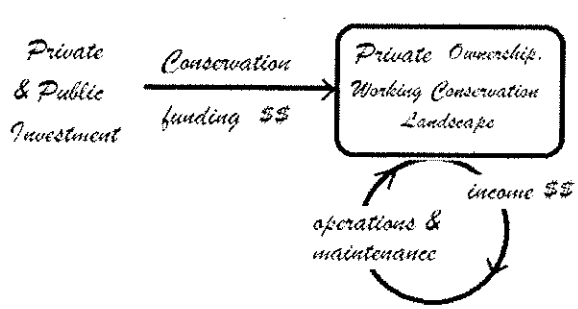
The time is ripe for a Sky Island Corridor Initiative because the science is largely in place, the beginning of a network of protected lands is already emerging,

and the opportunities to protect crucial corridors between the existing protected lands are rapidly vanishing. The collaborative conservation model—largely forged in the U.S. through Arizona-based alliances like Malpai Borderlands Group, Diablo Trust and Altar Valley Conservation Alliance—has brought maturity and empathy to discussions among ranchers, farmers, conservation biologists and environmental activists, and provides a model for the current initiative.

To be successful, the Sky Island Corridor Initiative must be large enough to focus attention of the conservation community and to link the Sky Islands to the Sierra Madre Occidental. A network of twenty plus new projects, each roughly the size of the Patagonia-Santa Rita example and all strategically tied to the existing network of conservation sites, is required. A Sky Island Corridor Initiative with the core funding on the order of $50 to $80M over ten years could be leveraged 3:1 to protect upwards of 100,000 acres of land on both sides of the border and in both of the macro-corridors identified. Working from a list of priority linkages established by the Corridor Oversight Group, participating organizations could establish local Corridor Design Groups, and compete in an open peer-reviewed process for funds that can only be spent in the priority corridors. The review process can be used to choose the best proposals and ensure that the collection of properties protected add up to macro-corridor protection.

The Sky Island Corridor Initiative should be open to the entire conservation community and should encourage a mixture of tried and true and new, innovative models for financing conservation at a landscape scale. The diagram below on the left is a caricature of the "old" model of conservation whereby philanthropic dollars are used to purchase land that is transferred to public ownership and the burden of operation and maintenance is assumed by taxpayers. The "new" model on the right uses a mixture of private investment and public funds for the purchase of land, restores the productivity of the land and supports conservation operations on the purchased property and adjacent land from the income stream generated by sustainable business activities on the protected land. The goal of the new model is to eventually reach a stage where *conservation mostly pays for itself by attracting investment capital and results in more protected land while offering modest returns on investment.*





The advantage of the new model is that it depends less on limited philanthropic and tax subsidy and allows limited conservation dollars to be stretched further. The approach may or may not reach the stage of paying for itself entirely, but the further it moves in that direction, the more land and species can be protected.

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This white paper has been prepared by Borderlands Restoration, L3C. We believe that, as a limited-profit company, with an explicit land protection and restoration mission combined with the ability to attract investment dollars, we are in an excellent position to participate in the new model of land acquisition outlined above. However, we also recognize that the new model, that we call the L3C equity investment model, has not been thoroughly tried and that there will always be a need for a variety of approaches and financing mechanisms for acquiring land and establishing conservation easements. We propose, therefore, that the fund be established for a Sky Island Corridor Initiative, that the fund be open to receive proposals from the entire conservation community, and that the L3C equity investment model be given a chance to compete alongside, and in collaboration with, more traditional land trust and conservation approaches. The funding community can then judge, based on the conservation results achieved, what role the new L3C equity investment model might play in future large-scale conservation efforts.

Rosemont SGCN HabitMap Query 11-12

"Grid ID"	"Taxa"	"Common"	"Scientific"	"Tier"
"31478"	"Amphibian"	"Chiricahua Leopard Frog"	"Rana chiricahuensis"	"1a"
"31478"	"Amphibian"	"Tarahumara Frog"	"Rana tarahumarae"	"1a"
"31478"	"Amphibian"	"Lowland Leopard Frog"	"Rana yavapaiensis"	"1a"
"31478"	"Amphibian"	"Sonoran Desert Toad"	"Bufo alvarius"	"1b"
"31478"	"Amphibian"	"Barking Frog"	"Craugastor augusti"	"1b"
"31478"	"Bird"	"Sprague's Pipit"	"Anthus spragueii"	"1a"
"31478"	"Bird"	"American Peregrine Falcon"	"Falco peregrinus anatum"	"1a"
"31478"	"Bird"	"Mexican Spotted Owl"	"Strix occidentalis lucida"	"1a"
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"31478"	"Bird"	"Gilded Flicker"	"Colaptes chrysoides"	"1b"
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"31478"	"Bird"	"Yellow Warbler"	"Dendroica petechia"	"1b"
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"31703" "Amphibian" "Chiricahua Leopard Frog" "Rana chiricahuensis" "1a"

"31703" "Amphibian" "Tarahumara Frog" "Rana tarahumarae" "1a"
"31703" "Amphibian" "Lowland Leopard Frog" "Rana yavapaiensis" "1a"
"31703" "Amphibian" "Sonoran Desert Toad" "Bufo alvarius" "1b"
"31703" "Amphibian" "Barking Frog" "Craugastor augusti" "1b"
"31703" "Bird" "Sprague's Pipit" "Anthus spragueii" "1a"
"31703" "Bird" "Western Yellow-billed Cuckoo" "Coccyzus americanus occidentalis" "1a"
"31703" "Bird" "Southwestern Willow Flycatcher" "Empidonax traillii extimus" "1a"
"31703" "Bird" "American Peregrine Falcon" "Falco peregrinus anatum" "1a"

"31703" "Bird" "Bald Eagle" "Haliaeetus leucocephalus" "1a"
"31703" "Bird" "Mexican Spotted Owl" "Strix occidentalis lucida" "1a"
"31703" "Bird" "Wood Duck" "Aix sponsa" "1b"
"31703" "Bird" "Arizona Grasshopper Sparrow" "Ammodramus savannarum ammolegus" "1b"
"31703" "Bird" "Western Grasshopper Sparrow" "Ammodramus savannarum perpallidus" "1b"
"31703" "Bird" "Violet-crowned Hummingbird" "Amazilia violiceps" "1b"
"31703" "Bird" "Golden Eagle" "Aquila chrysaetos" "1b"
"31703" "Bird" "Western Burrowing Owl" "Athene cunicularia hypugaea" "1b"
"31703" "Bird" "Ferruginous Hawk" "Buteo regalis" "1b"
"31703" "Bird" "Buff-collared Nightjar" "Caprimulgus ridgwayi" "1b"
"31703" "Bird" "Common Nighthawk" "Chordeiles minor" "1b"
"31703" "Bird" "Gilded Flicker" "Colaptes chrysoides" "1b"
"31703" "Bird" "Broad-billed Hummingbird" "Cynanthus latirostris" "1b"
"31703" "Bird" "Yellow Warbler" "Dendroica petechia" "1b"
"31703" "Bird" "Northern Buff-breasted Flycatcher" "Empidonax fulvifrons pygmaeus" "1b"
"31703" "Bird" "Mountain Pygmy-Owl" "Glaucidium gnoma gnoma" "1b"
"31703" "Bird" "Yellow-eyed Junco" "Junco phaeonotus" "1b"
"31703" "Bird" "Blue-throated Hummingbird" "Lampornis clemenciae" "1b"
"31703" "Bird" "Gould's Turkey" "Meleagris gallopavo mexicana" "1b"
"31703" "Bird" "Lincoln's Sparrow" "Melospiza lincolnii" "1b"
"31703" "Bird" "Whiskered Screech-Owl" "Megascops trichopsis" "1b"
"31703" "Bird" "Gila Woodpecker" "Melanerpes uropygialis" "1b"
"31703" "Bird" "Sulphur-bellied Flycatcher" "Myiodynastes luteiventris" "1b"

"31703" "Bird" "Dusky-capped Flycatcher" "Myiarchus tuberculifer" "1b"

"31703" "Bird" "Savannah Sparrow" "Passerculus sandwichensis" "1b"
"31703" "Bird" "Arizona Botteri's Sparrow" "Peucaea botterii arizonae" "1b"

"31703" "Bird" "Arizona Woodpecker" "Picoides arizonae" "1b"
"31703" "Bird" "Desert Purple Martin" "Progne subis hesperia" "1b"
"31703" "Bird" "Azure Bluebird" "Sialia sialis fulva" "1b"
"31703" "Bird" "Elegant Trogon" "Trogon elegans" "1b"
"31703" "Bird" "Pacific Wren" "Troglodytes pacificus" "1b"
"31703" "Bird" "Arizona Bell's Vireo" "Vireo bellii arizonae" "1b"
"31703" "Fish" "Gila Chub" "Gila intermedia" "1a"
"31703" "Fish" "Gila Topminnow" "Poeciliopsis occidentalis occidentalis" "1a"

"31703" "Fish" "Longfin Dace" "Agosia chrysogaster" "1b"
"31703" "Mammal" "Black-tailed Prairie Dog" "Cynomys ludovicianus" "1a"

"31703" "Mammal" "Ocelot" "Leopardus pardalis" "1a"
"31703" "Mammal" "Lesser Long-nosed Bat" "Leptonycteris yerbabuenae" "1a"

"31703" "Mammal" "Jaguar" "Panthera onca" "1a"
"31703" "Mammal" "Harris' Antelope Squirrel" "Ammospermophilus harrisii" "1b"
"31703" "Mammal" "Pale Townsend's Big-eared Bat" "Corynorhinus townsendii pallescens" "1b"
"31703" "Mammal" "Banner-tailed Kangaroo Rat" "Dipodomys spectabilis" "1b"

"31703" "Mammal" "Spotted Bat" "Euderma maculatum" "1b"
"31703" "Mammal" "Greater Western Mastiff Bat" "Eumops perotis californicus" "1b"
"31703" "Mammal" "Western Red Bat" "Lasiurus blossevillii" "1b"
"31703" "Mammal" "Western Yellow Bat" "Lasiurus xanthinus" "1b"
"31703" "Mammal" "Antelope Jackrabbit" "Lepus alleni" "1b"
"31703" "Mammal" "Arizona Myotis" "Myotis occultus" "1b"
"31703" "Mammal" "Cave Myotis" "Myotis velifer" "1b"
"31703" "Mammal" "Yuma Myotis" "Myotis yumanensis" "1b"
"31703" "Mammal" "Cockrum's Desert Shrew" "Notiosorex cockrumi" "1b"

"31703" "Mammal" "Pocketed Free-tailed Bat" "Nyctinomops femorosaccus" "1b"
"31703" "Mammal" "Coues whitetail deer" "Odocoileus virginianus couesi" "1b"

"31703" "Mammal" "Arizona Pocket Mouse" "Perognathus amplus" "1b"
"31703" "Mammal" "Arizona Gray Squirrel" "Sciurus arizonensis" "1b"
"31703" "Mammal" "Mexican Free-tailed Bat" "Tadarida brasiliensis" "1b"

"31703" "Mammal" "Southern Pocket Gopher" "Thomomys umbrinus intermedius" "1b"
"31703" "Mammal" "Kit Fox" "Vulpes macrotis" "1b"
"31703" "Reptile" "Rock Rattlesnake" "Crotalus lepidus" "1a"
"31703" "Reptile" "Ridge-nosed Rattlesnake" "Crotalus willardi" "1a"

"31703" "Reptile" "Gila Monster" "Heloderma suspectum" "1a"
"31703" "Reptile" "Ornate Box Turtle" "Terrapene ornata" "1a"
"31703" "Reptile" "Northern Mexican Gartersnake" "Thamnophis eques megalops" "1a"
"31703" "Reptile" "Tiger Rattlesnake" "Crotalus tigris" "1b"
"31703" "Reptile" "Hooded Nightsnake" "Hypsiglena species novum" "1b"

"31703" "Reptile" "Sonora Mud Turtle" "Kinosternon sonoriense sonoriense" "1b"
"31703" "Reptile" "Sonoran Whipsnake" "Masticophis bilineatus" "1b"

"31703" "Reptile" "Sonoran Coralsnake" "Micruroides euryxanthus" "1b"

"31703" "Reptile" "Slevin's Bunchgrass Lizard" "Sceloporus slevini" "1b"

"31703" "Reptile" "Green Ratsnake" "Senticolis triaspis" "1b"
"31703" "Reptile" "Chihuahuan Black-headed Snake" "Tantilla wilcoxi" "1b"

"31703" "Reptile" "Yaqui Black-headed Snake" "Tantilla yaquia" "1b"

"31479" "Amphibian" "Chiricahua Leopard Frog" "Rana chiricahuensis" "1a"

"31479" "Amphibian" "Tarahumara Frog" "Rana tarahumarae" "1a"
"31479" "Amphibian" "Lowland Leopard Frog" "Rana yavapaiensis" "1a"
"31479" "Amphibian" "Sonoran Desert Toad" "Bufo alvarius" "1b"

"31479" "Amphibian" "Barking Frog" "Craugastor augusti" "1b"
"31479" "Bird" "Sprague's Pipit" "Anthus spragueii" "1a"
"31479" "Bird" "American Peregrine Falcon" "Falco peregrinus anatum" "1a"

"31479" "Bird" "Mexican Spotted Owl" "Strix occidentalis lucida" "1a"
"31479" "Bird" "Arizona Grasshopper Sparrow" "Ammodramus savannarum ammolegus" "1b"
"31479" "Bird" "Western Grasshopper Sparrow" "Ammodramus savannarum perpallidus" "1b"
"31479" "Bird" "Violet-crowned Hummingbird" "Amazilia violiceps" "1b"
"31479" "Bird" "Golden Eagle" "Aquila chrysaetos" "1b"
"31479" "Bird" "Western Burrowing Owl" "Athene cunicularia hypugaea" "1b"
"31479" "Bird" "Ferruginous Hawk" "Buteo regalis" "1b"
"31479" "Bird" "Buff-collared Nightjar" "Caprimulgus ridgwayi" "1b"
"31479" "Bird" "Common Nighthawk" "Chordeiles minor" "1b"
"31479" "Bird" "Gilded Flicker" "Colaptes chrysoides" "1b"
"31479" "Bird" "Broad-billed Hummingbird" "Cynanthus latirostris" "1b"
"31479" "Bird" "Yellow Warbler" "Dendroica petechia" "1b"
"31479" "Bird" "Mountain Pygmy-Owl" "Glaucidium gnoma gnoma" "1b"
"31479" "Bird" "Blue-throated Hummingbird" "Lampornis clemenciae" "1b"
"31479" "Bird" "Gould's Turkey" "Meleagris gallopavo mexicana" "1b"
"31479" "Bird" "Lincoln's Sparrow" "Melospiza lincolnii" "1b"
"31479" "Bird" "Whiskered Screech-Owl" "Megascops trichopsis" "1b"
"31479" "Bird" "Gila Woodpecker" "Melanerpes uropygialis" "1b"
"31479" "Bird" "Savannah Sparrow" "Passerculus sandwichensis" "1b"
"31479" "Bird" "Arizona Botteri's Sparrow" "Peucaea botterii arizonae" "1b"

"31479" "Bird" "Arizona Woodpecker" "Picoides arizonae" "1b"
"31479" "Bird" "Azure Bluebird" "Sialia sialis fulva" "1b"
"31479" "Bird" "Elegant Trogon" "Trogon elegans" "1b"
"31479" "Bird" "Arizona Bell's Vireo" "Vireo bellii arizonae" "1b"
"31479" "Mammal" "Black-tailed Prairie Dog" "Cynomys ludovicianus" "1a"

"31479" "Mammal" "Ocelot" "Leopardus pardalis" "1a"
"31479" "Mammal" "Lesser Long-nosed Bat" "Leptonycteris yerbabuenae" "1a"

"31479" "Mammal" "Jaguar" "Panthera onca" "1a"
"31479" "Mammal" "Harris' Antelope Squirrel" "Ammospermophilus harrisii" "1b"
"31479" "Mammal" "Pale Townsend's Big-eared Bat" "Corynorhinus townsendii pallescens" "1b"
"31479" "Mammal" "Banner-tailed Kangaroo Rat" "Dipodomys spectabilis" "1b"

"31479" "Mammal" "Spotted Bat" "Euderma maculatum" "1b"
"31479" "Mammal" "Greater Western Mastiff Bat" "Eumops perotis californicus" "1b"
"31479" "Mammal" "Western Red Bat" "Lasiurus blossevillii" "1b"
"31479" "Mammal" "Western Yellow Bat" "Lasiurus xanthinus" "1b"
"31479" "Mammal" "Antelope Jackrabbit" "Lepus alleni" "1b"
"31479" "Mammal" "Arizona Myotis" "Myotis occultus" "1b"
"31479" "Mammal" "Cave Myotis" "Myotis velifer" "1b"
"31479" "Mammal" "Yuma Myotis" "Myotis yumanensis" "1b"
"31479" "Mammal" "Cockrum's Desert Shrew" "Notiosorex cockrumi" "1b"

"31479" "Mammal" "Pocketed Free-tailed Bat" "Nyctinomops femorosaccus" "1b"
"31479" "Mammal" "Coues whitetail deer" "Odocoileus virginianus couesi" "1b"

"31479" "Mammal" "Arizona Pocket Mouse" "Perognathus amplus" "1b"
"31479" "Mammal" "Mexican Free-tailed Bat" "Tadarida brasiliensis" "1b"

"31479" "Mammal" "Southern Pocket Gopher" "Thomomys umbrinus intermedius" "1b"

"31479" "Mammal" "Kit Fox" "Vulpes macrotis" "1b"
"31479" "Reptile" "Rock Rattlesnake" "Crotalus lepidus" "1a"
"31479" "Reptile" "Gila Monster" "Heloderma suspectum" "1a"
"31479" "Reptile" "Ornate Box Turtle" "Terrapene ornata" "1a"
"31479" "Reptile" "Northern Mexican Gartersnake" "Thamnophis eques megalops" "1a"
"31479" "Reptile" "Tiger Rattlesnake" "Crotalus tigris" "1b"
"31479" "Reptile" "Hooded Nightsnake" "Hypsiglena species novum" "1b"
"31479" "Reptile" "Sonoran Whipsnake" "Masticophis bilineatus" "1b"
"31479" "Reptile" "Sonoran Coralsnake" "Micruroides euryxanthus" "1b"
"31479" "Reptile" "Slevin's Bunchgrass Lizard" "Sceloporus slevini" "1b"
"31479" "Reptile" "Green Ratsnake" "Senticolis triaspis" "1b"
"31479" "Reptile" "Chihuahuan Black-headed Snake" "Tantilla wilcoxi" "1b"
"31479" "Reptile" "Yaqui Black-headed Snake" "Tantilla yaquia" "1b"
"31593" "Amphibian" "Chiricahua Leopard Frog" "Rana chiricahuensis" "1a"
"31593" "Amphibian" "Tarahumara Frog" "Rana tarahumarae" "1a"
"31593" "Amphibian" "Lowland Leopard Frog" "Rana yavapaiensis" "1a"
"31593" "Amphibian" "Sonoran Desert Toad" "Bufo alvarius" "1b"
"31593" "Amphibian" "Barking Frog" "Craugastor augusti" "1b"
"31593" "Bird" "Sprague's Pipit" "Anthus spragueii" "1a"
"31593" "Bird" "American Peregrine Falcon" "Falco peregrinus anatum" "1a"
"31593" "Bird" "Mexican Spotted Owl" "Strix occidentalis lucida" "1a"
"31593" "Bird" "Arizona Grasshopper Sparrow" "Ammodramus savannarum ammolegus" "1b"
"31593" "Bird" "Western Grasshopper Sparrow" "Ammodramus savannarum perpallidus" "1b"
"31593" "Bird" "Violet-crowned Hummingbird" "Amazilia violiceps" "1b"
"31593" "Bird" "Golden Eagle" "Aquila chrysaetos" "1b"
"31593" "Bird" "Western Burrowing Owl" "Athene cunicularia hypugaea" "1b"
"31593" "Bird" "Ferruginous Hawk" "Buteo regalis" "1b"
"31593" "Bird" "Buff-collared Nightjar" "Caprimulgus ridgwayi" "1b"
"31593" "Bird" "Common Nighthawk" "Chordeiles minor" "1b"
"31593" "Bird" "Gilded Flicker" "Colaptes chrysoides" "1b"
"31593" "Bird" "Broad-billed Hummingbird" "Cynanthus latirostris" "1b"
"31593" "Bird" "Yellow Warbler" "Dendroica petechia" "1b"
"31593" "Bird" "Mountain Pygmy-Owl" "Glaucidium gnoma gnoma" "1b"
"31593" "Bird" "Blue-throated Hummingbird" "Lampornis clemenciae" "1b"
"31593" "Bird" "Gould's Turkey" "Meleagris gallopavo mexicana" "1b"
"31593" "Bird" "Lincoln's Sparrow" "Melospiza lincolnii" "1b"
"31593" "Bird" "Whiskered Screech-Owl" "Megascops trichopsis" "1b"
"31593" "Bird" "Gila Woodpecker" "Melanerpes uropygialis" "1b"
"31593" "Bird" "Savannah Sparrow" "Passerculus sandwichensis" "1b"
"31593" "Bird" "Arizona Botteri's Sparrow" "Peucaea botterii arizonae" "1b"
"31593" "Bird" "Arizona Woodpecker" "Picoides arizonae" "1b"
"31593" "Bird" "Azure Bluebird" "Sialia sialis fulva" "1b"
"31593" "Bird" "Elegant Trogon" "Trogon elegans" "1b"
"31593" "Bird" "Arizona Bell's Vireo" "Vireo bellii arizonae" "1b"
"31593" "Mammal" "Black-tailed Prairie Dog" "Cynomys ludovicianus" "1a"
"31593" "Mammal" "Ocelot" "Leopardus pardalis" "1a"
"31593" "Mammal" "Lesser Long-nosed Bat" "Leptonycteris yerbabuenae" "1a"
"31593" "Mammal" "Jaguar" "Panthera onca" "1a"
"31593" "Mammal" "Harris' Antelope Squirrel" "Ammospermophilus harrisii"

"1b"
"31593" "Mammal" "Pale Townsend's Big-eared Bat" "Corynorhinus townsendii pallescens" "1b"
"31593" "Mammal" "Banner-tailed Kangaroo Rat" "Dipodomys spectabilis" "1b"

"31593" "Mammal" "Spotted Bat" "Euderma maculatum" "1b"
"31593" "Mammal" "Greater Western Mastiff Bat" "Eumops perotis californicus" "1b"
"31593" "Mammal" "Western Red Bat" "Lasiurus blossevillii" "1b"
"31593" "Mammal" "Western Yellow Bat" "Lasiurus xanthinus" "1b"
"31593" "Mammal" "Antelope Jackrabbit" "Lepus alleni" "1b"
"31593" "Mammal" "Arizona Myotis" "Myotis occultus" "1b"
"31593" "Mammal" "Cave Myotis" "Myotis velifer" "1b"
"31593" "Mammal" "Yuma Myotis" "Myotis yumanensis" "1b"
"31593" "Mammal" "Cockrum's Desert Shrew" "Notiosorex cockrumi" "1b"

"31593" "Mammal" "Pocketed Free-tailed Bat" "Nyctinomops femorosaccus" "1b"
"31593" "Mammal" "Coues whitetail deer" "Odocoileus virginianus couesi" "1b"

"31593" "Mammal" "Arizona Pocket Mouse" "Perognathus amplus" "1b"
"31593" "Mammal" "Mexican Free-tailed Bat" "Tadarida brasiliensis" "1b"

"31593" "Mammal" "Southern Pocket Gopher" "Thomomys umbrinus intermedius" "1b"
"31593" "Mammal" "Kit Fox" "Vulpes macrotis" "1b"
"31593" "Reptile" "Rock Rattlesnake" "Crotalus lepidus" "1a"
"31593" "Reptile" "Gila Monster" "Heloderma suspectum" "1a"
"31593" "Reptile" "Ornate Box Turtle" "Terrapene ornata" "1a"
"31593" "Reptile" "Northern Mexican Gartersnake" "Thamnophis eques megalops" "1a"
"31593" "Reptile" "Tiger Rattlesnake" "Crotalus tigris" "1b"
"31593" "Reptile" "Hooded Nightsnake" "Hypsiglena species novum" "1b"

"31593" "Reptile" "Sonoran Whipsnake" "Masticophis bilineatus" "1b"

"31593" "Reptile" "Sonoran Coralsnake" "Micruroides euryxanthus" "1b"

"31593" "Reptile" "Slevin's Bunchgrass Lizard" "Sceloporus slevini" "1b"

"31593" "Reptile" "Green Ratsnake" "Senticolis triaspis" "1b"
"31593" "Reptile" "Chihuahuan Black-headed Snake" "Tantilla wilcoxi" "1b"

"31593" "Reptile" "Yaqui Black-headed Snake" "Tantilla yaquia" "1b"

"31704" "Amphibian" "Chiricahua Leopard Frog" "Rana chiricahuensis" "1a"

"31704" "Amphibian" "Tarahumara Frog" "Rana tarahumarae" "1a"
"31704" "Amphibian" "Lowland Leopard Frog" "Rana yavapaiensis" "1a"
"31704" "Amphibian" "Sonoran Desert Toad" "Bufo alvarius" "1b"
"31704" "Bird" "Sprague's Pipit" "Anthus spragueii" "1a"
"31704" "Bird" "Western Yellow-billed Cuckoo" "Coccyzus americanus occidentalis" "1a"
"31704" "Bird" "Southwestern Willow Flycatcher" "Empidonax traillii extimus" "1a"
"31704" "Bird" "American Peregrine Falcon" "Falco peregrinus anatum" "1a"

"31704" "Bird" "Bald Eagle" "Haliaeetus leucocephalus" "1a"
"31704" "Bird" "Mexican Spotted Owl" "Strix occidentalis lucida" "1a"
"31704" "Bird" "Wood Duck" "Aix sponsa" "1b"
"31704" "Bird" "Arizona Grasshopper Sparrow" "Ammodramus savannarum ammolegus" "1b"
"31704" "Bird" "Western Grasshopper Sparrow" "Ammodramus savannarum perpallidus"

"1b"
"31704" "Bird" "Violet-crowned Hummingbird" "Amazilia violiceps" "1b"
"31704" "Bird" "Golden Eagle" "Aquila chrysaetos" "1b"
"31704" "Bird" "Western Burrowing Owl" "Athene cunicularia hypugaea" "1b"
"31704" "Bird" "Ferruginous Hawk" "Buteo regalis" "1b"
"31704" "Bird" "Buff-collared Nightjar" "Caprimulgus ridgwayi" "1b"
"31704" "Bird" "Common Nighthawk" "Chordeiles minor" "1b"
"31704" "Bird" "Gilded Flicker" "Colaptes chrysoides" "1b"
"31704" "Bird" "Broad-billed Hummingbird" "Cynanthus latirostris" "1b"
"31704" "Bird" "Yellow Warbler" "Dendroica petechia" "1b"
"31704" "Bird" "Mountain Pygmy-Owl" "Glaucidium gnoma gnoma" "1b"
"31704" "Bird" "Blue-throated Hummingbird" "Lampornis clemenciae" "1b"
"31704" "Bird" "Gould's Turkey" "Meleagris gallopavo mexicana" "1b"
"31704" "Bird" "Lincoln's Sparrow" "Melospiza lincolnii" "1b"
"31704" "Bird" "Whiskered Screech-Owl" "Megascops trichopsis" "1b"
"31704" "Bird" "Sulphur-bellied Flycatcher" "Myiodynastes luteiventris" "1b"

"31704" "Bird" "Dusky-capped Flycatcher" "Myiarchus tuberculifer" "1b"

"31704" "Bird" "Savannah Sparrow" "Passerculus sandwichensis" "1b"
"31704" "Bird" "Arizona Botteri's Sparrow" "Peucaea botterii arizonae" "1b"

"31704" "Bird" "Arizona Woodpecker" "Picoides arizonae" "1b"
"31704" "Bird" "Desert Purple Martin" "Progne subis hesperia" "1b"
"31704" "Bird" "Azure Bluebird" "Sialia sialis fulva" "1b"
"31704" "Bird" "Elegant Trogon" "Trogon elegans" "1b"
"31704" "Bird" "Pacific Wren" "Troglodytes pacificus" "1b"
"31704" "Bird" "Arizona Bell's Vireo" "Vireo bellii arizonae" "1b"
"31704" "Fish" "Gila Chub" "Gila intermedia" "1a"
"31704" "Fish" "Gila Topminnow" "Poeciliopsis occidentalis occidentalis"
"1a"
"31704" "Fish" "Longfin Dace" "Agosia chrysogaster" "1b"
"31704" "Mammal" "Black-tailed Prairie Dog" "Cynomys ludovicianus" "1a"

"31704" "Mammal" "Ocelot" "Leopardus pardalis" "1a"
"31704" "Mammal" "Lesser Long-nosed Bat" "Leptonycteris yerbabuenae" "1a"

"31704" "Mammal" "Jaguar" "Panthera onca" "1a"
"31704" "Mammal" "Pale Townsend's Big-eared Bat" "Corynorhinus townsendii
pallescens" "1b"
"31704" "Mammal" "Banner-tailed Kangaroo Rat" "Dipodomys spectabilis" "1b"

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californicus" "1b"
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"31704" "Mammal" "Arizona Myotis" "Myotis occultus" "1b"
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"31704" "Mammal" "Cockrum's Desert Shrew" "Notiosorex cockrumi" "1b"

"31704" "Mammal" "Pocketed Free-tailed Bat" "Nyctinomops femorosaccus"
"1b"
"31704" "Mammal" "Coues whitetail deer" "Odocoileus virginianus couesi" "1b"

"31704" "Mammal" "Arizona Pocket Mouse" "Perognathus amplus" "1b"
"31704" "Mammal" "Arizona Gray Squirrel" "Sciurus arizonensis" "1b"
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intermedius" "1b"
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"31704" "Reptile" "Sonoran Whipsnake" "Masticophis bilineatus" "1b"
"31704" "Reptile" "Sonoran Coralsnake" "Micruroides euryxanthus" "1b"
"31704" "Reptile" "Slevin's Bunchgrass Lizard" "Sceloporus slevini" "1b"
"31704" "Reptile" "Green Ratsnake" "Senticolis triaspis" "1b"
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"31480" "Amphibian" "Tarahumara Frog" "Rana tarahumarae" "1a"
"31480" "Amphibian" "Lowland Leopard Frog" "Rana yavapaiensis" "1a"
"31480" "Amphibian" "Sonoran Desert Toad" "Bufo alvarius" "1b"
"31480" "Amphibian" "Barking Frog" "Craugastor augusti" "1b"
"31480" "Bird" "Sprague's Pipit" "Anthus spragueii" "1a"
"31480" "Bird" "American Peregrine Falcon" "Falco peregrinus anatum" "1a"
"31480" "Bird" "Mexican Spotted Owl" "Strix occidentalis lucida" "1a"
"31480" "Bird" "Arizona Grasshopper Sparrow" "Ammodramus savannarum ammolegus" "1b"
"31480" "Bird" "Western Grasshopper Sparrow" "Ammodramus savannarum perpallidus" "1b"
"31480" "Bird" "Violet-crowned Hummingbird" "Amazilia violiceps" "1b"
"31480" "Bird" "Golden Eagle" "Aquila chrysaetos" "1b"
"31480" "Bird" "Western Burrowing Owl" "Athene cunicularia hypugaea" "1b"
"31480" "Bird" "Ferruginous Hawk" "Buteo regalis" "1b"
"31480" "Bird" "Buff-collared Nightjar" "Caprimulgus ridgwayi" "1b"
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"31480" "Bird" "Gilded Flicker" "Colaptes chrysoides" "1b"
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"31480" "Bird" "Yellow Warbler" "Dendroica petechia" "1b"
"31480" "Bird" "Mountain Pygmy-Owl" "Glaucidium gnoma gnoma" "1b"
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"31480" "Bird" "Gould's Turkey" "Meleagris gallopavo mexicana" "1b"
"31480" "Bird" "Lincoln's Sparrow" "Melospiza lincolnii" "1b"
"31480" "Bird" "Whiskered Screech-Owl" "Megascops trichopsis" "1b"
"31480" "Bird" "Gila Woodpecker" "Melanerpes uropygialis" "1b"
"31480" "Bird" "Savannah Sparrow" "Passerculus sandwichensis" "1b"
"31480" "Bird" "Arizona Botteri's Sparrow" "Peucaea botterii arizonae" "1b"
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"31480" "Bird" "Arizona Bell's Vireo" "Vireo bellii arizonae" "1b"
"31480" "Mammal" "Black-tailed Prairie Dog" "Cynomys ludovicianus" "1a"
"31480" "Mammal" "Ocelot" "Leopardus pardalis" "1a"
"31480" "Mammal" "Lesser Long-nosed Bat" "Leptonycteris yerbabuenae" "1a"
"31480" "Mammal" "Jaguar" "Panthera onca" "1a"
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"31480" "Mammal" "Banner-tailed Kangaroo Rat" "Dipodomys spectabilis" "1b"

"31480" "Mammal" "Spotted Bat" "Euderma maculatum" "1b"
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"31480" "Mammal" "Antelope Jackrabbit" "Lepus alleni" "1b"
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"31480" "Reptile" "Gila Monster" "Heloderma suspectum" "1a"
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"31480" "Reptile" "Tiger Rattlesnake" "Crotalus tigris" "1b"
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"31480" "Reptile" "Green Ratsnake" "Senticolis triaspis" "1b"
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"31480" "Reptile" "Yaqui Black-headed Snake" "Tantilla yaquia" "1b"
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"31594" "Amphibian" "Tarahumara Frog" "Rana tarahumarae" "1a"
"31594" "Amphibian" "Lowland Leopard Frog" "Rana yavapaiensis" "1a"
"31594" "Amphibian" "Sonoran Desert Toad" "Bufo alvarius" "1b"
"31594" "Bird" "Sprague's Pipit" "Anthus spragueii" "1a"
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"31594" "Bird" "Mexican Spotted Owl" "Strix occidentalis lucida" "1a"
"31594" "Bird" "Arizona Grasshopper Sparrow" "Ammodramus savannarum ammolegus" "1b"
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"31594" "Bird" "Golden Eagle" "Aquila chrysaetos" "1b"
"31594" "Bird" "Western Burrowing Owl" "Athene cunicularia hypugaea" "1b"
"31594" "Bird" "Ferruginous Hawk" "Buteo regalis" "1b"

"31594" "Bird" "Buff-collared Nightjar" "Caprimulgus ridgwayi" "1b"
"31594" "Bird" "Common Nighthawk" "Chordeiles minor" "1b"
"31594" "Bird" "Gilded Flicker" "Colaptes chrysoides" "1b"
"31594" "Bird" "Broad-billed Hummingbird" "Cynanthus latirostris" "1b"
"31594" "Bird" "Yellow Warbler" "Dendroica petechia" "1b"
"31594" "Bird" "Mountain Pygmy-Owl" "Glaucidium gnoma gnoma" "1b"
"31594" "Bird" "Blue-throated Hummingbird" "Lampornis clemenciae" "1b"
"31594" "Bird" "Gould's Turkey" "Meleagris gallopavo mexicana" "1b"
"31594" "Bird" "Lincoln's Sparrow" "Melospiza lincolnii" "1b"
"31594" "Bird" "Whiskered Screech-Owl" "Megascops trichopsis" "1b"
"31594" "Bird" "Gila Woodpecker" "Melanerpes uropygialis" "1b"
"31594" "Bird" "Savannah Sparrow" "Passerculus sandwichensis" "1b"
"31594" "Bird" "Arizona Botteri's Sparrow" "Peucaea botterii arizonae" "1b"

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"31594" "Mammal" "Jaguar" "Panthera onca" "1a"
"31594" "Mammal" "Harris' Antelope Squirrel" "Ammospermophilus harrisii" "1b"
"31594" "Mammal" "Pale Townsend's Big-eared Bat" "Corynorhinus townsendii pallescens" "1b"
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"31594" "Mammal" "Spotted Bat" "Euderma maculatum" "1b"
"31594" "Mammal" "Greater Western Mastiff Bat" "Eumops perotis californicus" "1b"
"31594" "Mammal" "Western Red Bat" "Lasiurus blossevillii" "1b"
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"31594" "Mammal" "Arizona Myotis" "Myotis occultus" "1b"
"31594" "Mammal" "Cave Myotis" "Myotis velifer" "1b"
"31594" "Mammal" "Yuma Myotis" "Myotis yumanensis" "1b"
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"31594" "Mammal" "Southern Pocket Gopher" "Thomomys umbrinus intermedius" "1b"
"31594" "Mammal" "Kit Fox" "Vulpes macrotis" "1b"
"31594" "Reptile" "Rock Rattlesnake" "Crotalus lepidus" "1a"
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"31594" "Reptile" "Slevin's Bunchgrass Lizard" "Sceloporus slevini" "1b"

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"31705" "Bird" "Violet-crowned Hummingbird" "Amazilia violiceps" "1b"
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"31705" "Bird" "Arizona Botteri's Sparrow" "Peucaea botterii arizonae" "1b"

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"31705" "Mammal" "Antelope Jackrabbit" "Lepus alleni" "1b"
"31705" "Mammal" "Arizona Myotis" "Myotis occultus" "1b"
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"31705" "Mammal" "Yuma Myotis" "Myotis yumanensis" "1b"
"31705" "Mammal" "Cockrum's Desert Shrew" "Notiosorex cockrumi" "1b"

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"31705" "Reptile" "Slevin's Bunchgrass Lizard" "Sceloporus slevini" "1b"

ROSEMONT COPPER PROJECT
CONSERVATION MEASURES SUMMARY

February 6, 2013

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INTRODUCTION

The Rosemont Copper Company (Rosemont) agrees to implement the following conservation measures for the purposes of supporting the ongoing consultation with the United States Fish and Wildlife Service (USFWS) for its Rosemont Copper Project (Project) and for the conservation of wildlife, fish, and plant species within the action area of the Project. Note that some of these measures as presented here are summaries of more detailed descriptions of conservation measures previously submitted to the Coronado National Forest (CNF) and the USFWS. The conservation measures described here are the result of ongoing discussions between the CNF, the United States Army Corps of Engineers (Corps), the USFWS, the Arizona Game and Fish Department (AGFD), Pima County, and Rosemont. These discussions have resulted in additions and revisions to earlier conservation measures identified by Rosemont and the CNF. When conflict between the measures summarized here and prior measures identified in correspondence, meeting minutes, technical reports, etc., exist, this version of the measures reflects the proposed measures to be considered by the USFWS during the development of its biological opinion. The CNF cannot require the commitment of lands as part of a mitigation or conservation program. When commitments of lands have been incorporated into these measures, they reflect commitments that have been made by Rosemont.

Within this document, "Project area" refers to the footprint of the Project as defined by the Barrel Alternative in the CNF Draft EIS for the Rosemont Project. "Action area" refers to the area identified by the CNF as the action area in its Biological Assessment for the Project. The "perimeter fence" and "security fence" boundaries identified in these conservation measures refer to those fence boundaries defined in the CNF Barrel Alternative in the Draft EIS. For ease of specialist review, ***Table 1*** is a matrix that references each of the conservation measures summarized below and the listed species and/or critical habitat benefitted.

A. GENERAL MONITORING AND REPORTING REQUIREMENTS

1. The CNF shall identify a CNF journey-level biologist (GS-9 or higher grade) to provide oversight and assess compliance with these conservation measures and any Reasonable and Prudent Measures (RPM) and Terms and Conditions of Take (T&C) that may be required by the USFWS as part of the Project's Section 7 consultation between the CNF (as lead federal agency) and the USFWS (Biological Monitor).

    1.1. Rosemont shall reimburse the CNF for the work performed by the Biological Monitor along with the overhead and supervisory support to the extent necessary to perform the duties as outlined below.

    1.2. This funded position shall also be available to support biological monitoring for listed and other non-listed species and biological resources as well as other mitigation and monitoring measures that may be required by the CNF.

    1.3. The Biological Monitor will coordinate directly with Rosemont and Rosemont's consultants on behalf of the CNF and shall be responsible for reviewing and approving submitted reports and analyses.

Table 1. Matrix of benefits to listed species and critical habitat by the proposed conservation measures described in this document

Proposed Conservation Measures	Species Listed Under the Endangered Species Act										Critical Habitat			
	Jaguar	Ocelot	Lesser long-nosed bat	Chiricahua leopard frog	Gila chub	Gila topminnow	Huachuca water umbel	Mexican spotted owl	Southwestern willow flycatcher	Pima pineapple cactus	Jaguar (Proposed)	Chiricahua leopard frog	Gila chub	Southwestern willow flycatcher
A. Monitoring and Reporting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B. Sonoita Creek Ranch	✓	✓	✓	✓	✓	✓	✓	✓			✓			
C. Cienega Creek Watershed	✓	✓		✓	✓	✓	✓		✓		✓	✓	✓	✓
D. Davidson Canyon Watershed Parcels	✓	✓	✓	✓							✓			
E. Helvetia Ranch Annex North Parcels	✓	✓	✓	✓						✓				
F. Water Features and Grazing Management	✓	✓	✓								✓	✓		
G. Chiricahua Leopard Frog Conservation Measures	✓	✓		✓							✓	✓		
H. Aquatic Species Conservation Measures	✓	✓		✓	✓	✓	✓		✓		✓	✓	✓	✓
I. Southwestern Willow Flycatcher Conservation Measures									✓					✓
J. Jaguar and Ocelot Conservation Measures	✓	✓									✓			
K. Lesser Long-nosed Bat Conservation Measures	✓	✓	✓	✓							✓	✓		
L. Pima Pineapple Cactus Conservation Measures										✓				

1.4. Initially, the level of effort anticipated to perform the role outlined above is estimated at approximately 20 percent of a Full-time Equivalent (FTE) position.

1.4.1. The funding requirements will be reviewed and updated annually, and shall continue throughout the life of the Project and for 5 years following mine closure.

1.4.2. Monitoring activities, unless specifically stated otherwise in the conservation measures described below, are anticipated to occur throughout the life of the project and for 5 years following mine closure. Rosemont and the Biological Monitor, with the USFWS, shall review the monitoring results annually. If appropriate, monitoring requirements and methods may be reduced or eliminated.

1.5. The Biological Monitor shall be Rosemont's primary point of contact with the CNF for all activities related to biological resources. The Biological Monitor will be the principal liaison with all other stakeholder agencies. Rosemont shall report significant findings, provide its

reports, etc., to the Biological Monitor rather than providing such information directly to the USFWS, the AGFD, the Bureau of Land Management (BLM), or Pima County. [This requirement shall not prohibit or limit the reporting obligations established in Rosemont's consultant's or biological contractor's scientific collecting permits or affect Rosemont's reporting obligations for any proffered Clean Water Act Section 404 permit.] The Biological Monitor will coordinate biological monitoring activities with the Rosemont Environmental Manager or other designated representative as identified by Rosemont.

2. Rosemont shall be responsible for all monitoring and reporting. The Biological Monitor will assess compliance with conservation measures through field visits and inspections, and by review of an annual monitoring report, described below.

3. Rosemont shall prepare an Annual Conservation Measure Implementation and Monitoring Report ("Annual Report") at the end of each calendar year. The Annual Report shall be due to the CNF by January 31 of the next calendar year throughout the life of the project and for 5 years post-closure. This report will include, but not be limited to, the following:

   3.1. A brief narrative or tabular description of the specific actions accomplished with regard to each specific conservation measure.

   3.2. A brief narrative or tabular description/summary of the objective of each of the conservation measures and whether the objective of that conservation measure was or was not met.

   3.3. A brief narrative or tabular description/summary of the status of concurrent reclamation efforts.

   3.4. A brief narrative or tabular description of the status of invasive species management.

   3.5. For each conservation measure, a description and summary of changes in baseline conditions (e.g., the number of water features with breeding Chiricahua leopard frogs [CLF] from previous years' surveys) will be provided.

   3.6. Amount of take of threatened and endangered species.

   3.7. A brief narrative or tabular summary of any problems, issues, and opportunities encountered in the prior calendar year with regard to the implementation of the conservation measures, RPMs, and T&Cs that may be authorized by the USFWS and other biological mitigation and monitoring measures.

   3.8. A brief narrative or summary of any adaptive management actions taken and recommendations for future adaptive management actions to be considered by Rosemont, the CNF, and the USFWS.

   3.9. Along with hard-copy reports, Rosemont will provide editable electronic files, including GIS files, in a format that can be used by the CNF. The CNF will convert editable files to un-editable files before sharing outside the agency.

4. Rosemont will ensure that anyone dealing directly with threatened and endangered species (e.g., surveys, salvage, translocation, etc.) for the Project has valid state and federal scientific collecting permits, are agents of the CNF, or have other suitable permits. Surveyors must send copies of permits with the year-end reports to the Biological Monitor as proof of compliance.

5. The CNF will reinitiate Section 7 Endangered Species Act (ESA) consultation if the CNF and the USFWS determine that the terms and conditions of the conservation measures and/or the RPMs have not been met.

B. SONOITA CREEK RANCH

Sonoita Creek Ranch is an approximately 1,200-acre ranch located about 6 miles south of Sonoita, Arizona, and approximately 2 miles north of Patagonia, Santa Cruz County, Arizona (***Figures 1 and 2***). A perennial spring, Monkey Spring, is located approximately 0.8 mile north (upstream) of the ranch and provides consistent perennial surface water to the ranch. Certificated water rights from Monkey Spring totaling approximately 590 acre-feet per annum are associated with the ranch for irrigation and stock-watering purposes. Nearly 6 acres of open water in two large ponds, including significant emergent and forested wetland and riparian components, are within the interior of the ranch connected by an earthen-lined canal conveying overflow water from the northern pond to the southern pond. Monkey Spring is the source of water for these perennial ponds. Currently, the ponds are being used by American bullfrogs (*Lithobates catesbeianus*) and exotic fish, including numerous *Centrarchidae* species.

The eastern boundary of Sonoita Creek Ranch shares a boundary with the CNF; the western boundary abuts State Route (SR) 82. The flat, broad floodplain of Sonoita Creek encompasses the western portion of the ranch; the foothills of the Canelo Hills, including Corral Canyon, are present in the eastern portion.

Specific conservation measures related to this property are provided below:

1. Rosemont has acquired the right to purchase approximately 1,200 acres of land along Sonoita Creek with ±590 acre-feet of certificated surface water rights from Monkey Spring along Sonoita Creek. These lands will be made available to the AGFD or other suitable land trust or conservation organization. The land area and water rights would afford the AGFD or other conservation organization an opportunity to develop an in-lieu fee mitigation program for impacts to waters of the U.S. in conformance with the Corps' 2008 mitigation rule and other Corps regulations. If the AGFD or other conservation partner is unable to obtain program approval from the Corps or chooses not to develop a Corps-approved in-lieu fee mitigation program at Sonoita Creek Ranch, Rosemont will be responsible for developing an applicant-sponsored 404 mitigation project at this site.

2. Rosemont will record a restrictive covenant or conservation easement on the Sonoita Creek Ranch property that precludes real estate development or similar land use activities and livestock grazing or other agricultural uses subject to the limitations outlined below. This restrictive covenant shall not restrict access for recreational or traditional cultural purposes to these lands provided that such

uses are compatible with the conservation uses of the property as determined by the Land Manager and the USFWS.[1]

3. Rosemont anticipates transferring ownership of Sonoita Creek Ranch, including the appurtenant water rights, to the AGFD or other suitable owner for conservation purposes consistent with the conservation and public benefits contemplated by these conservation measures.

4. Funding for long-term management will be provided by Rosemont via a payment of $150,000 per year to a management account for a period of 10 years commencing with the production of copper concentrates at the Project.

5. Surface water rights will be used to support the existing ponds that will be managed for CLF (*Lithobates chiricahuensis*), native fish, and Huachuca water umbel as described in greater detail below. Water available after the needs of the existing ponds have been met will be discharged onto the floodplain terrace of Sonoita Creek that is currently an agricultural field to facilitate the passive restoration of riparian habitat.

6. The two perennial ponds, adjacent wetland habitat, and earthen-lined channel between the ponds on Sonoita Creek Ranch will be renovated to provide habitat for the threatened CLF; provide the opportunity for the reintroduction of native fish, including the endangered Gila topminnow (*Poeciliopsis occidentalis occidentalis*) and the endangered Gila chub (*Gila intermedia*); and provide habitat for the endangered Huachuca water umbel (*Lilaeopsis schaffneriana* spp. *recurva*) and the opportunity for the reintroduction of this species, which currently occurs within designated critical habitat along Sonoita Creek north of Sonoita Creek Ranch.

   6.1. To remove American bullfrogs and non-native fish from the ponds, the ponds would be drained and the undesirable species removed via chemical or mechanical means.

   6.2. We anticipate that the AGFD or other approved conservation partner will implement the proposed renovation efforts. Rosemont will provide $100,000 in support of these renovation efforts. Funding for this effort will be provided by Rosemont via a payment of $20,000 per year to a management account for a period of 5 years commencing with the production of copper concentrates at the Project.

7. Managing Sonoita Creek Ranch for conservation purposes will provide habitat connectivity and a movement corridor for the endangered jaguar (*Panthera onca*) and the endangered ocelot (*Leopardus pardalis*) between the Canelo Hills/Patagonia Mountains and the Santa Rita Mountains, slightly over a mile away to the west of the ranch, in perpetuity. The southern portion of the ranch has been identified by the Arizona Wildlife Linkages Workgroup and the Arizona Missing Linkages Corridor design as a likely corridor between these two CNF land blocks.

[1] Prohibitions on livestock grazing and other agricultural uses incompatible with the conservation goals outlined here for Sonoita Creek Ranch shall not be placed in full force and effect until such time as the water rights appurtenant to the property have been secured for conservation purposes by transfer to a qualified organization that can hold such rights for conservation purposes.

8. Management actions in Sonoita Creek Ranch will not compromise the ability to manage for threatened and endangered species. This includes species that are not currently present, but could recolonize the area if habitat were improved.

9. Wildlife-friendly fencing will be installed to discourage use by cattle and encourage use by threatened and endangered species.

    9.1. Rosemont will construct wildlife fence along the western boundary of the property to direct wildlife to the SR 82 crossings of Big Casa Blanca Canyon and Smith Canyon.

    9.2. The balance of fence repaired and/or replaced at Sonoita Creek Ranch will be wildlife-friendly four-strand wire fence built in accordance with AGFD standards.

10. The management and protection of habitat at Sonoita Creek Ranch will protect the potential migration and dispersal habitat of the threatened Mexican Spotted Owl (*Strix occidentalis lucida;* MSO) between the Canelo Hills/Patagonia Mountains and the Santa Rita Mountains.

11. The management and protection of habitat on Sonoita Creek Ranch protects potential foraging habitat and provides a reliable perennial water source adjacent to potential foraging habitat for the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*; LLNB).

C. CIENEGA CREEK WATERSHED

Rosemont has acquired the right to purchase approximately 1,122 acre-feet of surface water rights held by the Del Lago Golf Course (***Figure 3***). These surface water rights will be used to enhance aquatic habitat values in the Cienega Creek watershed. The acquired rights are:

- 1908 Right (ADWR Certificate 610.0002) of 597.755 acre-feet per annum
- 1933 Right (ADWR Certificate 665.0003) of 477.545 acre-feet per annum, and
- 1935 Right (ADWR Certificate 617.0002) of 46.455 acre-feet per annum

A portion of these water rights will be used to support preservation and enhancement activities in the Cienega Creek watershed upstream of the Pantano Dam.

Specific conservation measures associated with the acquisition of these certificated water rights are listed below:

1. Rosemont will provide funding for stream renovation and restoration projects to increase water flows and enhance wetlands in the Cienega Creek watershed. The location and design of these projects will be determined by the BLM and the AGFD, with input from other key stakeholders in the watershed, including the CNF and the USFWS.

    1.1. Rosemont will provide funding for these projects by establishing a $2,000,000 fund (the Conservation Fund). The Conservation Fund will be established through the annual payment

of $200,000 for 10 years to an escrow or other suitable account managed and controlled by the AGFD or other designated conservation partner (the Conservation Partner). Payments to the fund will commence beginning on April 1 of the year following the year in which copper concentrates are initially produced at the Project and will be made on that same day in each succeeding calendar year until a total of $2,000,000 has been contributed to the Conservation Fund. Not more than 15 percent of this fund may be used by the Conservation Partner for fund administration, with the balance used for direct project execution.

1.2. The Conservation Partner shall work cooperatively and in consultation with the USFWS, the CNF, the BLM, the AGFD (if they are not identified as the Conservation Partner), and other landowners in the watershed to fund the development and implementation of conservation measures designed to preserve and enhance aquatic and riparian ecosystems and protect and maintain habitat for federally listed aquatic and riparian species in the watershed. These projects may include surveys for and the removal of bullfrogs, crayfish, and other non-native species in the watershed. The funds can be used to support approved management efforts by Pima County to control invasive aquatic species in the Cienega Creek Natural Preserve below and above the Pantano Dam. Project funds are not to be used for the remediation of unanticipated consequences of the action, such as waste rock slope failure. It is intended that these funds provide for long-term conservation benefit and that they not be fully expended in a short period of time.

2. Rosemont will transfer 150 acre-feet of the 1933 water right to the AGFD (or to another entity authorized under Arizona law to hold a surface water right for recreation and wildlife purposes), subject to the conditions described in C.5 below. This water right must be used to preserve and enhance the aquatic and riparian ecosystem in the upper Cienega Creek watershed for the benefit of federally listed species and other native species of fish, wildlife, and plants.

3. Rosemont will transfer 100 acre-feet of the 1933 water right to Pima County (or to another entity authorized under Arizona law to hold a surface water right for recreation and wildlife purposes), subject to the conditions described in C.5 below. Following transfer, these water rights must be used to preserve and enhance the aquatic and riparian ecosystem of the County's Cienega Creek Natural Preserve for the benefit of federally listed species and other native species of fish, wildlife, and plants.

4. Rosemont will transfer all of the 1935 water right to Pima County (or to another entity authorized under Arizona law to hold a surface water right for recreation and wildlife purposes), subject to the conditions described in C.5 below, to the lower reach of Davidson Wash within the Cienega Creek Natural Preserve that has also been designated an Outstanding Arizona Water. Following transfer, these water rights must be used to enhance and maintain the aquatic and riparian ecosystem in the lower reach of Davidson Canyon within the County's Cienega Creek Natural Preserve for the benefit of federally listed species and other native species of fish, wildlife, and plants.

5. To facilitate the transfer, Rosemont will file an application to sever 250 acre-feet of the 1933 water right and all of the 1935 water right, and transfer the place of diversion and beneficial use to the

Cienega Creek watershed at such location(s) as may be determined in coordination and consultation with the AGFD and Pima County. Such application will be filed with the Arizona Department of Water Resources (ADWR) on or before July 1, 2013. The severance and transfer of the water right is subject to approval by the ADWR. It is anticipated that it will take approximately 2 years for the ADWR to review and approve the application. It is also possible that irrigation districts and other water rights holders will object to the severance and transfer application, which may delay the approval process and could cause the ADWR to deny the application in whole or in part. In addition, due to the nature of Rosemont's agreement with the current owner of the water right, the transfer of the water right may be delayed until January 1, 2016. Rosemont will work diligently and in good faith to prepare and prosecute the severance and transfer application and will bear all costs associated with the application.

6. The balance of the surface water rights, approximately 825 acre-feet per annum, will be used for aquifer recharge below Pantano Dam. To accomplish this, a "managed underground storage facility (MUSF)" will be permitted through the ADWR. This will allow surface water flows currently diverted for golf course irrigation to be captured and discharged back to the streambed below the Pantano Dam within the Cienega Creek Natural Preserve.

   6.1. The anticipated environmental benefits of this discharge to the Cienega Creek Natural Preserve have been described by Pima County in a joint technical report prepared by Pima County and the City of Tucson.[2] Approximately 3,000 linear feet of surface flow and associated riparian habitat are expected to develop as a result of the MUSF. In addition to establishing surface flow along Pantano Wash, a large proportion of the water discharged to the MUSF will recharge the alluvial aquifer. The net change in shallow groundwater elevation and the rate of change are unknown, but we anticipate that changes in the aquifer in the upper reaches of the MUSF will be much greater than in the lower reach of the MUSF.

   6.2. Additional benefits may be realized beyond the benefits associated with Clean Water Act Section 404 mitigation for the Project. Pima County, the Pima County Regional Flood Control District, and/or its conservation partners may, at their discretion, develop an in-lieu fee mitigation program in reliance on the waters discharged to the MUSF in excess of the benefits expected to support, in part, Rosemont's Clean Water Act Section 404 mitigation requirements. These potential future in-lieu fee mitigation credits that may or may not be developed here are not considered part of Rosemont's proposed conservation measures.

7. A groundwater well is located on lands associated with the Pantano Dam. Rosemont will acquire and retire this well so that any potential effects of that well on the surface water of Cienega Creek and Pantano Wash from its use and operation do not occur.

[2] City of Tucson and Pima County, Arizona, Chuck Huckelberry and Mike Letcher. 2009. Riparian Protection Technical Paper, Water and Wastewater Infrastructure, Supply and Planning Study, Phase II. Prepared for City/County Waste and Wastewater Study Oversight Committee.

D. DAVIDSON CANYON WATERSHED PARCELS

These properties consist of six parcels on the eastern side of the Santa Rita Mountains. They total approximately 574 acres of semidesert grassland and associated riparian habitat (***Figures 1 and 4***). Two of these parcels (on Davidson Canyon Wash, downstream of the project) are being set aside as part of the Project's Clean Water Act Section 404 mitigation plan. Benefits to listed species are expected to result from the implementation of the management actions outlined in that plan. Specifically, required management actions are expected to benefit jaguar and ocelot (foraging when present and movement) and LLNB (foraging).

Specific conservation measures proposed for the Davidson Canyon Watershed Parcels include:

1. Rosemont will record a restrictive covenant or conservation easement on the Davidson Canyon Watershed Parcels that precludes real estate development or similar land use activities and restricts grazing. Grazing restrictions are expected to enhance foraging resources for LLNB and result in a general enhancement of native prey availability for jaguar.

2. The Davidson Canyon Watershed Parcels will be included as available land for the establishment of water features beneficial to listed species such as CLF, jaguar, and ocelot and to provide general wildlife benefits. See elements of Conservation Measures F, G, and J.

3. Portions of the Davidson Canyon Watershed Parcels have been identified as culturally important by Native Americans. None of the conservation actions outlined for the Davidson Canyon Watershed Parcels will preclude reasonable access to these parcels by interested Native American groups.

E. HELVETIA RANCH ANNEX NORTH PARCELS

The Helvetia Ranch Annex North Parcels consist of approximately 940 acres of semidesert grassland on the western side of the northern Santa Rita Mountains (***Figures 1 and 5***). This property contains occupied, suitable Pima pineapple cactus (PPC) habitat.[3]

The Helvetia Ranch Annex North Parcels directly link the Santa Rita Experimental Range to lands administered by the BLM, providing long-term protection of open space and habitat connectivity in this area, which benefits the movement of wildlife, including jaguar and ocelot, in the northern Santa Rita Mountains. This property provides some late-summer foraging habitat for LLNB.

Conservation measures identified on the Helvetia Ranch Annex North Parcels consist of the following:

1. Rosemont will record a restrictive covenant or conservation easement on the Helvetia Ranch Annex North Parcels that precludes real estate development or similar land use activities.

[3] Because of the presence of Pima pineapple cactus on the property, Rosemont does not propose to purchase mitigation credits from the established mitigation bank for this species.

2. The Helvetia Ranch Annex North Parcels will be included as available land for the establishment of water features beneficial to listed species such as CLF, jaguar, and ocelot and to provide general wildlife benefits. See elements of Conservation Measures F, G, and J.

F. WATER FEATURES AND GRAZING MANAGEMENT

Rosemont has developed conservation measures to address the potential impacts of the proposed Project on water features in the area and those species listed under the ESA (listed species) that utilize these resources. Water features potentially impacted include naturally occurring springs and seeps, earthen stock tanks, and spring-fed above-ground stock drinkers. Water features will be constructed for multiple purposes. A set of seven features will be enhanced to facilitate and support the CLF metapopulation in Greaterville and critical habitat for CLF and jaguar. Up to 23 additional water features will be constructed as needed to mitigate for springs that may be impacted within the 150-year 5-foot drawdown boundary. Key springs will be identified and monitored on an annual basis (see Conservation Measures G and H). These data, in conjunction with the well-monitoring data, will be used to determine the location and number of mitigation features to be placed on the landscape over the course of mine operation.

As part of this holistic approach to conservation, Rosemont also proposes to make permanent structural and non-structural improvements to the Thurber, Debaud, Greaterville, and Rosemont grazing allotments (the Allotments) located within the CNF on the northeastern side of the Santa Rita Mountains (***Figures 1 and 6***). These modifications will benefit species listed under the ESA (jaguar, ocelot, CLF, LLNB, and MSO) as well as special-status and common wildlife species, and improve and maintain resource conditions.

Specific conservation measures are described below:

1. Rosemont's Allotments are subject to the requirements of the Federal Land Management and Policy Act, 43 U.S.C. §1752 and the Forest Service's regulations governing grazing management, codified at 36 C.F.R. Part 222. In accordance with those requirements, Rosemont will prepare and submit to the CNF a request to modify the Allotment Management Plans (AMPs) for the Allotments within 1 year of the issuance of the Record of Decision. The modifications will be developed in consultation, cooperation, and coordination with the CNF range staff, with input from the AGFD, and will include the modifications described above.

2. Rosemont's request for modification of the AMPs will specify that to compensate for the loss of flowering agaves for LLNB due to the proposed mine (a total of 4,221 acres[4]), grazing by cattle will be restricted during the April 1 to June 15 period through rotation to alternative pastures[5] on

[4] 4,221 acres is the amount of direct build-out of the pit and associated facilities and does not include undisturbed lands (approximately 2,769 acres) between the perimeter fence and the security fence.

[5] The available information supporting quantitative prediction of the response of agave to the modified grazing practices proposed is limited by the number of studies and the sampling designs utilized (WestLand 2013). Using the limited data available from Widmer (2002) documenting the response of agave bolting to modified grazing practices, a 100 percent increase in agave bolting success might be realized (WestLand 2013). A more conservative estimate of a 25 to 50 percent increase in agave bolting success is projected.

approximately 8,000 acres of portions of the Debaud, Greaterville, and Rosemont allotments that currently are permitted to be grazed during the agave bolting period. This is expected to increase foraging resources for LLNB.

3. Portions of pastures within the CNF grazing allotments controlled by Rosemont will be put on a winter rotation to limit grazing during the growing season within riparian areas. This is expected to enhance riparian vegetation.

4. Key pastures will be rested for extended periods of time and made available for grazing when forage production on active pastures is reduced because of drought or other factors. This "grass bank" element is expected to enhance overall forage production within the Allotments without the reduction of current cattle stocking rates.

5. Rosemont will enhance existing water features, including stock ponds, and add additional water features throughout the Allotments to offset potential project impacts to seeps and springs within its grazing allotments to support CLF and other wildlife species. Up to 30 potential water features, including seven proposed to support the Greaterville CLF metapopulation, will be enhanced or created.

   5.1. Water feature enhancements and construction proposed to support the local CLF metapopulation will be implemented at the start of mining activities. A summary of the water features and proposed mitigation measures is provided in Section G, *Chiricahua Leopard Frog*. The conceptual configuration of the types of water features to be developed is provided in ***Figure** 7*.

   5.2. Additional water features proposed for construction within the Rosemont-controlled CNF grazing allotments will be implemented as needed and based on the findings of ongoing groundwater and seep and spring monitoring activities. [See CLF and aquatic species conservation measures for a description of monitoring activities.] Rosemont will work cooperatively with the Biological Monitor to identify specific springs and seeps impacted by the proposed action and will construct water features to mitigate those losses.

   5.3. Rosemont will establish a long-term management and maintenance fund to maintain the water features constructed in furtherance of this conservation measure.

G. CHIRICAHUA LEOPARD FROG

The Action Area encompasses two CLF Management Areas (MAs): the Santa Rita MA and the Empire Cienega MA in CLF Recovery Unit 2 (Santa Rita-Huachuca-Ajos/Bavispe). Additionally, two Critical Habitat Units (Unit 8 – Eastern Slope of the Santa Rita Mountains and Unit 9 – Las Cienegas National Conservation Area) are present within the Action Area.

There are tanks in the Greaterville area that were occupied periodically during 2008–2012 that are not part of Unit 8. These include Granite Tank, California Gulch Tank West, California Gulch Tank East, Bowman Tank, North Greaterville Tank, and Box Canyon.

California Gulch Tank West supported a robust breeding population during 2012 and was only maintained as perennial during 2011–2012 through the pumping of well water during the dry season to the tank via PVC pipe (by Rosemont Ranch). All sites in the area are and have been extremely vulnerable to local extinctions—mostly due to the instability/inconsistency of perennial water.

Conservation measures that benefit CLF are summarized below:

1. Conservation measures included in Sections B (*Sonoita Creek Ranch*), C (*Cienega Creek Watershed*), and F (*Water Features and Grazing Management*) that benefit CLF are incorporated here by reference.

2. Rosemont will conduct pre-construction survey following approved AGFD/USFWS survey protocols of suitable habitat within the footprint of the proposed construction area and a 0.25-mile buffer of the security fence prior to construction.

    2.1. Surveys will be conducted in the survey season prior to the initiation of construction activities.

    2.2. Surveyors shall use the latest version of standard sterilization techniques to guard against the spread of disease between surveyed tanks and water features.

    2.3. If CLF are found within the pre-construction survey area, Rosemont will contact the Biological Monitor to facilitate the capture and relocation of CLF if they are located within areas that will be directly impacted by the Project. If CLF are detected within the pre-construction survey area, but outside areas that will be directly impacted by the Project, the Biological Monitor will coordinate with the USFWS to determine whether translocation is required or if the detected CLF should be left in place. Prior to relocation, captured frogs will be tested for chytridiomycosis.

    2.4. Dead and dying frogs encountered during pre-construction surveys will be swabbed to test for chytridiomycosis.

    2.5. During pre-construction surveys, periodic swabbing of live, healthy-appearing frogs will be required to test for the presence of chytridiomycosis. Up to 10 samples will be collected. [Alternatively, environmental DNA testing may be useful for advanced testing, when methods are refined, and cost effective, and may be substituted for the testing of individual frogs.]

    2.6. The Biological Monitor shall approve the list of vendors where samples are to be sent for chytridiomycosis testing.

3. Rosemont will conduct annual monitoring surveys for CLF using established survey protocols to confirm the breeding of CLF.

3.1. Annual monitoring surveys will commence the first spring survey period after construction activities have been initiated at the Project.

3.2. All suitable habitat within the perimeter fence area and within 1 mile of the perimeter fence area will be surveyed.

3.3. Dead or dying frogs encountered during monitoring surveys will be swabbed to test for chytridiomycosis.

3.4. During annual monitoring surveys, periodic swabbing of live, healthy-appearing frogs will be required to test for the presence of chytridiomycosis. Up to 10 samples will be collected during each annual survey effort. The Biological Monitor will determine where the samples are to be sent for testing. [Alternatively, environmental DNA testing may be useful for advanced testing, when methods are refined, and cost effective, and may be substituted for the testing of individual frogs.]

3.5. The Biological Monitor shall approve the list of vendors where samples are to be sent for chytridiomycosis testing.

3.6. Surveyors will note any American bullfrogs and other non-native invasive aquatic species encountered during the surveys.

4. Many of the stock tanks in the vicinity of Greaterville have relatively small watersheds and/or highly porous substrates lacking clay particles and only provide intermittent water sources that are not suitable to support CLF breeding populations. CLF have been observed at many of these tanks, especially following summer rains, but are unable to persist once the tanks have dried. Tank/water feature construction will be implemented to support the maintenance of the metapopulation of CLF in the Greaterville area. [See *Water Features and Grazing Management* conservation measures for additional discussion.]

4.1. The tanks listed in ***Table 2*** will be renovated to increase the reliability of the water features available to support the CLF Greaterville metapopulation to enhance and support critical habitat for CLF.

4.2. The tank renovation activities outlined in ***Table 2*** will commence within 1 year from the initiation of construction activities to develop the Project.

4.3. Rosemont will annually monitor the integrity of the seven renovated tanks listed in ***Table 2*** during the life of the mine and for 5 years post-closure.

4.4. Rosemont will participate in the Southeastern Arizona Working Group of the CLF recovery team to find opportunities and solutions toward species recovery in Recovery Unit 2.

Table 2. Tanks within the Greaterville Chiricahua leopard frog metapopulation that will be renovated to enhance the reliability of the tanks to support Chiricahua leopard frog

Tank Name	UTM_X	UTM_Y	Proposed Improvements
Bowman Tank	524574	3516390	Renovations and improvements to earthen stock tanks to increase water-holding capacity and duration. Renovations to stock tanks would involve the removal of sediments to increase their volume, the compaction of substrates (i.e., fines, if available) in the tank basin and berm to decrease infiltration, and/or the installation of impervious liners to impede infiltration in all or part of the basin. Design consideration will be given to the installation of structures (e.g., gabions, silt traps) for erosion and sediment control. Supplement surface waters with structures for breeding, thermoregulation, and hiding. Examples of structures include submergent and emergent vegetation, bank vegetation, and shrub branches above and below the surface.
California Gulch Tank East	523290	3516852	
California Gulch Tank West	522711	3516861	
Enzenberg Canyon Tank	520660	3514551	
Granite Mountain Tank	522717	3513980	
Granite Tank	521117	3514218	
North Greaterville Tank	522467	3515592	

WestLand (2012b) modeled climatic conditions (e.g., rainfall, evaporation, runoff) to determine the theoretical watershed size necessary to support and maintain (at a minimum) a lined tank basin with a surface area of 82 feet^2 and a maximum depth of 4 feet (25 m^2 by 1.2 m deep). Assumptions included: (a) trapezoidal shape; bottom dimensions = 2 feet^2; side slope = 10:1; (b) 15.3 inches of precipitation (estimated from Rosemont rain gauge data); (c) open water evaporation factors from the Arizona Department of Environmental Quality (1978); (d) 90 percent of runoff occurs during the period July–September; (e) runoff = 0.141 acre-feet/acre (Tetra Tech 2012); and (f) liner infiltration = 0.0034 foot/day (design standard for clay liner). Model outputs suggest that a watershed size of ≥ 10 acres would be sufficient to supply and maintain a lined tank as defined above as perennial throughout the year. Tank-specific details such as upland and tank basin substrate composition and porosity would need to be field-investigated on a tank-by-tank basis. This model as currently parameterized is conservative in nature, and individual tank conditions, once investigated in the field, will serve to refine the current generalized model on a case-by-case basis.

5. Rosemont will create additional water features to support CLF within the grazing allotments it controls in the northern Santa Rita Mountains and on its Davidson Canyon Watershed Parcels (Conservation Measure D) and Helvetia Ranch Annex North Parcels (Conservation Measure E) to the extent determined necessary by the monitoring measures outlined in Conservation Measure H (*Aquatic Species*) and the Biological Monitor. These water features will be constructed for multiple purposes, including the provision of benefits for CLF, jaguar, and ocelot as well as general wildlife benefits.

   5.1. Up to 23 additional water features will be constructed as needed to mitigate for springs that may be impacted within the modeled 150-year 5-foot drawdown boundary. Key springs will be identified and monitored on an annual basis and these data, in conjunction with well-monitoring data, will be used to determine the location and number of mitigation features to be placed on the landscape.

   5.2. The water features would be constructed within the Rosemont-controlled grazing allotments, the Helvetia Ranch Annex North Parcels, and the Davidson Canyon Watershed Parcels.

   5.3. The water features would generally follow the conceptual designs and locations provided in ***Figures 7 and 8***. Selection of the appropriate design and location shall be made in consultation with the Biological Monitor and the USFWS.

5.4. The new structures are intended to enhance metapopulation dynamics, but not at the expense of encouraging the rapid colonization between recovery unit populations, dispersal of invasive aquatic species, or spread of chytridiomycosis.[6]

6. As part of the Invasive Species Management Plan, Rosemont will implement control measures to remove invasive aquatic species that have the potential to negatively affect CLF such as American bullfrog, non-native tiger salamander, crayfish, and warm-water fish species.

6.1. Methods for the implementation of this program will be outlined in the Invasive Species Management Plan.

6.2. The Invasive Species program will be implemented beginning in the first year copper concentrates are produced.

6.3. The Invasive Species program will include the seven tanks renovated as part of the CLF conservation measures near Greaterville and new tanks constructed as part of these conservation measures during the life of the Project and at other suitable CLF habitats within the perimeter fence.

7. Up to four of the stormwater ponds located along the perimeter of the reclamation footprint and included in the reclamation plan will be designed in a fashion that will facilitate their use by CLF (see ***Figure 8***) without compromising the primary stormwater management function. The timing of the construction of these features will be dictated by the timing of concurrent reclamation programs.

8. If it is determined that CLF are or may be exposed to process water harmful to CLF, Rosemont will construct barriers to exclude CLF from these areas. This work will be performed in coordination with the Biological Monitor.

H. AQUATIC SPECIES: GILA CHUB, GILA TOPMINNOW, HUACHUCA WATER UMBEL

These aquatic species are found in Empire Gulch and Cienega Creek. None are known to occur in the seeps or springs within the perimeter fence of the Project or in the tanks proposed for renovation in Conservation Measures F (*Water Features and Grazing Management*) and G (*Chiricahua Leopard Frog*). The lowest reaches of Davidson Canyon and Box Canyon may have potential habitat.

Specific conservation measures for these species are outlined below:

1. Conservation measures included in Sections B (*Sonoita Creek Ranch*) and C (*Cienega Creek Watershed*) that benefit these species are incorporated here by reference.

[6] At this time, chytridiomycosis has been documented in the Empire Cienega area, but not the Santa Rita recovery unit, so caution is warranted, at least for now.

2. Rosemont will implement the conceptual monitoring plan prepared by Water and Earth Technologies (2012) to evaluate the impacts of groundwater drawdown on surface water features to the extent that authorization to install and access proposed monitoring sites is obtained. Two of the sites identified in this report have been installed, and monitoring is being conducted there. Application for the other monitoring locations has been made to the Arizona State Land Department. As authorizations for these sites are obtained, monitoring will commence at these sites.

3. Groundwater monitoring wells required for Rosemont's Project Aquifer Protection Permit (APP), issued in April 2012, will be monitored on a quarterly basis for depth to groundwater and water quality as prescribed by the APP. These data will be provided to the Biological Monitor for comparison to the model-predicted impacts to groundwater elevation changes. [Existing wells within the footprint of the proposed mine will not be monitored over the long term as they will be destroyed by mining operations.] Groundwater monitoring wells will be placed in accordance with the APP between the Project area and:

    - Lower Cienega Creek
    - Upper Cienega Creek
    - Empire Gulch
    - Lower Davidson Canyon
    - Box Canyon

4. Should groundwater quality data reach alert levels or aquifer quality limits, Rosemont will comply with the requirements of the APP.

5. The stormwater permit for the Project imposes specific requirements for surface water sampling and it will be implemented in accordance with the requirements of the Arizona Department of Environmental Quality as specified by the Environmental Protection Agency. Should impacts over and above the levels predicted in the Environmental Impact Statement be identified during monitoring efforts, the funding provided by the Cienega Creek Watershed Conservation Fund (Conservation Measure C) will be used to implement adaptive management strategies to offset the unanticipated effects.

6. Monitor geomorphic changes to Davidson Canyon.

    6.1. Initial geomorphic monitoring will begin at the start of construction and then be conducted at the same monitoring points every 5 years until 5 years after closure.

    6.2. Four sample sites will be established by Rosemont. The Biological Monitor will review and approve the selection of the four sample sites.

    6.3. Geomorphic monitoring will be conducted using Forest Service protocols or an agreed upon alternative approved by the Biological Monitor.

7. If monitoring shows that the Cienega Creek Watershed is being affected, the Cienega Creek Watershed Conservation Fund should be used as a resource to fund mitigation projects.

8. The Cienega Creek Watershed Conservation Fund cannot be used outside the Cienega Creek Watershed or to implement other conservation measures proposed by Rosemont (WestLand 2013).

I. SOUTHWESTERN WILLOW FLYCATCHER

The Southwestern Willow Flycatcher is typically associated with riparian habitat adjacent to waters such as Cienega Creek and Empire Gulch. There is no suitable habitat within the perimeter fence of the Project.

The specific conservation measure for this species is summarized below:

1. Conservation measures included in Sections C (*Cienega Creek Watershed*), G (*Chiricahua Leopard Frog*), and H (*Aquatic Species*) that benefit Southwestern Willow Flycatcher are incorporated here by reference.

J. JAGUAR AND OCELOT

A jaguar has been recently (2012) documented in the northern Santa Rita Mountains and the Whetstone Mountains (identified as the same animal), and the USFWS has proposed critical habitat for jaguar that includes the Project area. There are no known recent records of ocelot from the northern Santa Rita Mountains. The closest known recent record (2012) is a record from the Huachuca Mountains south and east of the Project.

Specific conservation measures for these species are summarized below:

1. Conservation measures included in Sections B (*Sonoita Creek Ranch*), C (*Cienega Creek Watershed*), D (*Davidson Canyon Watershed Parcels*), E (*Helvetia Ranch Annex North Parcels*), F (*Water Features and Grazing Management*), and H (*Aquatic Species*, particularly monitoring aspects within the current configuration of proposed jaguar critical habitat) that benefit jaguar and ocelot are incorporated here by reference.

2. Rosemont will ensure that restored or replaced springs (Conservation Measures F and G) within jaguar critical habitat (the most current delineation) are constructed in accordance with jaguar Primary Constituent Elements for surface water.

3. As part of the concurrent reclamation program, Rosemont will work to establish an average of 3 to 40 percent woody vegetation cover over the reclamation area (excluding the pit). This shall be established as a prescriptive obligation of the concurrent reclamation program in appropriate areas as determined in conjunction with the Biological Monitor during project development.

4. Monitor road-kill weekly along SR 83 from the northern extent of the currently proposed critical habitat to Gardner Canyon Road to assess the loss of jaguar, ocelot, or jaguar prey base (white-tailed and mule deer, collared peccary, and white-nosed coati, in particular). Monitoring will begin at the commencement of mine construction and continue through the second year of mine operation, a total of 4 years. After the initial 4 years of monitoring, the Biological Monitor, working with Rosemont, the AGFD, and the USFWS, will determine if additional field data collection is necessary to inform the determination of crossing need and location. Report road-kill in the annual report. Smaller ocelot prey (lagomorphs, rodents) does not need to be reported. The mortality of any Forest Service- or BLM-sensitive species should also be reported. This work may be conducted by the Biological Monitor as part of their regular site visits funded by Rosemont, with funding from the proponent. In addition to increasing knowledge regarding the movement of wildlife in the area, information collected during this investigation may identify a suitable wildlife crossing structure location that could be constructed using Regional Transportation Authority funds dedicated for that purpose.

5. Report all jaguar and ocelot sightings immediately to the Biological Monitor.

6. Rosemont will provide $50,000 to the AGFD or other suitable entity approved by the CNF to support camera studies for large predators, including jaguar and ocelot. The money will be provided for additional monitoring efforts between the Santa Rita and Whetstone Mountains, with particular emphasis on proposed critical habitat linkages and the linkage predicted by corridor models (USFWS 2012, WestLand 2012c). In addition to increasing knowledge regarding the movement of wildlife in the area, information collected during this investigation may identify a suitable wildlife crossing structure location that could be constructed using Regional Transportation Authority funds dedicated for that purpose.

K. LESSER LONG-NOSED BAT

LLNB are known to forage in the Project area. Small numbers have been documented roosting in mine features that will be directly affected by the Project and a large late-summer roost was identified north of the Project. [A new roost site unknown prior to the commencement of baseline biological studies for the Project.]

1. Conservation measures included in Sections B (*Sonoita Creek Ranch*), D (*Davidson Canyon Watershed Parcels*), E (*Helvetia Ranch Annex North Parcels*), and F (*Water Features and Grazing Management*) that benefit LLNB are incorporated here by reference.

2. Prior to the submittal of the proposed modification of the AMP (Conservation Measure F), Rosemont shall refine existing estimates of agave that will be impacted within the security fence area. Rosemont will also conduct studies sufficient to identify and establish baseline conditions in the pastures proposed to be included in the AMP modification for seasonal grazing restrictions to increase the flowering success of agave.

3. Rosemont shall include Palmer's agave in its concurrent reclamation plan.

3.1. Plant (transplanted or nursery-grown stock) at least 35,850 Palmer's agaves as outlined in Table 1 of WestLand (2012a) and ***Table 3***. The average density of plantings as proposed is 10.3 per acre. A record of the agave transplanted and planted from nursery-grown stock during concurrent reclamation efforts and general location and density of transplants shall be maintained and reported to the Biological Monitor.

Table 3. Concurrent reclamation area and agave planting density. Acreage estimates from CDM (2012).

Reclamation Year	Concurrent Reclamation Area (acres)*	Number of Agave Transplants or Nursery-grown Plants
Year 1 (Project Year 3)	114	1,400
Year 2 (Project Year 4)	169	1,700
Year 3 (Project Year 5)	259	3,000
Year 4 (Project Year 6)	75	750
Year 5 (Project Year 7)	93	1,000
Years 6–10 (Project Years 8–12)	390	4,000
Years 11–15 (Project Years 13–17)	383	4,000
Years 16–22 (Project Years 18–24)	1,990	20,000
Total	**3,471**	**35,850**

* *Soil resources and growth media will be salvaged as practicable and as needed for reclamation. These areas will be seeded using a native seed mix.*

3.2. Rosemont shall include Palmer's agave seed in its seed mix provided such seeds are commercially available.

4. Rosemont shall conduct a scientifically designed study to document the efficacy of seasonal grazing restrictions in the enhancement of agave-flowering success. The study shall be implemented annually for 5 years following the approval of the AMP modifications and implementation of the grazing-management practices.

5. During the sixth year of implementation of conservation measures K.3 and K.4, Rosemont, the USFWS, and the Biological Monitor will evaluate the success of these conservation measures. If warranted, appropriate adaptive management actions will be developed by the Biological Monitor, the USFWS, and Rosemont.

6. Rosemont will annually monitor the Helena Mine complex and Adit R2, plus any newly discovered large LLNB roost sites (>100 bats), within 1 mile of the perimeter fence for LLNB. [Note that if the mine feature is not controlled by Rosemont or if for any other reason access cannot be obtained by the Biological Monitor, this monitoring obligation shall not apply.]

6.1. Monitoring of each site shall be conducted three times during the late-summer LLNB survey period: July, August, and September. One of the surveys during the survey season at the Helena Mine will be scheduled to coincide with the region-wide count.

6.2. Monitoring of the Helena Mine complex, Adit R2, and other large LLNB roost sites shall be conducted annually until 5 years after mine closure. Monitoring surveys are anticipated to commence beginning in 2013.

6.3. Surveys shall be conducted by evening emergence counts. Infrared (IR) tape recordings of the exit shall be made during each survey. The number of cameras used to capture emergence on tape will be sufficient to fully document monitored emergence events. Digital copies of the recordings will be provided to the Biological Monitor. [Post-processing of the tapes and live exit count verification using IR recordings are not proposed.]

6.4. Monitored roost sites shall not be entered, except as authorized by the Biological Monitor in coordination with the USFWS.

6.5. Rosemont shall provide a brief tabular summary of the monitoring results to the Biological Monitor within 2 working days of each monitoring effort.

7. Rosemont will conduct reconnaissance-level surveys of other known cave and mine features capable of supporting bats within the perimeter fence and within 1 mile of the perimeter fence for LLNB and other bat species.

7.1. Reconnaissance-level surveys shall be conducted on other known cave and mine features capable of supporting LLNB (or other bats) that have only minor numbers of LLNB (≤100). [Roost sites with more than 100 bats shall be monitored in accordance with the requirements of Conservation Measure K.6.]

7.2. Reconnaissance-level surveys shall consist of one visit to each monitored feature during the late summer (July through September).

7.3. Reconnaissance-level surveys of other known caves and mine features shall be conducted annually for the life of the Project and for 5 years following closure.

7.4. Features known or suspected to have minor numbers of LLNB (≤100) will be monitored by external exit count using unattended IR cameras.

7.5. Caves or mine features suspected to be occupied by LLNB shall not be entered. Caves or mine features that are not suspected to have LLNB may be entered, if determined safe, or may be monitored by external exit count, the placement of IR cameras, or other suitable means.

7.6. Rosemont shall provide a brief tabular summary of the reconnaissance-level survey results to the Biological Monitor within 10 working days of the completion of the reconnaissance surveys.

8. Rosemont will close 20 mine features, including the Chicago Mine, prior to Project construction (WestLand 2012a). If other sites are identified by Rosemont in proximity to the Project that may require closure for safety purposes, Rosemont will coordinate with the Biological Monitor.

8.1. Because of the low numbers of LLNB (approximately 20 to 25) that have been documented to use the mine features that will be disturbed by the Project, there will be no limitation on the timing of closure. Should surveys prior to closure indicate levels of use by LLNB substantially greater than previously documented (30 or more), Rosemont shall notify the Biological Monitor prior to initiating exclusion and closure of that cave or mine feature.

8.2. Closure is a two-step process. First, bats and other wildlife are excluded from the mine using standard techniques. Once wildlife has been excluded, the mine can be permanently blocked (=closed) to prevent access by wildlife and minimize the risk of loss during construction and mining activities.

8.2.1. Prior to the construction of exclusions, the biologist responsible for the exclusion shall inspect the features to ensure, to the extent possible and safe, that wildlife is not present in the mine features to be closed.

8.2.2. To accomplish the exclusions, the portal or collar of the mine feature will be covered with 1-inch-diameter chicken wire. For features with the potential for terrestrial wildlife, the wire will be placed in a manner that allows exit but not entrance to the mine [90-degree bend at the bottom with a 2-foot extension facing away from the portal opening with no anchors at bottom.] The 1-inch openings in the wire permit bats to exit, but they will not enter. Similarly, wildlife within the feature will be able to push out through the bottom, but the bend will prohibit entry. The wire will be placed over the entrance a minimum of 4 days and not more than 7 days before the mine is closed. The wire would be removed immediately prior to closure.

8.2.3. If gaps between the chicken wire and the perimeter of the portal or collar develop prior to closure, the exclusion shall be repaired and the closure delayed for 4 additional days.

8.2.4. Prior to exclusion, Rosemont will notify the Biological Monitor. Once exclusions are in place, documentation of the exclusion shall be provided to the Biological Monitor.

8.2.5. The biologist responsible for the placement and construction of the exclusion or the Biological Monitor shall verify the integrity of the exclusion immediately prior to the initiation of closure activities.

9. Following the construction of the mine and during the initial year of operation, Rosemont shall work with the Biological Monitor to review the efficacy of light mitigation measures at key resource areas around the mine, such as the Helena Mine, as identified by the Biological Monitor. If additional shielding can be placed to further reduce lighting effects without adverse consequences to safety and operational efficiencies, Rosemont shall implement the additional requested shielding in a manner consistent with safe mining practices.

10. Rosemont will fence (similar to Blue Bird Mine fence, ***Figure 9)*** the R2 Mine and the Helena Mine complex to exclude unauthorized human access. If, during the life of the Project, any new major roost sites (greater than 100 LLNB at peak count) are detected within 1 mile of the perimeter fence, the roost site will be fenced or otherwise protected from unauthorized human access in a manner approved by the Biological Monitor.

11. During the life of the Project, Rosemont shall work with the Biological Monitor to identify potential restoration areas outside the security fence and within 2 miles of the perimeter fence that are suitable for Palmer's agave. Employing the seed mix being used for concurrent reclamation programs where appropriate, Rosemont will assist the CNF with the revegetation of these areas. In addition to seeding, revegetation efforts will include planting Palmer's agave transplants or nursery-grown Palmer's agave. This effort will include portions of the old Arizona Trail being abandoned as part of these conservation measures.

12. Rosemont has worked with the Arizona Trail group and the CNF to relocate the Arizona Trail away from the Project and the Helena Mine complex. The proposed relocation is depicted on ***Figure 10***.

L. PIMA PINEAPPLE CACTUS

PPC within the Project area are only known from the utility corridor accessing the Project from the western side of the Santa Rita Mountains.

Specific conservation measures for this species are summarized below:

1. The Helvetia Ranch North Annex Parcels contain PPC and suitable PPC habitat, and the conservation measures included in Section E (*Helvetia Ranch Annex North Parcels*) are incorporated here by reference.

2. Construction practices along the proposed utility corridors will be employed to keep surface disturbance to the minimum practicable and to avoid PPC.

    2.1. Before ground disturbance, the utility corridor routes will be surveyed. Known PPC localities will be flagged and, to the extent possible, avoided.

    2.2. Rosemont will protect the PPC that can be avoided with clear limit fencing, and construction activity in the vicinity of these plants will be monitored during construction.

    2.3. Rosemont will educate construction personnel for the power and water lines in the offsite utility corridor on how to identify PPC and marking/avoidance methods.

    2.4. PPC that cannot be avoided by utility construction will be transplanted into suitable habitat. A monitoring and maintenance program will be initiated to facilitate the establishment that will follow similar to previous efforts for PPC transplantation and will involve watering for the first few months after transplant, followed by regular monitoring.

M. WESTERN YELLOW-BILLED CUCKOO

There are reports of Western Yellow-billed Cuckoo (*Coccyzus americanus,* YBC) in Barrel Canyon, Box Canyon, and other areas within the action area. In addition, YBC are expected to occur within suitable habitat along Cienega Creek.

Specific conservation measures for this species are summarized below:

1. Also refer to mitigation measures outlined in Sections B (*Sonoita Creek Ranch*), C (*Cienega Creek Watershed*), H (*Aquatic Species*), and I (*Southwestern Willow Flycatcher*) of this conservation measure summary.

2. Rosemont will survey for YBC in those drainages in the Project area that have potential habitat (e.g., Barrel Canyon and McCleary Canyon) within the perimeter fence boundary.

    2.1. Surveys shall be performed in accordance with current accepted survey protocols (Halterman et al. 2009) and shall commence in June 2013.

    2.2. Surveys shall be conducted within suitable habitat within undisturbed portions of the perimeter fence area annually for the first 5 years of mine operation.

3. Where vegetation clearing is scheduled during the YBC nesting season, Rosemont shall coordinate with the Biological Monitor and the USFWS prior to vegetation clearing in suitable YBC habitat.

    3.1. Vegetation clearing within 50 meters of an active YBC nest or the center of an active YBC territory shall not occur during the YBC nesting period.

    3.2. This conservation measure shall not restrict vegetation clearing for the implementation of an approved mining plan of operations outside the YBC nesting period.

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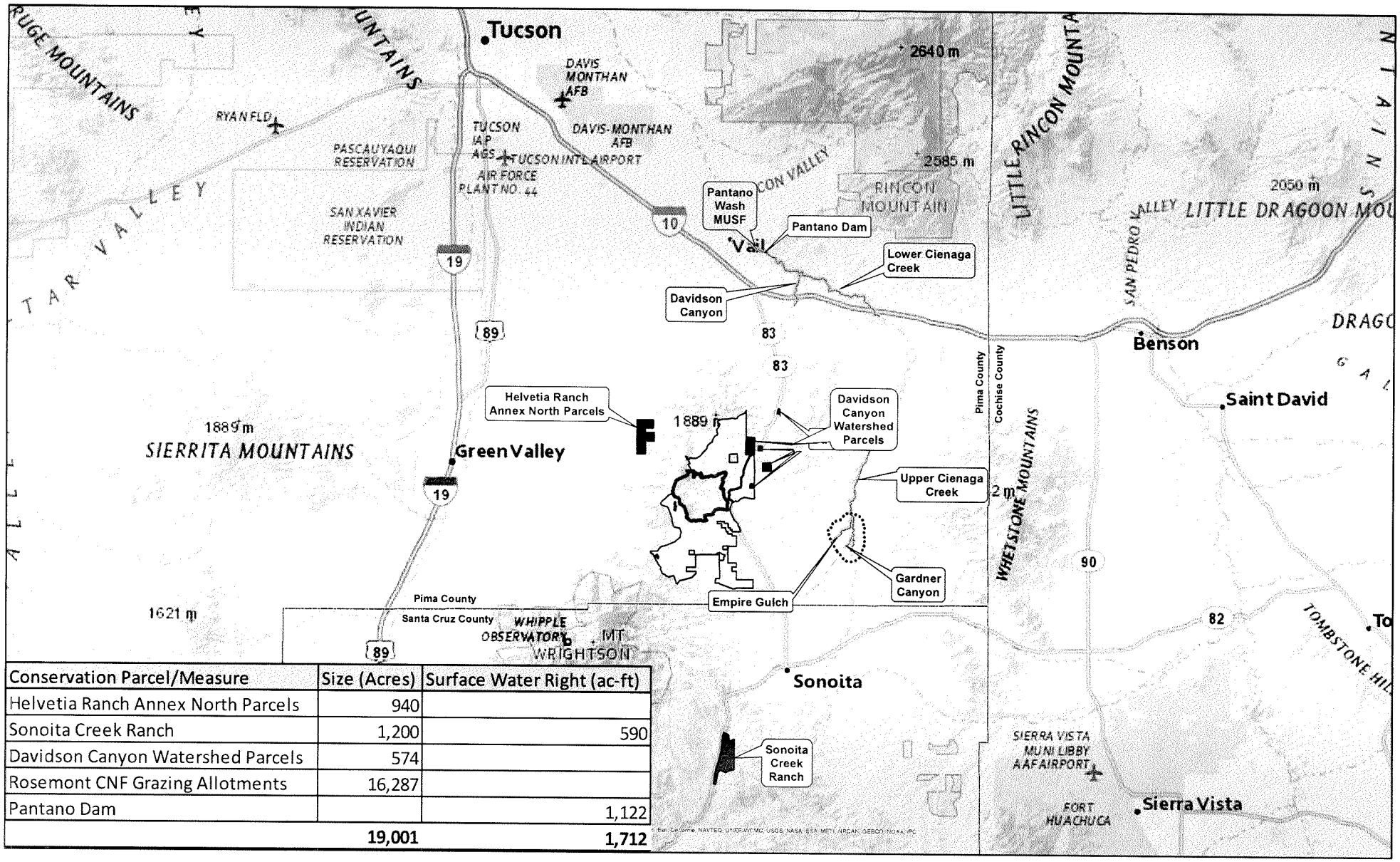
FIGURES



Conservation Parcel/Measure	Size (Acres)	Surface Water Right (ac-ft)
Helvetia Ranch Annex North Parcels	940	
Sonoita Creek Ranch	1,200	590
Davidson Canyon Watershed Parcels	574	
Rosemont CNF Grazing Allotments	16,287	
Pantano Dam		1,122
	19,001	**1,712**

Image Source: National Geographic Online Imagery

Parcel — Conservation Parcel

Area — Surface Water Right Allocation

Rosemont Project Security Fence

Rosemon CNF Grazing Allotments

N

0 5 10 Miles

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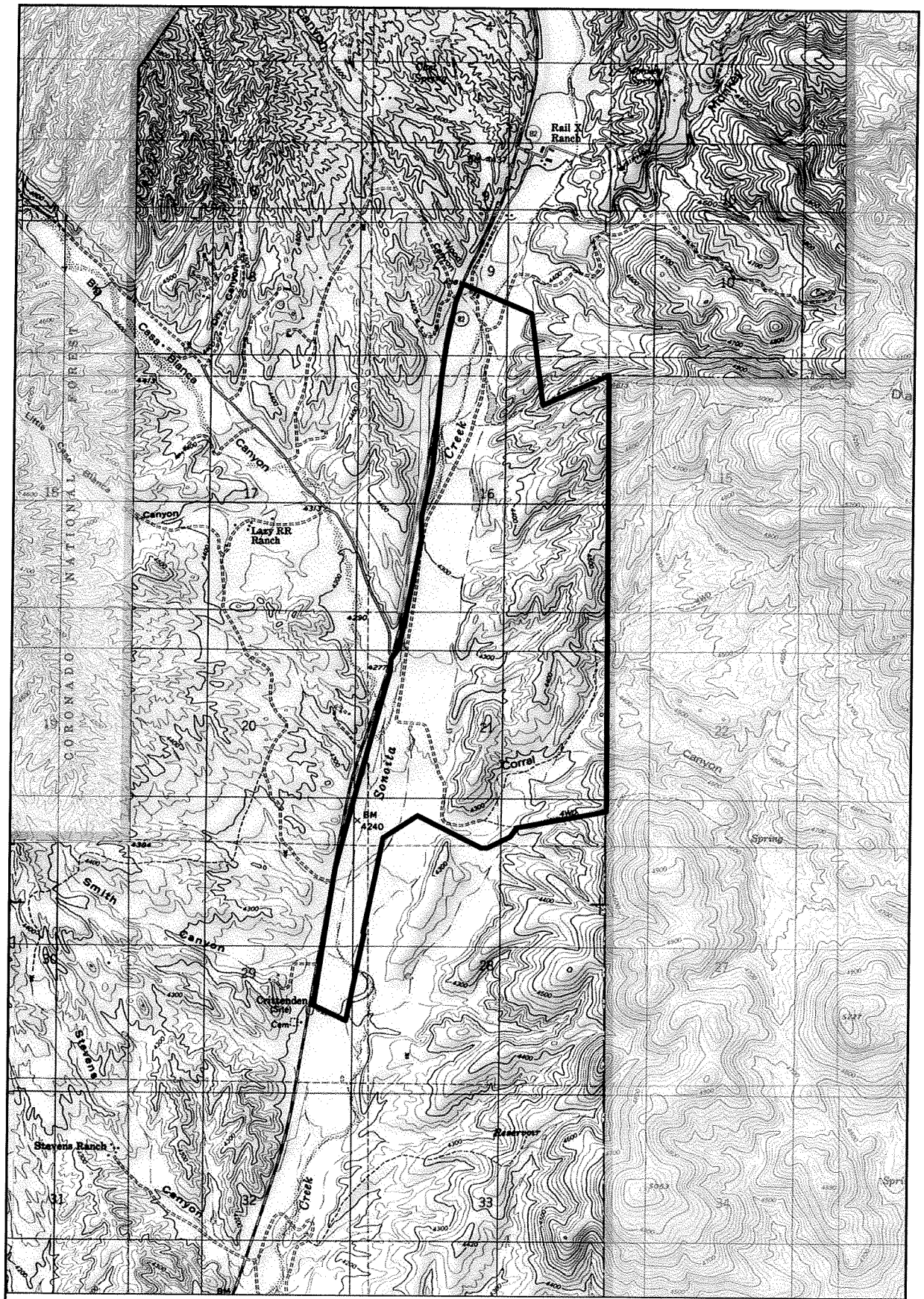
ROSEMONT COPPER COMPANY

Conservation Measures Summary

OVERVIEW OF THE LANDS INCORPORATED INTO THE CONSERVATION PROGRAM DEVELOPED BY ROSEMONT COPPER COMPANY

Figure 1



T21S, R16E, Portions of Sections 9, 16, 20-22, and 28-29
Santa Cruz County, Arizona,
Sonoita and Mount Hughes USGS 7.5' Quadrangles
Image Source: ArcGIS Online USA Topo Maps

Legend

Sonoita Creek Ranch

Surface Management

Private Land (No Color)

State Trust Land

Forest Service

N

0 1,000 2,000 Feet

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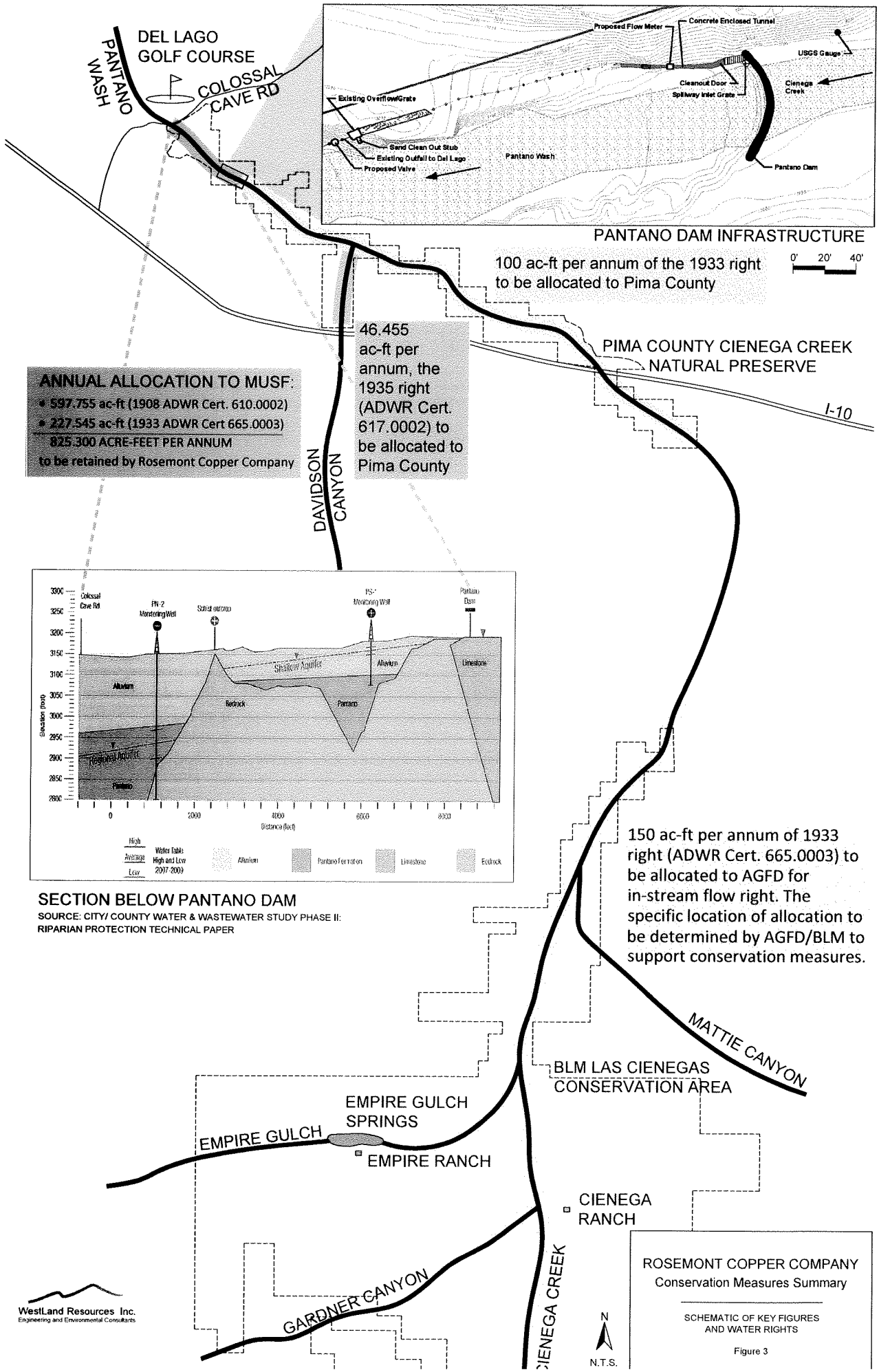
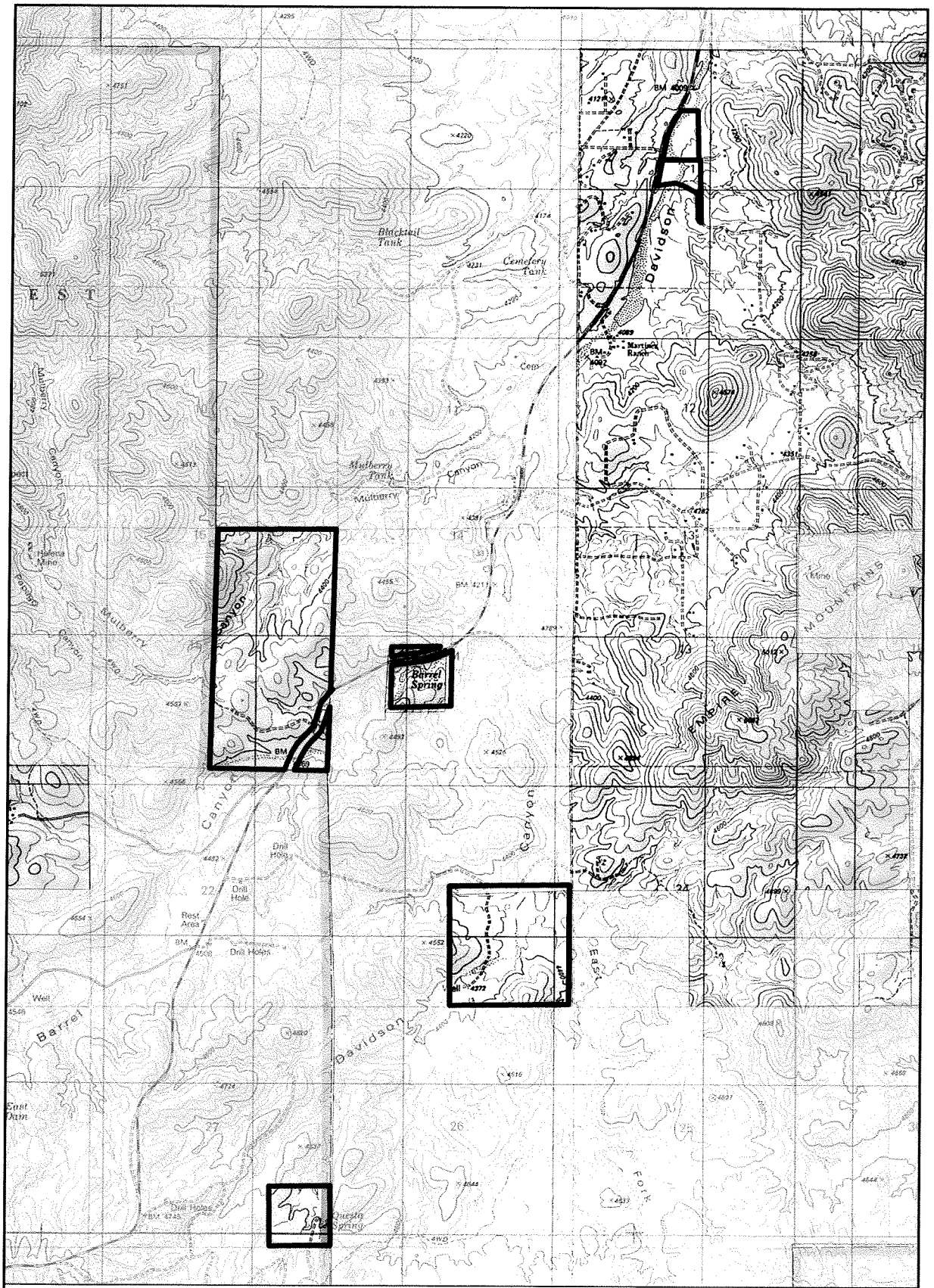
ROSEMONT COPPER COMPANY
Conservation Measures Summary

SONOITA CREEK RANCH
Figure 2


DEL LAGO GOLF COURSE
PANTANO WASH
COLOSSAL CAVE RD
Proposed Flow Meter
Concrete Enclosed Tunnel
USGS Gauge
Cienega Creek
Cleanout Door
Spillway Inlet Grate
Existing Overflow/Grate
Sand Clean Out Stub
Existing Outfall to Del Lago
Proposed Valve
Pantano Wash
Pantano Dam
PANTANO DAM INFRASTRUCTURE
0' 20' 40'
100 ac-ft per annum of the 1933 right to be allocated to Pima County
46.455 ac-ft per annum, the 1935 right (ADWR Cert. 617.0002) to be allocated to Pima County
PIMA COUNTY CIENEGA CREEK NATURAL PRESERVE
I-10
ANNUAL ALLOCATION TO MUSF:
• 597.755 ac-ft (1908 ADWR Cert. 610.0002)
• 227.545 ac-ft (1933 ADWR Cert 665.0003)
825.300 ACRE-FEET PER ANNUM
to be retained by Rosemont Copper Company
DAVIDSON CANYON
Colossal Cave Rd
PN-2 Monitoring Well
Schist outcrop
PS-1 Monitoring Well
Pantano Dam
Shallow Aquifer
Alluvium
Limestone
Bedrock
Pantano
Regional Aquifer
Elevation (feet)
Distance (feet)
High
Average
Low
Water Table High and Low 2007-2009
Alluvium
Pantano Formation
Limestone
Bedrock
SECTION BELOW PANTANO DAM
SOURCE: CITY/ COUNTY WATER & WASTEWATER STUDY PHASE II: RIPARIAN PROTECTION TECHNICAL PAPER
150 ac-ft per annum of 1933 right (ADWR Cert. 665.0003) to be allocated to AGFD for in-stream flow right. The specific location of allocation to be determined by AGFD/BLM to support conservation measures.
MATTIE CANYON
BLM LAS CIENEGAS CONSERVATION AREA
EMPIRE GULCH SPRINGS
EMPIRE GULCH
EMPIRE RANCH
CIENEGA RANCH
GARDNER CANYON
CIENEGA CREEK
N
N.T.S.
WestLand Resources Inc.
Engineering and Environmental Consultants
ROSEMONT COPPER COMPANY
Conservation Measures Summary
SCHEMATIC OF KEY FIGURES AND WATER RIGHTS
Figure 3



T18S, R16E, Portions of Section 1, 14-15, 22-23, and 27,
Pima County, Arizona,
Mount Fagan and Empire Ranch USGS 7.5' Quadrangles
Image Source: ArcGIS Online USA Topo Maps

Legend

Davidson Canyon Watershed Parcels

Surface Management

Bureau of Land Management (BLM)

Private Land (No Color)

State Trust Land

Forest Service

N

0 1,000 2,000 Feet

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ROSEMONT COPPER COMPANY
Conservation Measures Summary
DAVIDSON CANYON
WATERSHED PARCELS
Figure 4

WestLand Resources, Inc.
Engineering and Environmental Consultants

March 11, 2013

Mr. Larry Jones
CORONADO NATIONAL FOREST
300 W Congress
Tucson, AZ 85701

RE: CLARIFICATION AND SUPPLEMENTAL INFORMATION IN SUPPORT OF SUPPLEMENTAL BIOLOGICAL ASSESSMENT PREPARED BY THE CORONADO NATIONAL FOREST AND SWCA, INC., FOR THE ROSEMONT COPPER PROJECT

Dear Mr. Jones:

After review of the Supplemental Biological Assessment (SBA) WestLand Resources, Inc. (WestLand) offers the attached clarifying information in support of the SBA and the ongoing Endangered Species Act Section 7 consultation for the Rosemont Project. Specifically, we provide clarification on the ownership status of the lands that are part of the conservation measures proposed by Rosemont, on some minor issues associated with information provided by Rosemont and their consultants in support of the Section 7 consultation and preparation of the SBA, and on the status of proposed 404 mitigation at Sonoita Creek Ranch which had changed since the January 15 discussion referenced in the SBA.

WestLand appreciates the efforts of the US Fish & Wildlife Service and the Forest Service in support of the ongoing consultation and trust that the information provided here will be found helpful.

Should you have any questions or require any additional information please do not hesitate to contact me at (520) 206-9585.

Respectfully,
WestLand Resources, Inc.

Brian S. Lindenlaub
Principal

cc: Kathy Arnold, Rosemont Copper Company
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CLARIFICATION AND SUPPLEMENTAL INFORMATION IN SUPPORT OF SUPPLEMENTAL BIOLOGICAL ASSESSMENT PREPARED BY THE CORONADO NATIONAL FOREST AND SWCA, INC., FOR THE ROSEMONT COPPER PROJECT

1. REGARDING CONSERVATION LANDS STATUS

Comment/Discussion Point: The SBA states that *"Third, as of the time of this writing, none of these lands have actually been acquired, nor do they have conservation easements or appropriate water rights. Nevertheless, RCC has made a commitment to acquire and conserve these lands through appropriate measures (except that the Fullerton Ranch parcel, which was discussed in the BA, was withdrawn)"* (SBA, pg. 4).

Relevant Documents in Record: WestLand 2013

Clarification: This statement in the Supplemental Biological Assessment (SBA) is technically correct; Rosemont does not currently hold title to certain land and water rights that are part of the conservation and mitigation measures for the Project (identified in the Rosemont's Conservation Measures Summary; WestLand 2013). However, Rosemont has entered into contracts to purchase these lands and water rights, and has made non-refundable payments to the current owners in accordance with the contracts to secure and maintain its right to complete these acquisitions. Following acquisition, appropriate conservation easements or restrictive covenants will be placed on these conservation parcels as required by the Record of Decision and Clean Water Act (CWA) Section 404 permit. The statement in the SBA suggests that it is uncertain whether Rosemont can or will acquire these lands and water rights, which is not the case.

Fullerton Ranch is part of Rosemont's larger conservation strategy, but is not part of the conservation measures associated with the Endangered Species Act Section 7 process. It was removed from the Conservation Measures Summary (WestLand 2013) to avoid confusion.

2. REGARDING 404 MITIGATION LANDS

Comment/Discussion Point: *"Note that at the time of this writing (15 January 2013), WestLand had informed us (pers. comm.) that this report (in part) is somewhat moot, as RCC is not now intending to conduct active restoration of the Sonoita Creek Parcel"* (SBA, pg. 9).

Relevant Documents in Record: WestLand 2012a, WestLand 2013

Clarification: Restoration at Sonoita Creek Ranch will be part of Rosemont's CWA Section 404 mitigation plan, as outlined in Rosemont's Conservation Measures Summary (WestLand 2013). This restoration will be done by the Arizona Game and Fish Department as part of an in-lieu fee mitigation program from which Rosemont will purchase mitigation credits, or it will be implemented in the same form by Rosemont as an applicant-sponsored mitigation program, as generally outlined in the November Habitat Mitigation and Monitoring Plan (WestLand 2012a). In addition, Rosemont will fund the renovation of the two ponds on the property, allowing the reintroduction of native aquatic species, as outlined in Rosemont's Conservation Measures Summary (WestLand 2013).

3. REGARDING POTENTIAL EFFECTS OF MINE LIGHTING

Comment/Discussion Point: *"Although the WestLand report[1] did not include vehicles as part of their total lumen output, the Monrad report[2] (p. 21) did mention that 'lumen packages [of vehicular mining equipment] per fixture can range from hundreds of lumen to over 100,000 lumens and multiple light sources are generally present on any given piece of equipment.' Further, they noted that 'glare control and light pollution reduction considerations are usually secondary to the needs of the operator for task lighting in his various fields of view.' They do propose various options for reducing the amount of vehicular lighting, but these are not detailed commitments"* (SBA, pg. 8).

Relevant Documents in Record: WestLand 2012b, Monrad 2012a, Monrad 2012b

Clarification: The Forest Service is correct in that for horizontal lighting, WestLand (2012b) did not take into account mobile sources. For clarification, we assumed that most of the vehicular lighting would be from vehicles in the pit and thus does not contribute to horizontal lighting as modeled in our analysis. Thus our horizontal analysis focuses on known stable/stationary light sources. The U.S. Fish and Wildlife Service (USFWS) considered this type of light source to be the most important in its analysis of proposed jaguar critical habitat; the GIS layer used to identify areas that met the low human influence Primary Constituent Element appears to calculate only stable/stationary lighting sources (USFWS 2012).

However, WestLand's analysis of skyglow did take into account mobile light sources. We used total lumens, excluding lighting associated with the heap leach pad (this lighting was excluded because the heap leach pad is no longer part of the Forest Service's Preferred Alternative), with and without mobile light sources in our analysis of skyglow (see WestLand 2012b, pg. 5, Table 1). This analysis was based on an earlier version of Monrad's light mitigation analysis (Monrad 2012a). Monrad (2012b) has increased the amount of lumens for some areas of the proposed mine, but the amount of lumens over the entire mine site is similar to that described in Monrad (2012a) and used in WestLand (2012b).

The Forest Service quotes Monrad (2012b, pg. 21) to suggest that mobile lighting was not quantified for the Rosemont Project, but can be extensive. In this quote, however, Monrad (2012b) was describing the traditional lighting sources associated with mobile equipment to juxtapose with the reduced lumens associated with the proposed lighting for the Rosemont Project. The lumens associated with the mobile equipment used by Rosemont are directly quantified by Monrad (2012b, pg. 26) and will not be as large as is implied by the SBA.

Specifically, the quotation used by the Forest Service refers to a discussion in Monrad (2012b) of traditional lighting sources associated with mobile equipment: "Vehicular mining equipment typically utilizes a mix of HID halogen and/or xenon light sources for task lighting and warning lighting systems. Lumen packages per fixture can range from hundreds of lumens to over 100,000 lumens, and multiple light sources are generally present on any given piece of equipment" (Monrad 2012b, pg. 21). Monrad

[1] Cited as WestLand (2012b) in this document.
[2] Cited as Monrad (2012b) in this document.

(2012b) subsequently provides a discussion of modern lighting systems using LEDs that the Rosemont Project will use for equipment lighting: "The specification of LED lighting with precise beam spreads to suit the task lighting needs for all equipment-mounted lighting systems is proposed to minimize stray light, place more light on the task target, reduce total lumens emitted into the environment, minimize off-site spill light, and greatly curtail the negative effects upon astronomical interests from the upward scattering of light" (Monrad 2012b, pg. 21). All equipment-mounted lighting will also use "high-performance sharp-cutoff optical assemblies and LED technologies to efficiently target task areas while minimizing wasteful upward light components" (Monrad 2012b, pg. 23). Moreover, "direct uplight components from numerous portable and equipment-mounted task lighting systems will be curtailed by the evolution of the mine pit excavation and placement of surrounding materials by the end of the first year of operation" (Monrad 2012b, pg. 23).

The Forest Service also implies that mobile lighting sources have not been quantified. In fact, Monrad (2012b, pg. 26) supplies this information.

4. REGARDING POTENTIAL EFFECTS ON JAGUAR AND PROPOSED JAGUAR CRITICAL HABITAT

Comment/Discussion Point: *"With regards to the revised corridor ('Arizona Missing Linkages') modeling (Beier et al. 2007), the authors re-ran this 'Beier model' (based on a presentation on 13 November 2012). There is very little information on just how this was done, what the assumptions were, how Jaguar destinations (habitat blocks) were established, modeling sensitivity issues, and what their other criteria were-i.e., there is no methods section"* (SBA, pg. 10).

Relevant Documents in Record: WestLand 2012c

Clarification: In response to this statement, we provide some additional discussion of our methods to ensure that the data provided in WestLand (2012c) are as informative as possible. We cited corridordesign.org for the methodology of the re-run of the "Beier model" (WestLand 2012c, pg. 5). The website has an in-depth discussion of the general methodological approach of the GIS modeling. We did not provide information on the scores of land cover, distance from roads, elevation, and topography, as these data are provided by corridordesign.org. For the Forest Service's convenience, we provide Excel sheets outlining the weightings and scores used in this model associated with land cover, elevation, topographic position, and distance from roads (see ***Attachment A***).

We have performed a suite of sensitivity analyses with this model, including changing the weighting of roads relative to land cover, the value of land cover types that are most prevalent in the area, and the start and end points within jaguar critical habitat. These sensitivity analyses were not included as part of WestLand (2012c). The sensitivity analyses indicate that the southern portion of the predicted jaguar corridor is relatively robust to changes in land cover types and weighting of variables. We have provided graphics of the results of these analyses in ***Attachment B***.

As stated in WestLand (2012c, pg. 18), we used the boundaries of the Patagonia and Whetstone critical habitat units as start/end points for the model informing movement of jaguars among critical habitat units. These boundaries are relevant to the analysis of the predicted effects on jaguar and proposed jaguar critical habitat; the USFWS includes a critical habitat subunit between the Patagonia and Whetstone critical habitat units specifically to provide a movement corridor for jaguars. Modifications to the start/end point within the northern Santa Rita Mountains (e.g., adjustment of the model to simulate the start/end point within the middle of the Patagonia critical habitat block in the northern Santa Rita Mountains) do influence the location of the predicted corridor. This is likely because the model tends to select a short corridor over a long corridor, particularly when much of the landscape is modeled as suitable habitat, as is the case for the jaguar model (see WestLand 2012c, Figure 1, and Beier et al. 2007, Figure 32).

Despite the sensitivity to start/end points in the northern Santa Rita Mountains and the relative instability of the northern section of the corridor, the simulation of the proposed mine does not appreciably change the modeled corridor under any sensitivity analysis. This is the important message from these sensitivity analyses; although the corridor is sensitive to some changes in model assumptions, it is largely insensitive to the simulation of the mine. This provides evidence that suggests that the Project will not sever the movement of jaguars between the proposed Whetstone and Patagonia Units. The simulation of the mine also does not result in the loss of the northern Santa Rita Mountains as modeled core habitat for jaguar (see ***Attachment C***). Again, we stress that we did not perform any post-processing of these models, as we find these changes to be overly subjective and prefer to interpret raw model results after investigating sensitivity analyses.

5. REGARDING POTENTIAL EFFECTS OF MINE LIGHTING

Comment/Discussion Point: *"Other taxa accounts in Rich and Longcore (2006) mention the* (sic) *how certain wavelengths of emitted light can be adjusted to decrease effects to certain animals. At least some of the design features that employ these measures are discussed in Monrad (2012)*[3] *and WestLand (2012g)*[4]*, although details are somewhat lacking"* (SBA, pg. 22).

Relevant Documents in Record: WestLand 2012b, Monrad 2012a, Monrad 2012b

Clarification: As discussed in WestLand (2012b, pg. 9), short wavelengths of light (i.e., less than 500 nm) attract vertebrate species. It appears from the foregoing statement that there may be some confusion about what portions of the mine will employ lights that minimize these wavelengths.

Rosemont has committed to using the light mitigation recommendations provided by Monrad (2012b). All the proposed design features described by Monrad (2012b) will utilize light sources that minimize short wavelengths of light to reduce potential effects on wildlife. Monrad (2012b) provides detailed

[3] Cited as Monrad (2012b) in this document.
[4] Cited as WestLand (2012b) in this document.

spectral data on the lighting to be used: Filtered White LED (pg. 16) and Narrow Band Amber LED (pg. 15). As discussed in Monrad (2012b), "the proposed lighting design for the Rosemont Project will employ either narrow band amber ALED or 500 nm filtered LED" (Monrad 2012b, pg. 20). Moreover, the quantification of the lumen output of lighting sources explicitly identifies the total lumens associated with either ALED or FLED, the only light sources proposed for the Rosemont Project (Monrad 2012b, pg. 26).

6. REGARDING POTENTIAL EFFECTS OF MINE LIGHTING

Comment/Discussion Point: *"The WestLand report (2012g)*[5] *did not adequately convey all issues related to artificial lighting. First, the changes in light levels were based on natural light, especially the phases of the moon, but the moon emits light from above, rather than on the horizontal. This is important because lights on the horizontal are not only additive to ambient light, but will actually shine in the eyes of animals"* (SBA, pg. 22).

Relevant Documents in Record: WestLand 2012b

Clarification: The lux values associated with the analysis and figures provided by WestLand (2012b) were scaled to moonlight values. The intention was not to imply that lights would shine from above. Rather, the scaling of predicted lux values to moonlight values was meant to aid in the interpretation of the lux values. To avoid further confusion, we interpret below lux values using vehicle headlights, perhaps allowing the Forest Service to interpret these values more easily.

We obtained an average lumen output of approximately 1,550 lumens for a Toyota Prius headlight bulb from three types of replacement bulbs available at drivewire.com (http:/www.drivewire.com /vehicle/2010-toyota-prius/headlight-bulbs). We then obtained an approximate area of 0.024 m^2 from a replacement driver-side headlight assembly for a 2012 Toyota Prius provided by a Toyota dealership in Tucson, Arizona. Combined, these measurements provide an estimate of 65,000 lux for the amount of light emitted at the face of a Toyota Prius headlight. We can then use this estimate to provide a more informative scale to interpret the predicted lux values that resulted from the WestLand (2012b) horizontal light model. Note that comparable values result from calculations of a Ford Explorer headlight.

As stated in WestLand 2012b (pgs. 5 and 6), most of the highest lux values are within the perimeter fence. Outside the perimeter fence, the geographic extent of light from the mine is limited, and the amount of light that reaches these areas is slight. For example, closer to the light sources and just outside the perimeter fence, predicted lux values reach 0.3 lux (e.g., Figure 1 in WestLand 2012b), or the equivalent of approximately 4.6×10^{-6} Toyota Prius headlights. Farther from the light sources, predicted lux values reach 0.001 lux (e.g., Figure 1 in WestLand 2012b), equivalent to approximately 1.5×10^{-8} Toyota Prius headlights. These calculations are not meant to suggest that only Toyota Priuses (or Ford Explorers) will be driving SR 83 or access roads to the mine. Rather, they are meant to aid in the interpretation of the

[5] Cited as WestLand (2012b) in this document.

predicted lux values in the horizontal plane (i.e., potentially shining into the eyes of wildlife) from our lighting model and provide context for evaluating the potential effects of increased lighting on biological resources.

We also believe that additional discussion of the modeling of light effects will help the Forest Service to interpret the predicted lux values, as we included several assumptions to simplify the model. The light flux at a given location within the 12-mile radius was estimated by accounting for the geometric spreading of the light (i.e., calculating the amount of light across a geometric surface), but does not account for the diffusion or absorption of the light. Thus the geometric spreading of light is conservative; we assumed that no ground absorption, no atmospheric absorption, and no atmospheric scattering of light would occur. The only attenuation of a given light source was a consequence of the geometric spreading of light. In addition, using a hemisphere bounded on the bottom with a horizontal plane to calculate light attenuation is an approximation of the physical geometry since the light sources are above the ground and some receivers would be below the hemisphere. A surface slightly larger than we modeled is required to model light reaching an observer below the light source. This larger surface would result in larger attenuation due to greater geometric spreading and predict lower light flux at the receiver for a given source and distance than the approach taken in our model. Therefore, our modeling approach is conservative and predicts more lux in the horizontal plane to reach a given location than would be generally expected under natural conditions.

More specifically, the radius of the hemisphere is equal to the distance from the source to the observer. When the radius of the hemisphere is $(2\pi)^{-0.5}$ meters, the area of the hemisphere is equal to 1 square meter and the light flux in lux is equal to the light power in lumens. As the distance between the source and observer increases, the surface area of the hemisphere over which the light is spread increases and the light power per square meter, or light flux, decreases. The light flux decreases as the square of the distance from the source.

$$L_2 = \frac{A_1}{A_2} L_1 = \frac{L_1}{2\pi r^2}$$

Where L_2 = Light flux at observer in lux.

A_1 = Area of a 1-square-meter hemisphere surrounding the light source.

L_1 = Light flux at A_1 in lux.

r = Distance from source to observer in meters.

A_2 = Area of hemisphere with radius r, where the area of a hemisphere = $2\pi r^2$.

7. REGARDING POTENTIAL EFFECTS OF MINE LIGHTING

Comment/Discussion Point: *"The report [WestLand 2012g]*[6] *also does not take into full consideration the lighting emitted by vehicles, possibly because an estimation of light from this mobile source cannot be quantified. Vehicular traffic will be present on SR 83, the west and east access roads, and within the project area"* (SBA, pg. 22).

Relevant Documents in Record: WestLand 2012b, WestLand 2012c

Clarification: See ***Comment #3*** in this document for a discussion of the quantification of mobile lighting sources from mining equipment. The Forest Service is correct in that the lighting analysis performed by WestLand (2012b) did not account for vehicular traffic on SR 83 and the access roads. However, data discussed in WestLand (2012b) and WestLand (2012c) are informative in the analysis of the potential effects of vehicular traffic on SR 83 and the mine access roads.

The USFWS (2012) provides a baseline from which to measure the potential effects of vehicular traffic on jaguars. Briefly, USFWS (2012) implicitly concludes that current traffic volumes of 2,300 to 3,000 vehicles per day do not influence jaguar movement or the suitability of surrounding potential habitat; portions of SR 83 are within a critical habitat unit included solely to support jaguar movement and within a critical habitat unit determined by the USFWS to have all the Primary Constituent Elements of jaguar habitat (USFWS 2012). The portion of the 2,300 cars per day that are currently using SR 83 at night is likely not insignificant. Mine-related traffic on the access roads is predicted to be considerably less than current traffic volumes on SR 83. Although the exact amount of mine-related traffic that is predicted to occur at night along these access roads is unknown, much of the mine-related traffic is associated with a short period of time surrounding shift changes, and the hourly traffic to the mine site is particularly small relative to current traffic volumes.

For bats, Lowery et al. (2009) demonstrate that lesser long-nosed bats (LLNBs) forage and use night roosts in urban areas with light sources from skyglow, urban development, and vehicular traffic (see Figures 4 and 5 in Lowry et al. 2009). Lowery et al. (2009) also conclude that bats around Tucson selected areas zoned for minimal light intensity (i.e., generally less than 12,500 lumens per acre). Monrad (2012a, pgs. 27 and 28) and Monrad (2012b, pg. 26) indicate that the predicted lumens per acre from mine lighting will be below the 12,500-lumens-per-acre limit identified by Lowery et al. (2009) (11,582 lumens per acre assuming a total developed acreage of 500 acres; Monrad 2012b, pg. 26). Therefore, the available data indicate that LLNBs can tolerate some level of light from urban or industrial sources. Also, the relationship between light and its potential effects on LLNBs is nonlinear; an increase in light does not necessarily lead to an observed effect on LLNBs. Rather, data from Lowery et al. (2009) suggest a threshold effect whereby lighting above a certain level may negatively influence LLNBs, while below this threshold potential effects are limited. Given the data presented in WestLand (2012b) and the calculations of lumens provided by Monrad (2012b), the potential effects of lighting from the mine on LLNBs could

[6] Cited as WestLand (2012b) in this document.

be limited [clearly, the mine footprint, excluding concurrent reclamation areas, will not contain suitable forage for LLNB].

8. REGARDING POTENTIAL EFFECTS OF MINE LIGHTING

Comment/Discussion Point: *"The general location of light source itself was excised in the figures, so that may lead to the impression that there will be no light in most of the project area… certainly the effects of artificial night light in the proximity of the source would have a more significant impact on (for example) Jaguars (a nocturnal species) than areas in the periphery"* (SBA, pg. 22).

Relevant Documents in Record: WestLand 2012b, WestLand 2012c

Clarification: Based on this statement, the SBA suggests that WestLand (2012b) concluded that there will be no increased light levels within most of the project area. It appears that there is some confusion regarding the purpose of the analyses provided by WestLand (2012b).

As stated in WestLand (2012c, pg. 3), we assume that mine activities in general are likely to exclude jaguars from areas within the perimeter fence. Empirical evidence, however, indicates that jaguars do not completely avoid human activity (e.g., Colchero et al. 2010). For example, the GIS model developed by the USFWS (2012) concludes that human activity does not necessarily preclude jaguars. Instead, there is a threshold effect of human activity; areas above this threshold are no longer considered suitable for jaguars and areas below this threshold remain suitable. For this reason, proposed jaguar critical habitat includes areas with some human activity (USFWS 2012). The Rosemont Project is proposed for construction in an area of the Coronado National Forest that already has some level of human activity, as evidenced by comments submitted to the Forest Service regarding the potential effects of the Rosemont Project on recreational activities in and near the northern Santa Rita Mountains. Clearly, these areas are subject to human uses, including hunting, camping, hiking, and illegal trafficking of people and drugs. As such, the relevant question of interest with respect to potential effects of mine lighting on jaguar is the spatial extent of the light emanating from stationary light sources within the mine that may extend outside the perimeter fence.

The analysis performed and figures presented in WestLand (2012b) inform this question. To simplify the presentation of this analysis, however, lux values within the light-emanating areas of the mine are explicitly described in the text, and not visually presented on the figures. The amount of light within the area identified as "general location of light sources" on the figures presented by WestLand (2012b) is explicitly quantified in the text of WestLand (2012b, pg. 4).

9. REGARDING POTENTIAL EFFECTS OF MINE LIGHTING ON THE BIOLOGICAL CLOCK OF JAGUAR AND OCELOT

Comment/Discussion Point: *"All aspects of mammalian behavioral changes discussed by Beier (2006), above, could affect Jaguar and Ocelot in the vicinity… Certainly the added illumination will disrupt the biological clock of Jaguar and Ocelot, which are primarily to persistently nocturnal species"* (SBA, pg. 24).

Relevant Documents in Record: SBA

Clarification: The SBA references discussions in Beier (2006) to conclude that lights will disrupt the biological clock of jaguar and ocelot. Almost all the studies discussed in Beier (2006) in reference to the disruption of biological clocks, "demonstrate that brief (10- to 15-minute duration) and moderately bright (about 1,000 lux, equivalent to bright twilight) stimuli can shift the circadian clock by 1 to 2 hours—these experiments were conducted only on captive animals held in 24-hour darkness except for the experimental stimuli" (Beier 2006, pg. 31).

Dauchy et al. (1997) [discussed in Beier (2006)] and (2010), however, do provide evidence that the physiology of captive rats can be affected by illumination as low as 0.2 lux, although most effects are seen in experimental conditions of constant bright light (300 lux) during the dark phase. These findings are based on rats held under tightly controlled, experimental conditions with the goal, in part, of supporting improved laboratory animal facility design and enhanced lighting protocols (Dauchy et al. 2010). In general, we agree with the caution expressed by Beier (2006, pg. 31): although these laboratory results can be informative, they cannot be directly translated to wild animals.

10. REGARDING CONSERVATION MEASURES FOR PIMA PINEAPPLE CACTUS

The SBA does not include conservation measures related to Pima pineapple cactus (PPC) in either its discussion of Helvetia Ranch North (pg. 43) or conservation measures specific to PPC (pg. 53-54). As stated in the BA for the Rosemont Copper Project, Helvetia Ranch North is occupied by PPC. WestLand surveyed for PPC on Helvetia Ranch North and found 13 live and one dead PPC during a 17 percent survey of the entire parcel. Based on the geological conditions of occupied areas, Helvetia Ranch North contains up to 705 acres of suitable PPC habitat.

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ATTACHMENT A

SCORES AND WEIGHTINGS USED IN CORRIDOR MODELS

(AVAILABLE AT CORRIDORDESIGN.ORG)

		Mammals															
Land cover class	**Land cover grid value**	Antelope Jackrabbit	Arizona Gray Squirrel	Badger	Bighorn Sheep	Black Bear	Black-tailed Jackrabbit	Coati	Coues' White-tailed Deer	Elk	Jaguar	Javelina	Kit Fox	Mountain Lion	Mule Deer	Porcupine	Pronghorn
Conifer-Oak Forest and Woodland	1	26	89	48	11	100	28	89	89	100	89	33	22	100	67	100	22
Encinal	2	63	85	48	11	100	50	100	100	94	89	67	33	100	78	100	39
Mixed Conifer Forest and Woodland	3	19	63	44	11	78	11	100	72	100	78	44	17	78	78	96	22
Pine-Oak Forest and Woodland	4	22	85	52	11	100	50	89	89	100	78	33	17	100	78	100	28
Pinyon-Juniper Woodland	5	41	44	67	11	44	67	89	83	100	89	56	22	100	56	96	44
Ponderosa Pine Woodland	6	15	67	52	11	67	44	89	61	100	67	44	17	67	56	100	33
Spruce-Fir Forest and Woodland	7	0	41	44	11	67	17	33	50	100	67	22	0	67	22	100	22
Aspen Forest and Woodland	8	4	33	41	11	56	22	33	56	100	44	0	6	78	100	100	0
Juniper Savanna	9	48	22	89	22	33	78	56	83	100	78	33	78	67	67	59	72
Montane-Subalpine Grassland	10	15	4	93	44	67	33	33	50	100	67	22	22	44	67	41	83
Semi-Desert Grassland and Steppe	11	96	0	100	56	56	72	33	44	39	100	89	100	56	89	48	100
Big Sagebrush Shrubland	12	37	0	78	33	33	89	33	17	44	67	11	67	44	78	59	72
Blackbrush-Mormon-tea Shrubland	13	48	0	74	44	22	67	33	22	33	56	0	67	44	44	56	50
Chaparral	14	30	44	52	11	78	50	56	78	56	67	78	44	78	67	63	22
Creosotebush, Mixed Desert and Thorn Scrub	15	85	0	89	44	44	94	56	56	11	89	78	100	44	44	56	89
Creosotebush-White Bursage Desert Scrub	16	85	0	89	44	11	94	33	33	11	67	67	100	44	44	56	94
Desert Scrub (misc)	17	89	0	74	89	56	100	22	50	22	67	89	100	44	44	56	78
Gambel Oak-Mixed Montane Shrubland	18	44	74	59	11	78	56	67	94	89	78	22	56	78	67	67	61
Mat Saltbush Shrubland	19	41	0	63	22	0	67	11	22	28	56	0	72	44	22	63	56
Mesquite Upland Scrub	20	81	7	74	33	44	72	78	72	33	67	89	56	67	78	63	39
Mixed Low Sagebrush Shrubland	21	56	0	74	44	22	89	44	22	33	44	0	67	44	56	56	94
Paloverde-Mixed Cacti Desert Scrub	22	89	0	63	78	56	100	44	22	22	56	100	78	33	78	56	83
Pinyon-Juniper Shrubland	23	59	4	70	22	44	78	78	83	100	67	0	67	89	56	67	72
Sand Shrubland	24	48	0	70	33	0	78	11	17	17	44	0	89	56	33	56	61
Stabilized Coppice Dune and Sand Flat Scrub	25	48	0	67	22	0	78	11	22	17	44	33	100	56	44	44	39
Greasewood Flat	26	48	22	41	33	11	61	56	61	56	78	0	83	44	44	67	39
Riparian Mesquite Bosque	27	74	52	41	11	56	61	89	78	78	100	100	61	67	78	81	28
Riparian Woodland and Shrubland	28	52	100	41	11	56	67	100	89	94	100	89	50	89	78	81	28
Arid West Emergent Marsh	29	11	11	26	0	56	11	78	56	94	89	56	11	22	56	11	33
Active and Stabilized Dune	30	56	0	22	0	0	61	11	6	0	11	22	72	22	0	30	39
Badland	31	15	0	37	0	0	22	11	6	0	11	11	11	44	11	15	33
Barren Lands, Non-specific	32	19	0	33	22	0	28	11	0	0	0	11	11	22	0	11	39
Bedrock Cliff and Outcrop	33	19	7	15	89	0	28	33	22	0	44	22	11	44	22	44	6
Cliff and Canyon	34	26	7	11	100	0	28	67	22	0	0	33	11	44	33	44	0
Mixed Bedrock Canyon and Tableland	35	22	7	11	89	0	22	44	11	11	0	0	11	44	33	41	22
Playa	36	22	0	15	11	0	22	0	6	0	0	22	11	0	44	0	33
Volcanic Rock Land and Cinder Land	37	22	0	0	33	0	17	33	6	0	11	11	22	11	22	15	28
Warm Desert Pavement	38	11	0	11	11	0	17	33	0	0	11	22	11	11	11	4	33
Wash	39	63	11	22	11	22	56	56	22	17	22	100	44	33	89	30	78
Invasive Grassland or Forbland	40	56	0	63	44	0	61	33	44	67	56	56	67	33	56	37	83
Invasive Riparian Woodland and Shrubland	41	37	30	26	11	0	56	67	67	89	78	56	44	56	78	67	28
Recently Mined or Quarried	42	0	0	7	0	0	0	11	11	0	0	0	0	22	44	15	0
Agriculture	43	37	30	48	0	44	50	56	33	33	11	33	33	0	44	33	28
Developed, Medium - High Intensity	44	7	7	0	0	0	11	11	0	0	0	33	11	0	11	11	0
Developed, Open Space - Low Intensity	45	41	11	30	0	0	44	33	17	33	0	67	33	22	56	30	22
Open Water	46	7	11	7	0	0	11	0	33	6	33	0	0	11	0	0	39

Mammals

	Antelope Jackrabbit	Arizona Gray Squirrel	Badger	Bighorn Sheep	Black Bear	Black-tailed Jackrabbit	Coati	Coues' White-tailed Deer	Elk	Jaguar	Javelina	Kit Fox	Mountain Lion	Mule Deer	Porcupine	Pronghorn
Elevation (in meters)	0 - 152: 78 152 - 457: 89 457 - 1524: 100 1524 - 1676: 22 1676 - 4000: 0	0 - 1003: 11 1003 - 1524: 67 1524 - 2012: 100 2012 - 2850: 67 2850 - 4000: 22	0 - 1676: 100 1676 - 2438: 78 2438 - 4000: 44	0 - 899: 89 899 - 1006: 100 1006 - 2134: 78 2134 - 4000: 33	0 - 762: 22 762 - 1219: 44 1219 - 1981: 100 1981 - 2591: 89 2591 - 4000: 67	0 - 1829: 100 1829 - 2438: 67 2438 - 4000: 22	-	0 - 610: 33 610 - 914: 44 914 - 1219: 89 1219 - 1829: 100 1829 - 2438: 78 2438 - 4000: 33	-	0 - 1219: 78 1219 - 1829: 100 1829 - 2438: 78 2438 - 4000: 67	0 - 1524: 100 1424 - 2134: 78 2134 - 4000: 0	-	-	-	-	-

Mammals

GIS Habitat Factor	Antelope Jackrabbit	Arizona Gray Squirrel	Badger	Bighorn Sheep	Black Bear	Black-tailed Jackrabbit	Coati	Coues' White-tailed Deer	Elk	Jaguar	Javelina	Kit Fox	Mountain Lion	Mule Deer	Porcupine	Pronghorn
Land Cover	70	70	65	30	75	70	95	65	75	60	50	75	70	80	87	45
Elevation	10	10	7	10	10	10	0	5	0	5	30	0	0	0	0	0
Topography	13	10	15	50	10	10	0	15	0	15	20	15	10	15	3	37
Distance from Roads	7	10	13	10	5	10	5	15	25	20	0	10	20	5	10	18

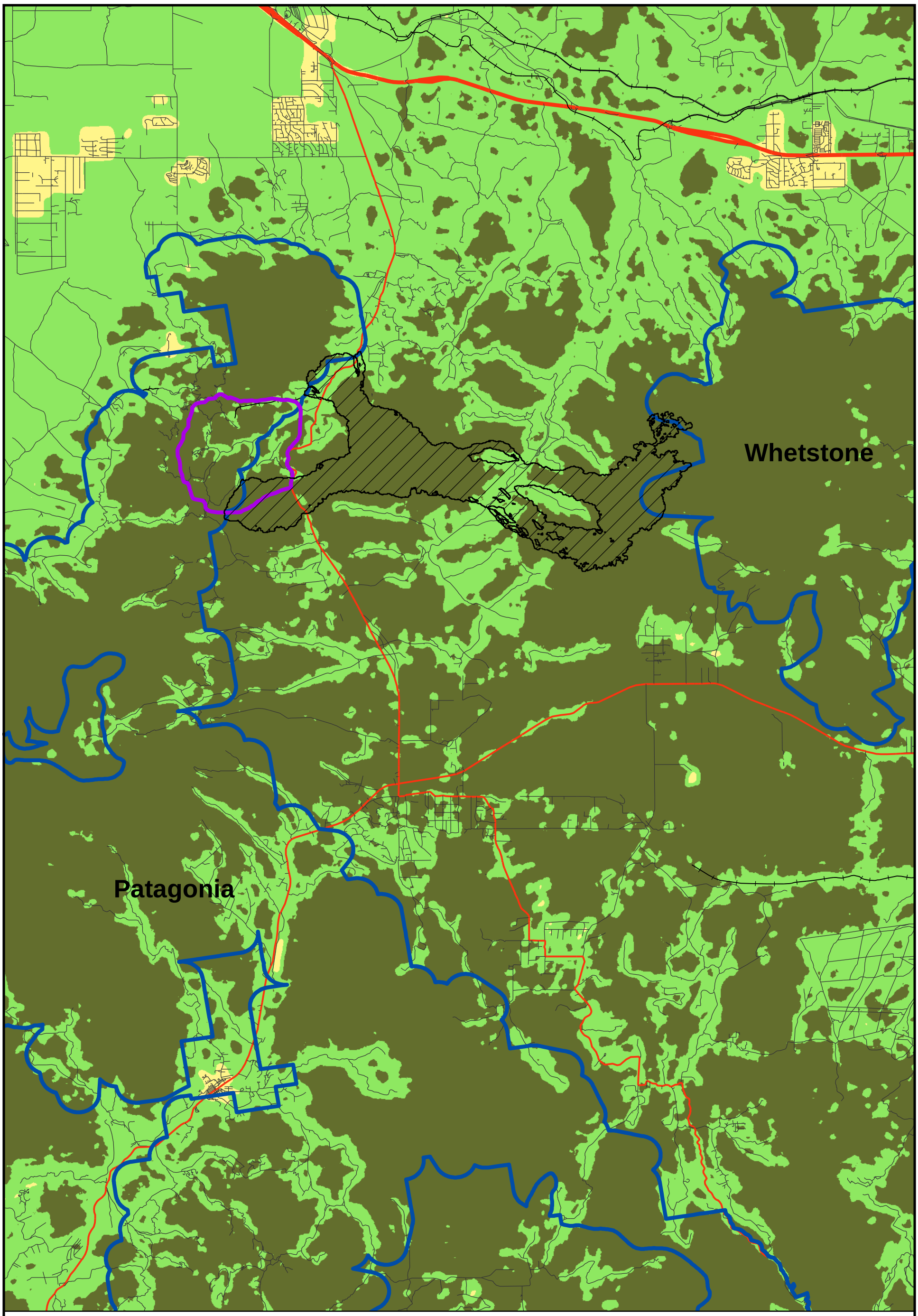
		Mammals															
Topo position class	**Topo grid value**	Antelope Jackrabbit	Arizona Gray Squirrel	Badger	Bighorn Sheep	Black Bear	Black-tailed Jackrabbit	Coati	Coues' White-tailed Deer	Elk	Jaguar	Javelina	Kit Fox	Mountain Lion	Mule Deer	Porcupine	Pronghorn
Canyon Bottom	1	48	100	56	22	78	72	-	100	-	100	100	-	100	89	100	33
Flat - Gentle Slopes	2	96	61	100	33	44	94		61		56	100		78	89	89	100
Steep Slope	3	70	61	26	100	78	67		94		89	33		78	67	100	22
Ridgetop	4	56	39	37	56	67	67		67		67	67		67	44	89	44

Mammals

	Antelope Jackrabbit	Arizona Gray Squirrel	Badger	Bighorn Sheep	Black Bear	Black-tailed Jackrabbit	Coati	Coues' White-tailed Deer	Elk	Jaguar	Javelina	Kit Fox	Mountain Lion	Mule Deer	Porcupine	Pronghorn
Dist from roads class (in meters)	0 - 250: 11 250 - 500: 44 500 - 1000: 78 1000 - 15000: 100	0 - 250: 33 250 - 500: 67 500 - 15000: 100	0 - 250: 44 250 - 15000: 100	0 - 1000: 44 1000 - 15000: 100	0 - 100: 11 100 - 500: 67 500 - 15000: 100	0 - 250: 11 250 - 500: 44 500 - 1000: 78 1000 - 15000: 100	0 - 500: 22 500 - 1000: 78 1000 - 15000: 100	0 - 250: 22 250 - 500: 44 500 - 750: 89 750 - 15000: 100	0 - 100: 11 100 - 200: 22 200 - 400: 44 400 - 1000: 55 1000 - 2000: 89 2000 - 15000: 100	0 - 250: 1 250 - 500: 33 500 - 1000: 56 1000 - 2000: 89 2000 - 15000: 100	-	0 - 50 : 33 50 - 250: 78 250 - 500: 89 500 - 15000: 100	0 - 200: 22 200 - 500: 44 500 - 1000: 56 1000 - 1500: 89 1500 - 15000: 100	0 - 250: 33 250 - 1000: 78 1000 - 15000: 100	0 - 150: 22 250 - 500: 56 500 - 1000: 89 1000 - 15000: 100	0 - 100: 11 100 - 250: 44 250 - 1000; 78 1000 - 15000: 100

ATTACHMENT B

MODELING RESULTS FROM SENSITIVITY ANALYSES



Legend

- Jaguar 1% Corridor
- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates

Average Habitat Suitability

- Low Suitability
- Medium Suitability
- High Suitability

0 15,000 30,000 Feet

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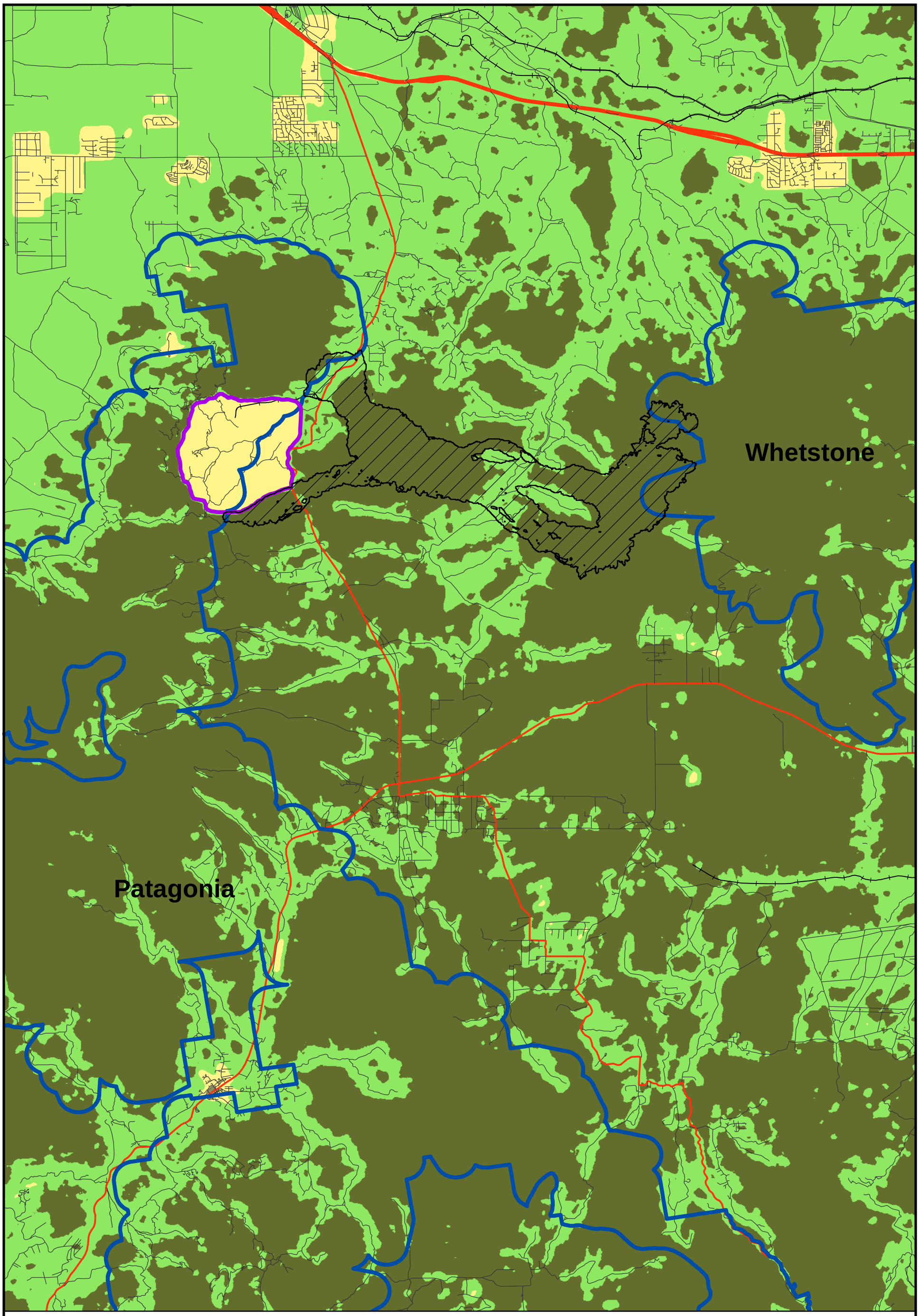
ROSEMONT COPPER
Jaguar Movement Corridor
Sensitivity Analyses

MOVEMENT BETWEEN CRITICAL HABITAT UNITS
Base Data-Mine Not Simulated



Legend

- Jaguar 1% Corridor
- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates

Average Habitat Suitability

- Low Suitability
- Medium Suitability
- High Suitability

0 15,000 30,000 Feet

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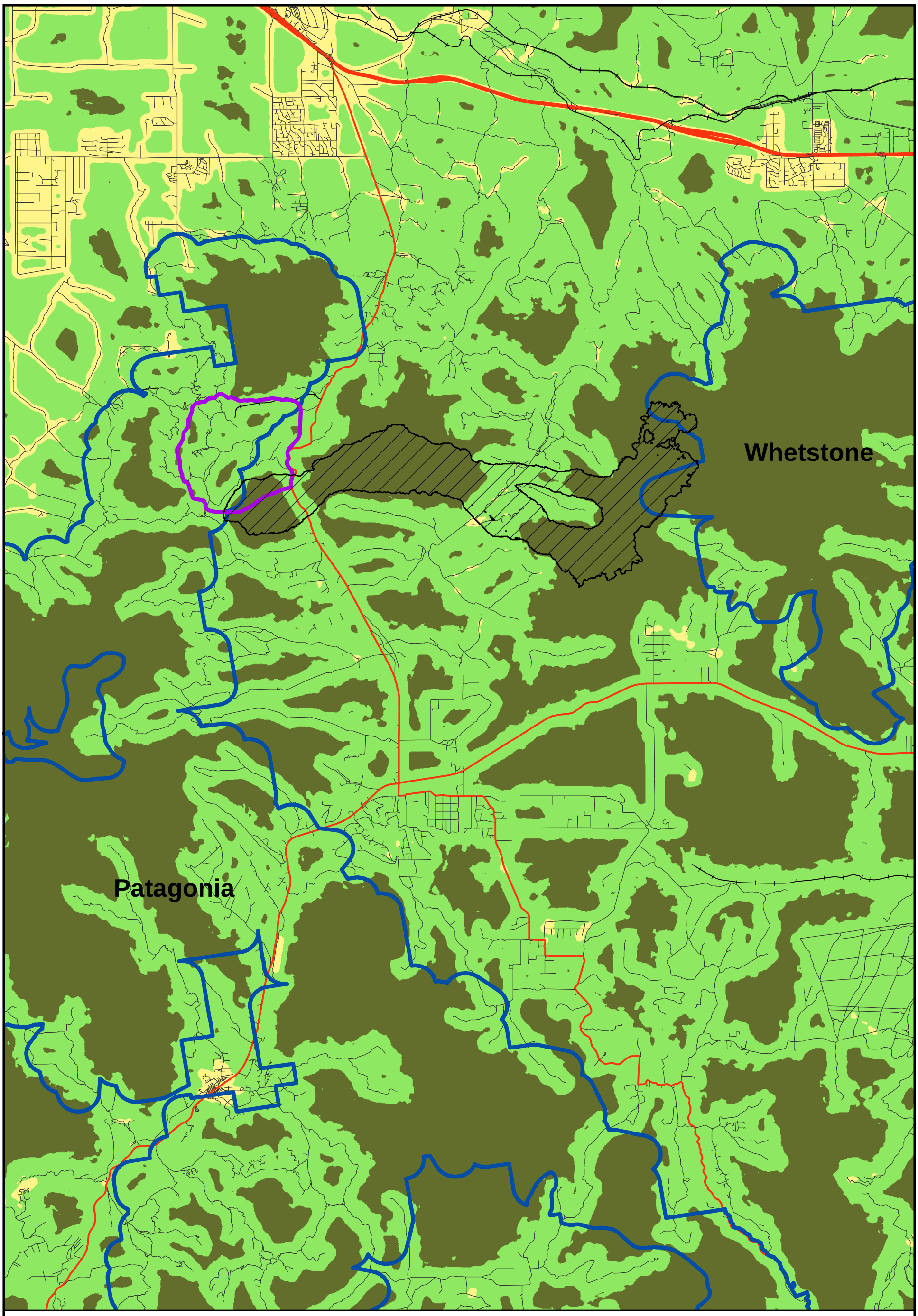
Sensitivity Analyses

MOVEMENT BETWEEN CRITICAL HABITAT UNITS
Base Data-Mine Simulated



Legend

- Jaguar 1% Corridor
- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates

Average Habitat Suitability

- Low Suitability
- Medium Suitability
- High Suitability

0 15,000 30,000 Feet

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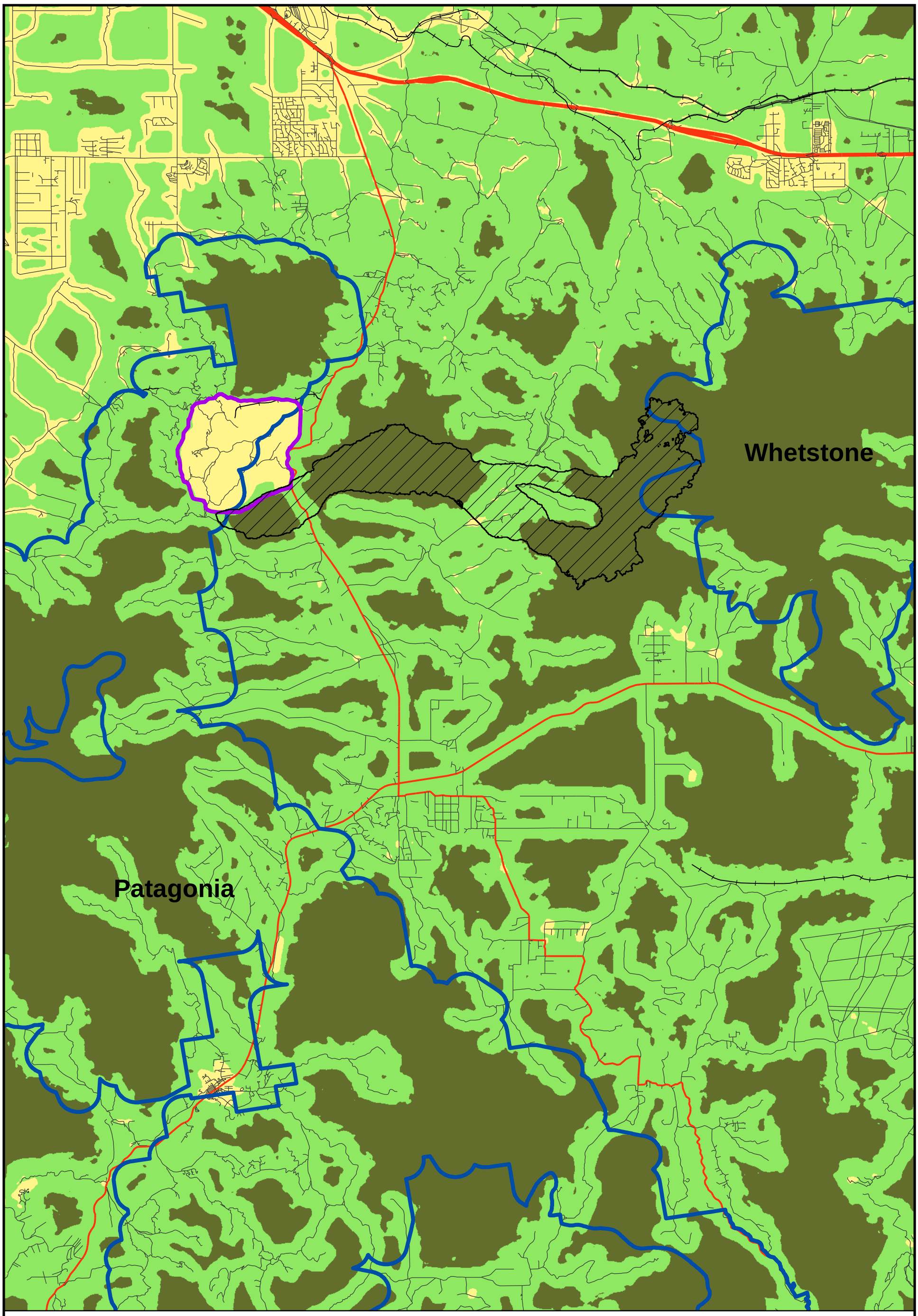
Sensitivity Analyses

MOVEMENT BETWEEN CRITICAL HABITAT UNITS
Mine Not Simulated-Increased Road Weight
Road Weight: 40%
Land Cover Weight: 40%



Legend

- Jaguar 1% Corridor
- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates

Average Habitat Suitability

- Low Suitability
- Medium Suitability
- High Suitability

0 15,000 30,000 Feet

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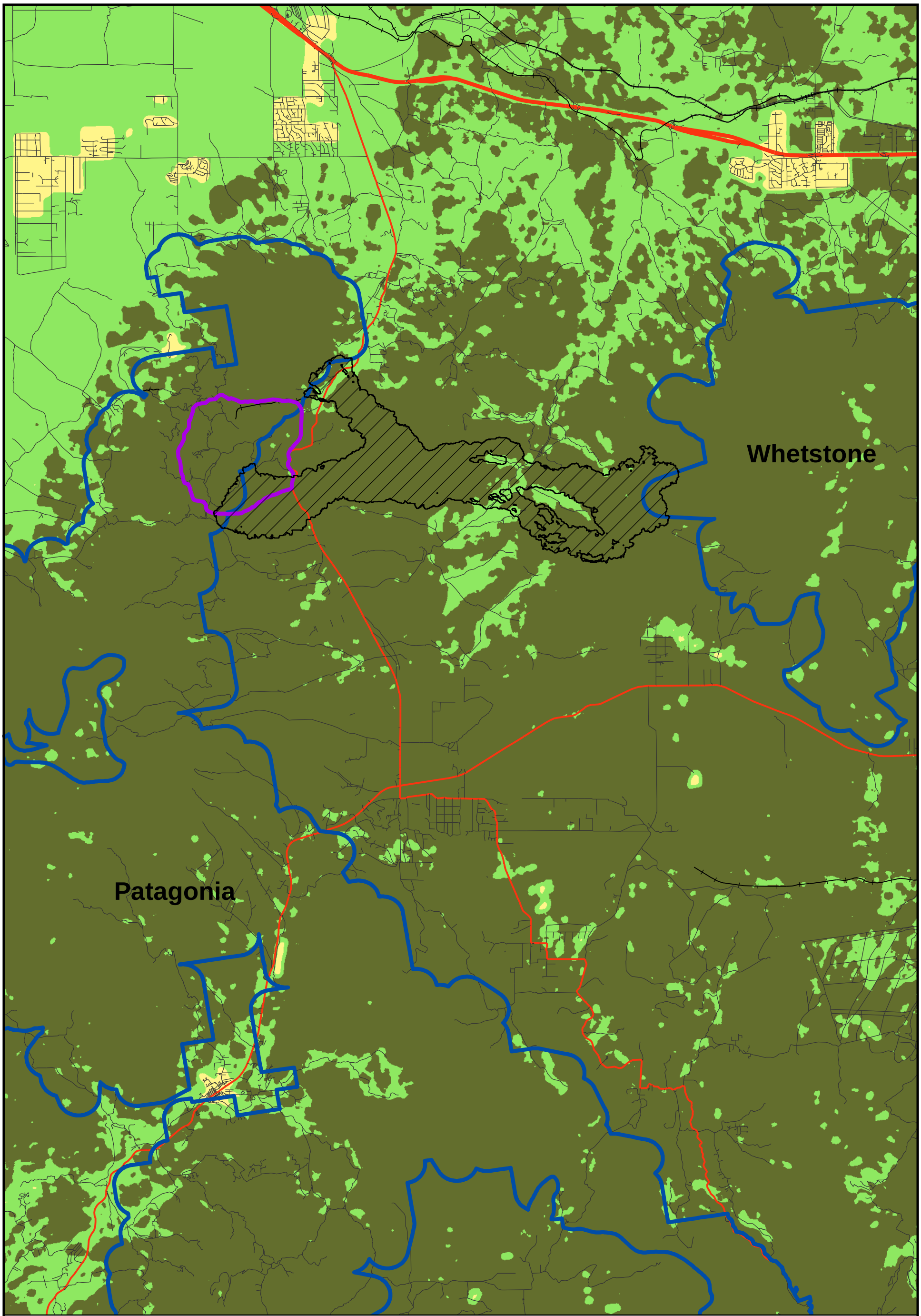
MOVEMENT BETWEEN CRITICAL HABITAT UNITS
Mine Simulated-Increased Road Weight
Road Weight: 40%
Land Cover Weight: 40%



Legend

- Jaguar 1% Corridor
- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates

Average Habitat Suitability

- Low Suitability
- Medium Suitability
- High Suitability

0 15,000 30,000 Feet

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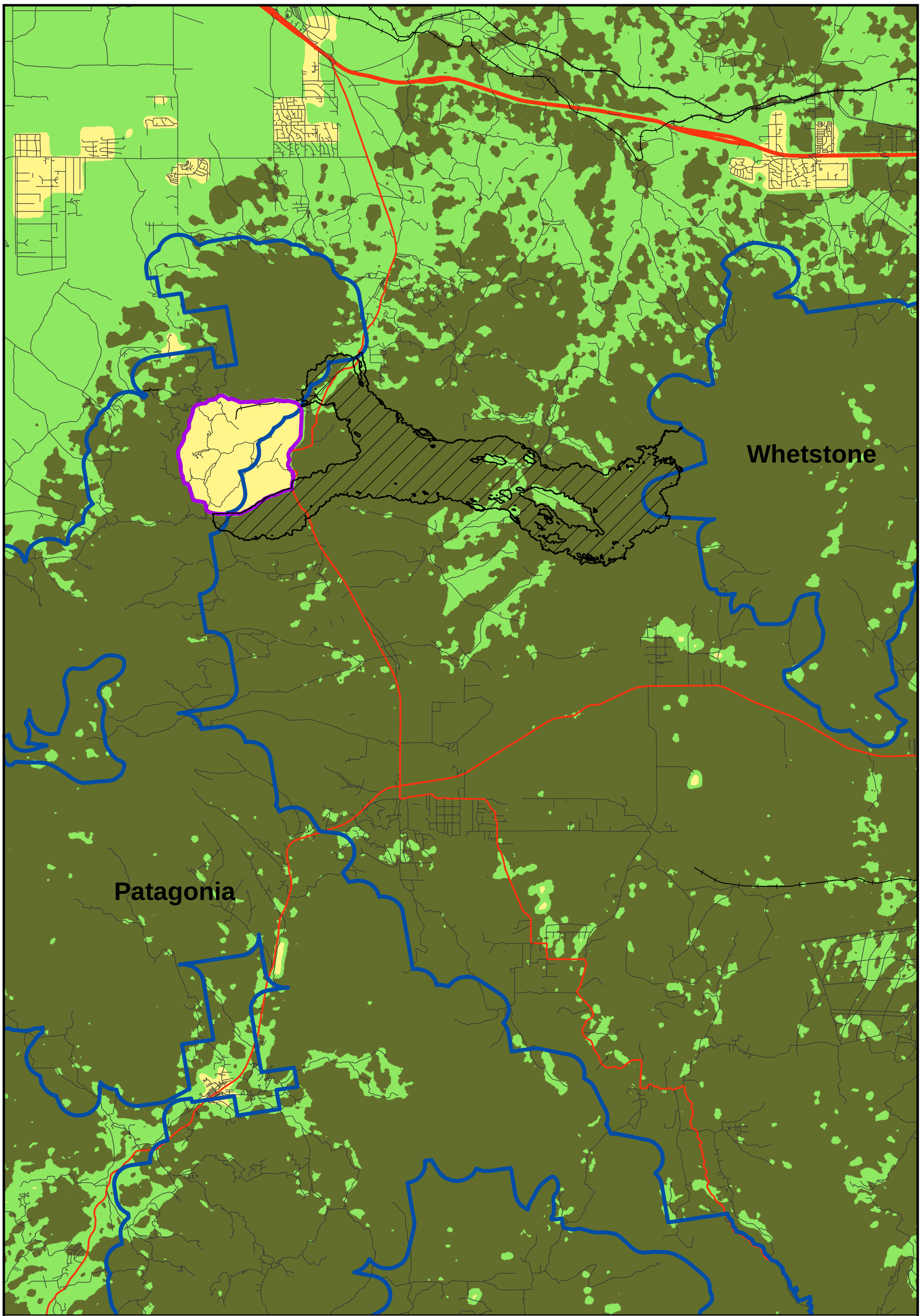
MOVEMENT BETWEEN CRITICAL HABITAT UNITS
Mine Not Simulated-Decreased Road Weight
Road Weight: 10%
Land Cover Weight: 70%



Legend

- Jaguar 1% Corridor
- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates

Average Habitat Suitability

- Low Suitability
- Medium Suitability
- High Suitability

0 15,000 30,000 Feet

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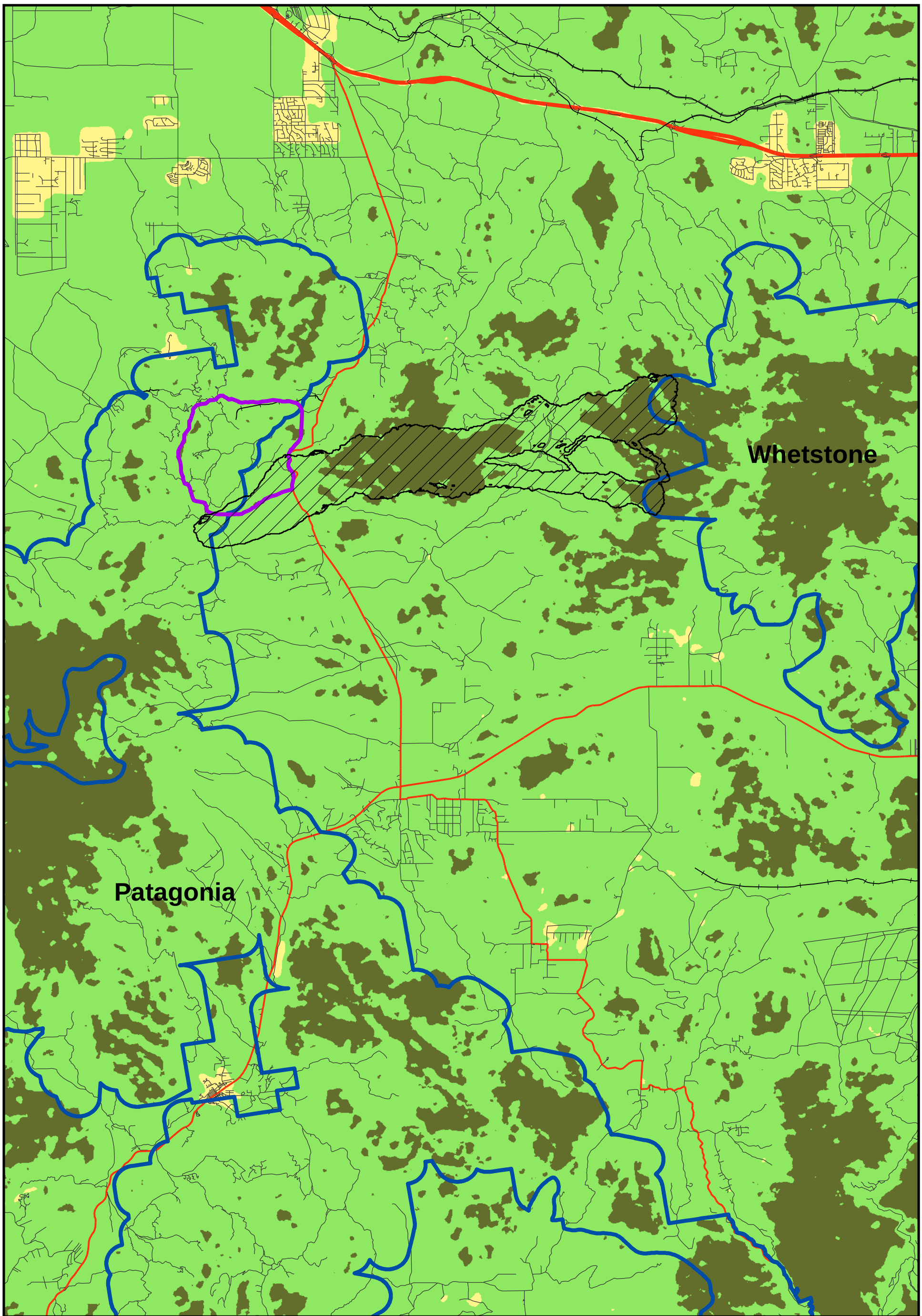
MOVEMENT BETWEEN CRITICAL HABITAT UNITS
Mine Simulated-Decreased Road Weighting
Road Weight: 10%
Land Cover Weight: 70%



Legend

- Jaguar 1% Corridor
- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates

Average Habitat Suitability

- Low Suitability
- Medium Suitability
- High Suitability

0 15,000 30,000 Feet

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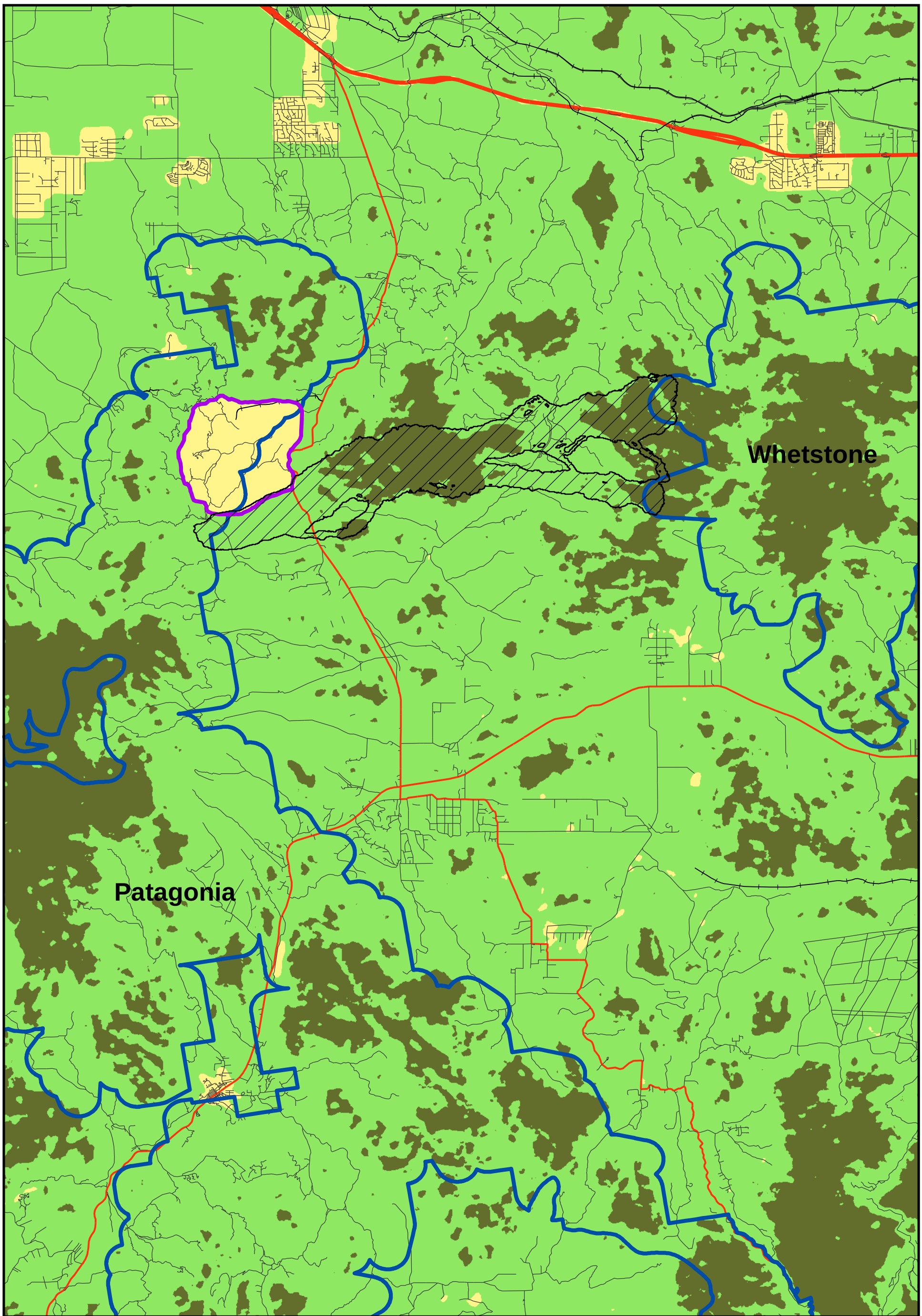
MOVEMENT BETWEEN CRITICAL HABITAT UNITS
Mine Not Simulated-Land Cover Scores Altered
Madrean Oak Woodland Score: 45
Semi-desert Grassland Score: 50



Legend

- Jaguar 1% Corridor
- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates

Average Habitat Suitability

- Low Suitability
- Medium Suitability
- High Suitability

0 15,000 30,000 Feet

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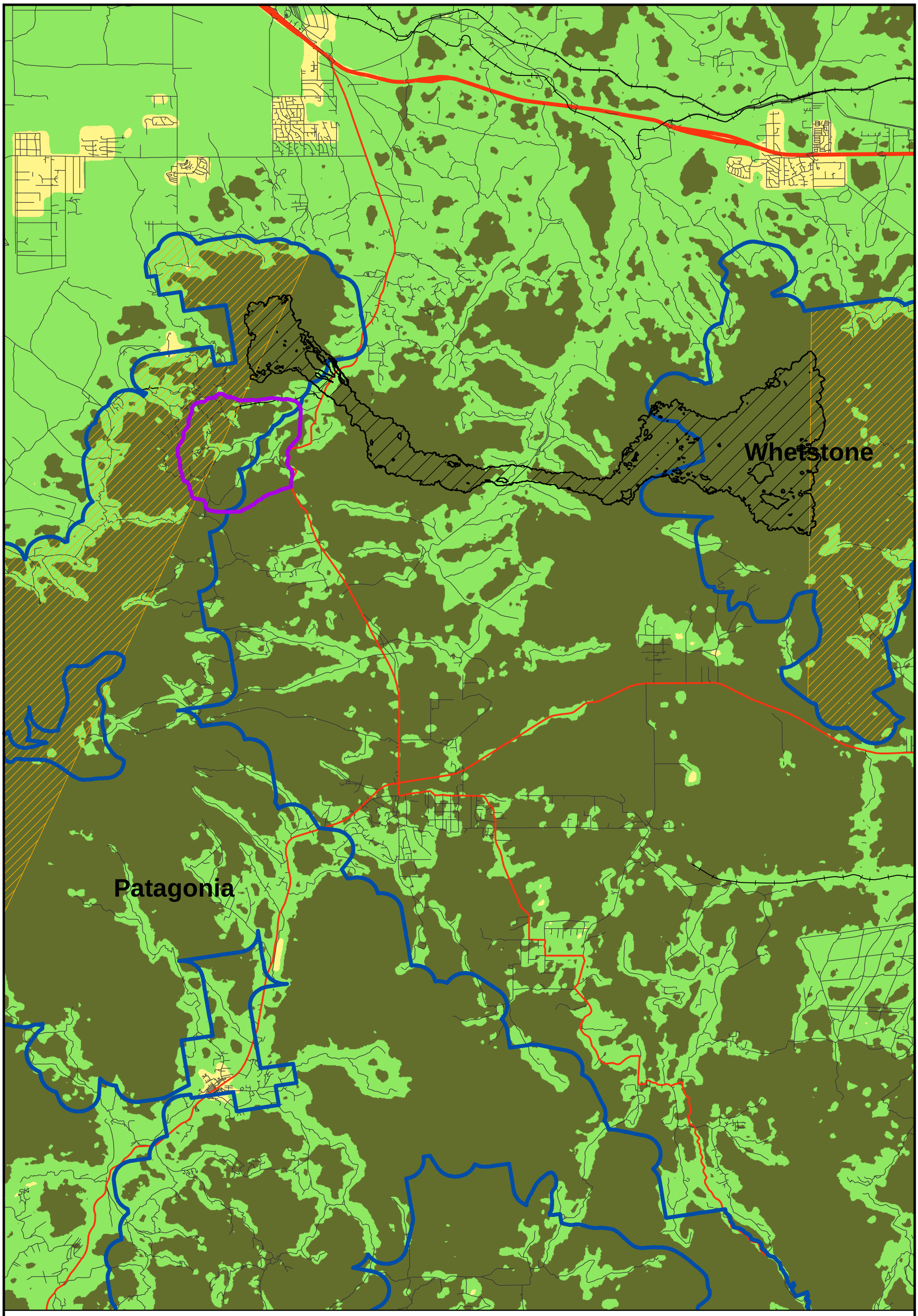
Sensitivity Analyses

MOVEMENT BETWEEN CRITICAL HABITAT UNITS
Mine Simulated-Land Cover Scores Altered
Madrean Oak Woodland Score: 45
Semi-desert Grassland Score: 50



Legend

- Jaguar 1% Corridor
- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates
- Model Endpoints

Average Habitat Suitability

- Low Suitability
- Medium Suitability
- High Suitability

0 15,000 30,000 Feet

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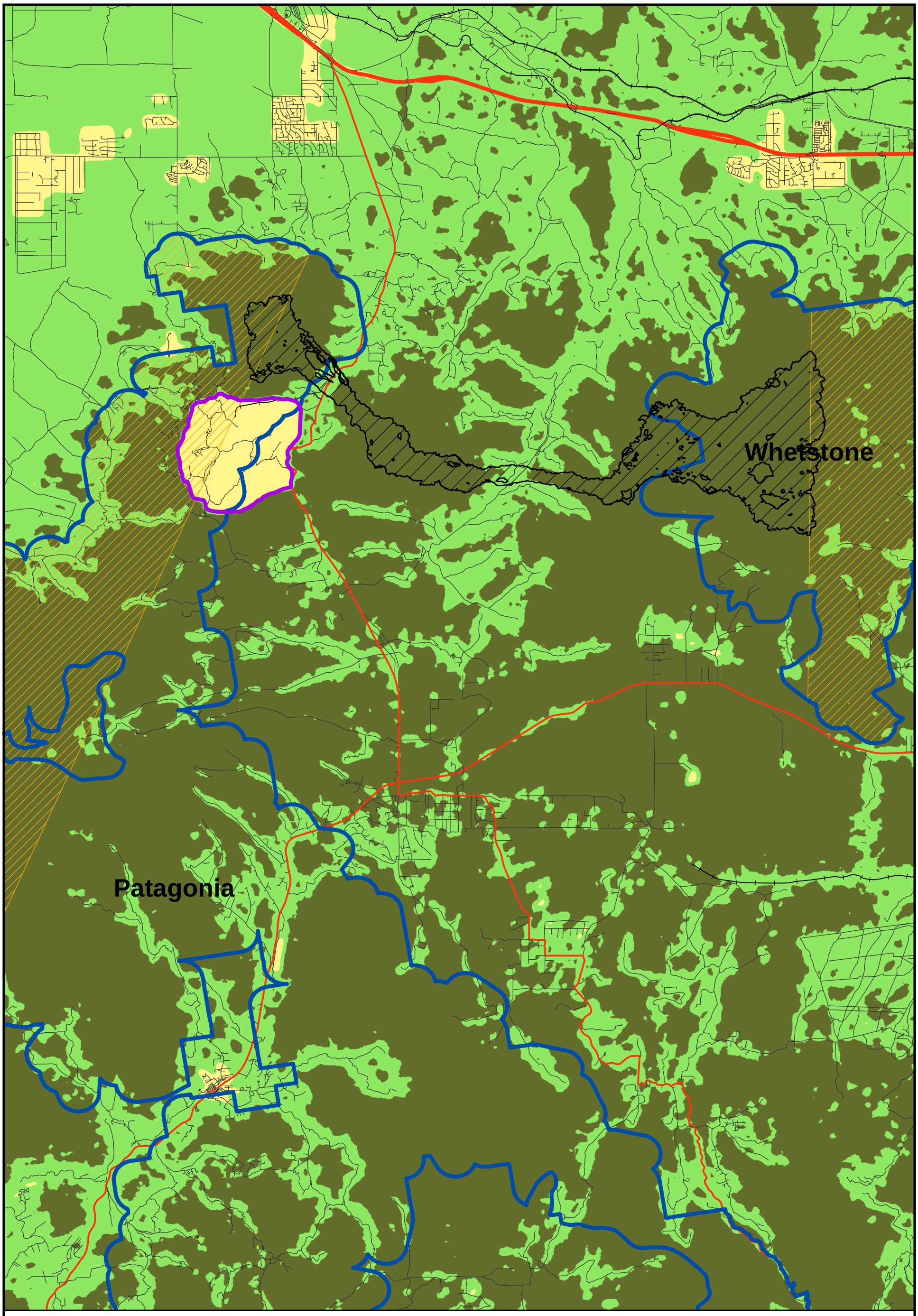
Jaguar Movement Corridor
Sensitivity Analyses

MOVEMENT BETWEEN CRITICAL HABITAT UNITS
Mine Not Simulated-Habitat Unit Start/End Points Altered



Legend

- Jaguar 1% Corridor
- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates
- Model Endpoints

Average Habitat Suitability

- Low Suitability
- Medium Suitability
- High Suitability

0 15,000 30,000 Feet

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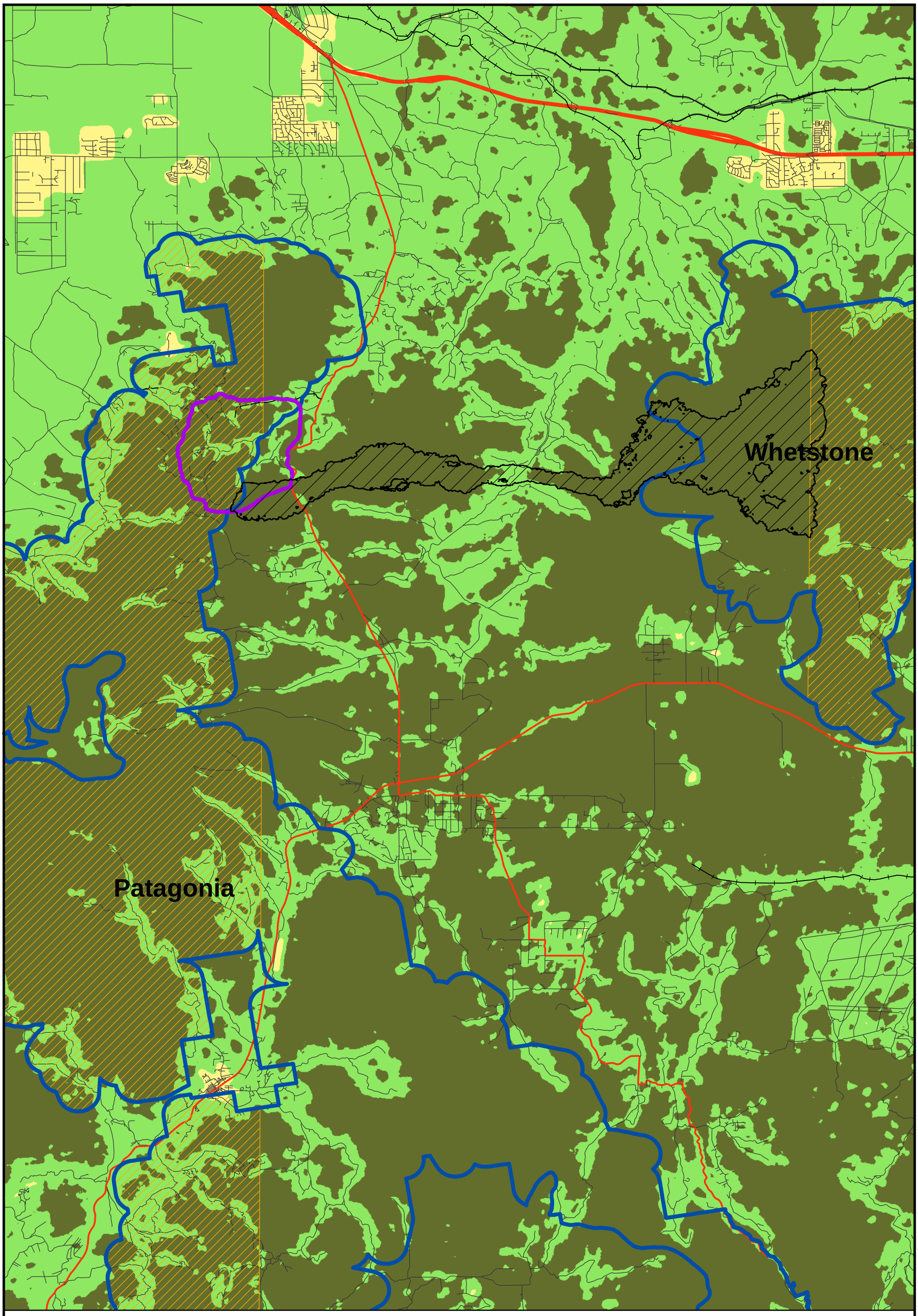
Jaguar Movement Corridor
Sensitivity Analyses

MOVEMENT BETWEEN CRITICAL HABITAT UNITS
Mine Simulated-Habitat Unit Start/End Points Altered



Legend

- Jaguar 1% Corridor
- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates
- Model Endpoints

Average Habitat Suitability

- Low Suitability
- Medium Suitability
- High Suitability

0 15,000 30,000 Feet

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ROSEMONT COPPER
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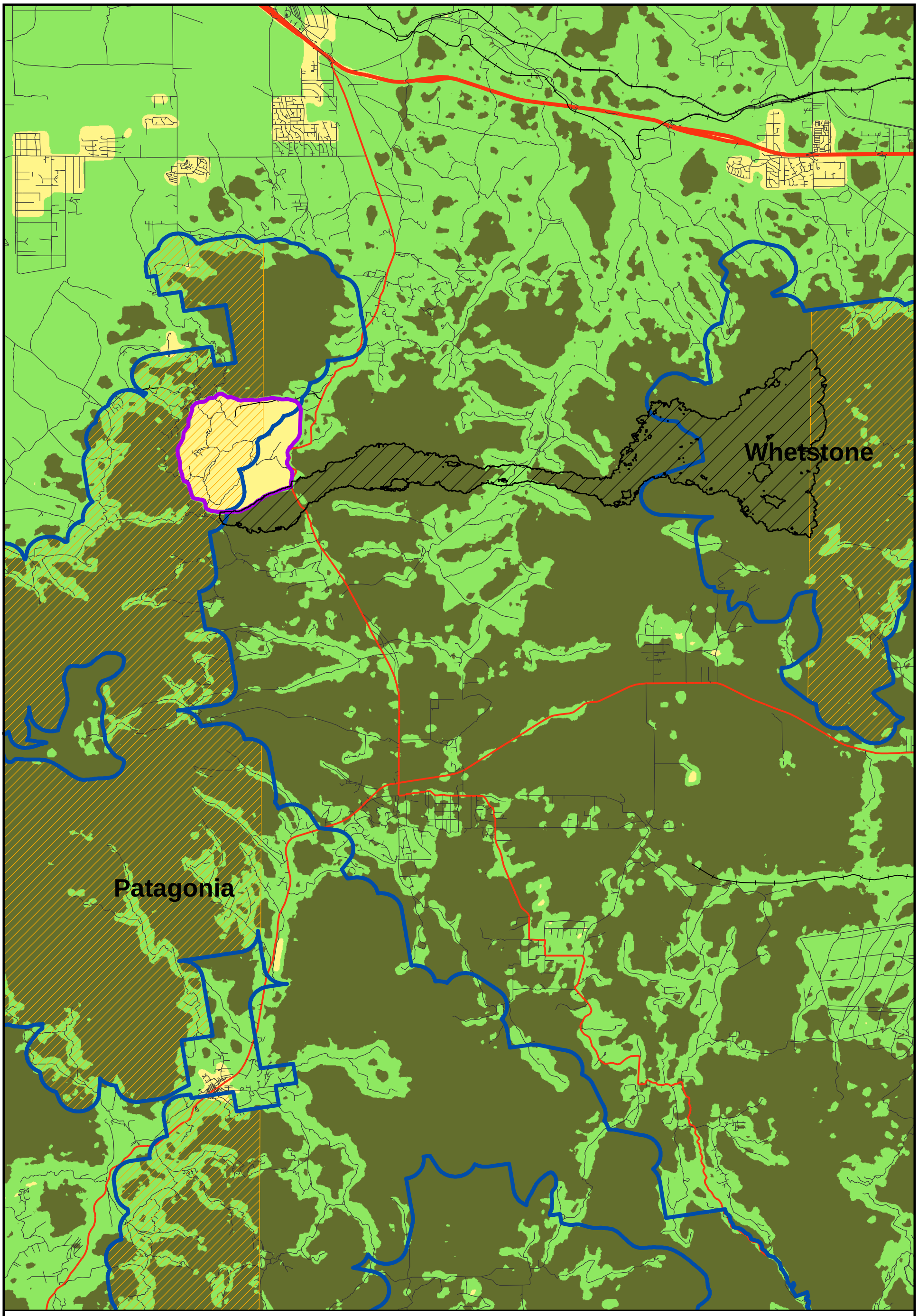
Sensitivity Analyses

MOVEMENT BETWEEN CRITICAL HABITAT UNITS
Mine Not Simulated-Habitat Unit Start/End Points Altered



Legend

- Jaguar 1% Corridor
- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates
- Model Endpoints

Average Habitat Suitability

- Low Suitability
- Medium Suitability
- High Suitability

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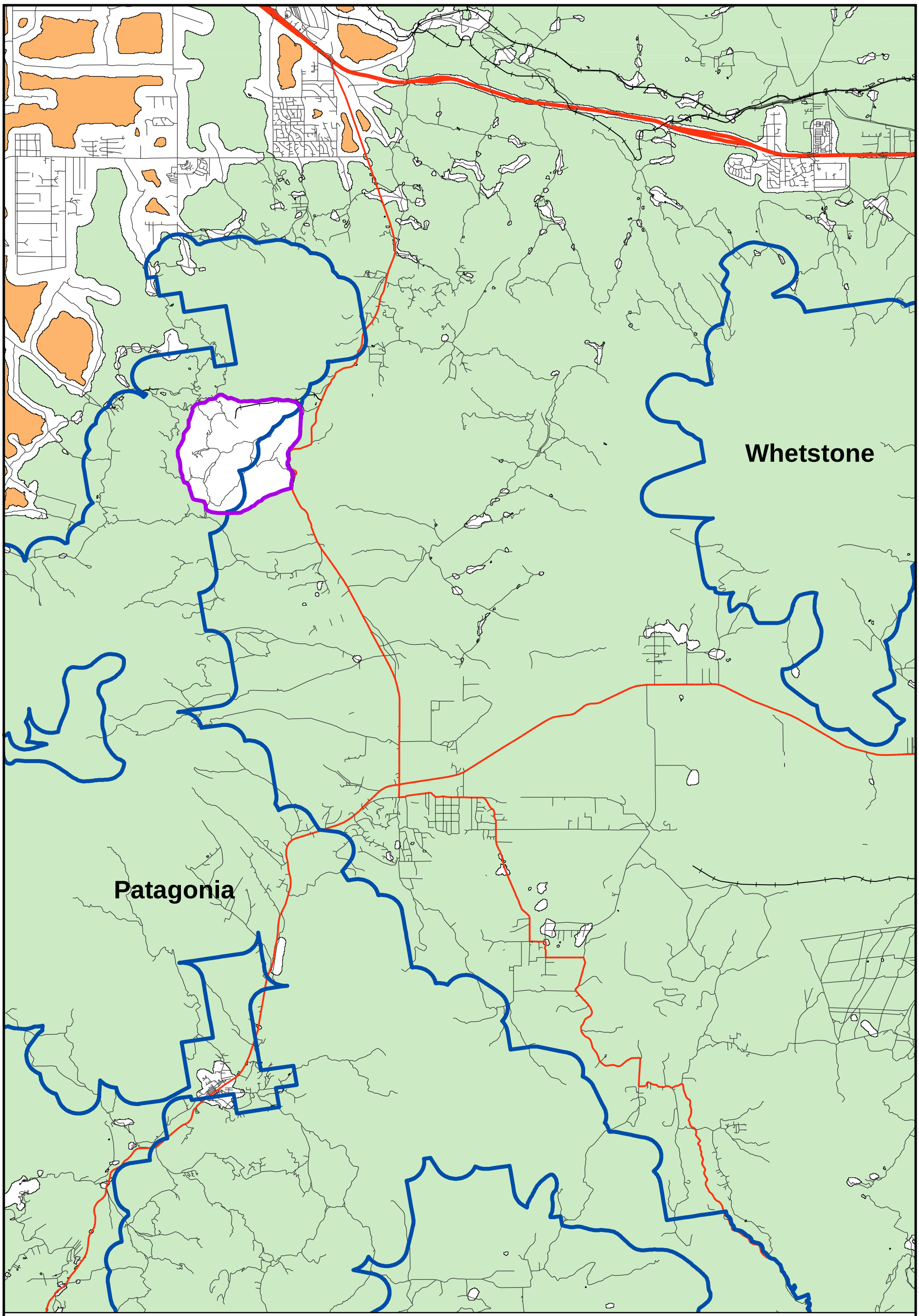
0 15,000 30,000 Feet

ROSEMONT COPPER
Jaguar Movement Corridor
Sensitivity Analyses

MOVEMENT BETWEEN CRITICAL HABITAT UNITS
Mine Simulated-Habitat Unit Start/End Points Altered

ATTACHMENT C

HABITAT PATCH/ CORE MODEL



Legend

- Rosemont Perimeter Fence
- Critical Habitat Block
- Roads
- Railroads
- US,State,County Hwys
- Interstates
- No Habitat
- Smaller than a Patch
- Potential Core

0 15,000 30,000 Feet

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Jaguar Movement Corridor
Sensitivity Analyses

HABITAT PATCH/CORE MODEL
Mine Simulated