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1. INTRODUCTION

WestLand Resources, Inc. (WestLand) was retained by Rosemont Copper Company (Rosemont) to prepare a series of technical memorandums for the Rosemont Copper Project (Project) that detail conservation measures proposed for species listed under the Endangered Species Act in connection with the Section 7 consultation process. This memorandum describes conservation measures that are proposed specifically for impacts to lesser long-nosed bat foraging resources and roosting habitat, and is a supplement to the Biological Assessment for the Rosemont Copper Company Project dated June 2012 (SWCA 2012).

2. FORAGING RESOURCE CONSERVATION MEASURES

Palmer’s agave is the most common agave species in the Project area and the only agave in the Project area that is important as a nectivorous bat foraging resource; therefore, all future references to agave in this technical memorandum will be referring to Palmer’s agave.1

The goal of the conservation measures for impacts to lesser long-nosed bat foraging resources is to mitigate the spatial and temporal loss of the forage resources through the replacement of agave on the landscape and supplemental feeding.

2.1. CONCURRENT RECLAMATION

Rosemont will implement its concurrent reclamation program as outlined in the Preliminary Reclamation and Closure Plan for the Barrel Alternative (CDM 2012). Note that this is not a final reclamation design, which will be ultimately dependent on the Coronado National Forest’s (CNF’s) Record of Decision. The conservation measures described here may be revised as the reclamation design is finalized. As part of this effort agave will be re-established into suitable reclaimed areas and surrounding areas. This would be accomplished through the planting of nursery-grown agave plants, onsite transplants and agave seeds within the approved seed mix. Concurrent reclamation will occur within an estimated 3,471 acres over 22 years (Table 1).

2.2. AGAVE PLANTING

Three thousand (3,000) nursery-grown or transplanted agave will be planted in reclamation areas and surrounding areas each year for 10 years beginning in Year 1 of reclamation activities (Table 1).

Suitable agaves will be removed from disturbance areas prior to vegetation clearing and placed in an agave nursery for future transplant into reclamation areas. Planted agaves will be monitored for survival, and goals for density and survival rates will be addressed through adaptive management.

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1 Schott’s agave (Agave schottii) is common on the ridges north of Scholefield Canyon, but it is rare elsewhere in the project area. Schott’s agave is not typically used as a foraging resource by lesser long-nosed bats and this species of agave was largely absent from the proposed Rosemont impact area. Only a few rosettes of Parry’s agave were observed on the Property and no flowering stems of Parry’s agave have been found in the project area (WestLand 2009).
Table 1. Concurrent Reclamation Area and Agave Planting. Acreage estimates taken from CDM (2012).

<table>
<thead>
<tr>
<th>Year</th>
<th>Concurrent Reclamation Area (acres)</th>
<th>Number of Agave Transplants or Nursery Grown Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>114</td>
<td>1,400</td>
</tr>
<tr>
<td>Year 2</td>
<td>169</td>
<td>1,700</td>
</tr>
<tr>
<td>Year 3</td>
<td>259</td>
<td>3,000</td>
</tr>
<tr>
<td>Year 4</td>
<td>75</td>
<td>750</td>
</tr>
<tr>
<td>Year 5</td>
<td>93</td>
<td>1,000</td>
</tr>
<tr>
<td>Years 6-10</td>
<td>390</td>
<td>4,000</td>
</tr>
<tr>
<td>Years 11-15</td>
<td>383</td>
<td>4,000</td>
</tr>
<tr>
<td>Years 16-22 (post operations)</td>
<td>1,990</td>
<td>20,000</td>
</tr>
<tr>
<td>Total</td>
<td>3,471</td>
<td>35,850</td>
</tr>
</tbody>
</table>

* 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.

2.3. ALLOTMENT MANAGEMENT PLAN MODIFICATIONS

Rosemont proposes to make permanent structural and non-structural improvements to the Thurber, Debaud, and Rosemont grazing allotments (the Allotments) located on the northeastern side of the Santa Rita Mountains. Rosemont proposes to increase available foraging resources for lesser long-nosed on the Allotments by enhancing the flowering success of agave to offset unavoidable losses of foraging resources within the mine footprint and within 10 miles of the Helena Mine. To accomplish this, Rosemont will request modification of the Allotments’ Allotment Management Plans (AMPs) to implement a grazing rotation schedule that will eliminate livestock grazing on selected pastures from April 1 to June 15 each year (USFWS 2002) to prevent herbivory by cattle on the bolting flower stalks of Palmer’s agave. A minimum of 7,500 acres of pasture will be subject to this modified grazing regime. This is slightly more than 1.5 times the area directly impacted by mine development. This proposed conservation measure is expected to enhance available forage within the probable foraging range of Helena Mine by approximately 150 percent of the anticipated impacts from mine development.

Cattle and other herbivores damage bolting agave flower stalks by grazing on the nutrient-rich stems. A study by Widmer (2002) reported the impact of cattle grazing on agave in both wet and dry years at multiple study sites across the CNF. The study compared the effect of cattle grazing on plots during the time agave flowering stalks were bolting in late spring (May 1st – June 1st) compared to cattle grazing on plots prior to the start of bolting (September 30th – April 30th). Seventy-eight percent of flower stalks were grazed when cattle were occupying the study sites during bolting compared to 55 percent when cattle were not present during the bolting period in 2000, a dry year. Successful flowering in the absence of cattle was twice that when cattle were present. Precipitation, presumably affecting available forage and water resources, appears to affect the degree of herbivory. In a wet year, 60 percent of flowering agaves were grazed when cattle were present during the bolting period compared to only 14 percent when...
cattle were not present during the bolting period in 2001. Again, as with the data collected during 2000, a dry year, successful flowering in the absence of cattle at the study sites in 2001 was approximately twice that when cattle were present.  

Rosemont’s request for modification of the AMPs will specify that to compensate for the permanent loss of flowering agaves for lesser long-nosed bats due to the proposed mine, 4,221 acres, grazing by cattle will be restricted on approximately 7,500 acres during the April 1 to June 15 period through rotation to alternative pastures. Based upon data collected in studies conducted by the UofA (Widmer 2002) restricting grazing between April 1 to June 15 on approximately 7,500 acres will reduce herbivory on bolting agave stalks and increase flowering stalk production by approximately 150 percent of the estimated loss from development of the Rosemont Project. This measure will be combined with additional resources and protections of roost sites described in the lesser long-nosed conservation measures submitted previously to the CNF and to the U.S. Fish and Wildlife Service (USFWS).

3.· ROOSTING HABITAT CONSERVATION MEASURES

The Chicago Mine will be impacted by the Project (Figure 1). Lesser long-nosed bats have been consistently observed during surveys of the Chicago Mine, which is used by bats as a day roost. Two other mines, Helena Mine and Adit R-2, known to be used by lesser long-nosed bats that occur in the vicinity of the Project, will be avoided (Figure 2).

The goal of the mitigation measures for impacts to lesser long-nosed bat roosting habitat is to avoid direct harm to individual bats during the construction phases of the Project, monitor the use of two known lesser long-nosed bat roosts in the vicinity of the Project, and protect those roosts from human disturbance.

3.1. EXCLUSION AND CLOSURE OF MINES WITHIN PROJECT IMPACT AREAS

Rosemont has identified 13 mine features, including the Chicago Mine that are proposed for exclusion and closure prior to Project impacts (Figure 1). The preferred method for exclusion of bats from a mine feature is to block the portal or collar with one-inch-diameter chicken wire. The wire permits bats to fly out of the mine, but they will not fly back through the wire into the mine. Rebar stakes will be placed every two feet and all edges of the chicken wire will be placed flush with the surface at least 2 feet from

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2 During the dry year, 78 percent damage to agave when cattle were present resulted in 22 percent successful flowering whereas in the absence of cattle 55 percent of agave stems were damaged or 45 percent successful flowering. The benefit of removing cattle is equal to 0.45/0.22 = 2.05, a doubling of successful flowering stems. Similarly, during the wet year, 60 percent damage to agave when cattle were present resulted in 40 percent successful flowering whereas in the absence of cattle 14 percent of agave stems were damaged or 86 percent successful flowering. The benefit of removing cattle is equal to 0.486/0.40 = 2.15, a doubling of successful flowering stems. The conclusion drawn from this study is that removing cattle from pastures during the bolting period of agave flower stalks leads to a doubling of the number of successful flower stalk available to lesser long-nosed foraging.

3 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.

4 The current conditions are that there are approximately 1.18 successful flowering agave plants per acre (WestLand 2009). Thus, the predicted number of successful flower stalks within the footprint of the proposed project is 4,981. By designating pastures where cattle grazing will be restricted from April 1 – June 15, the number of successfully flowering agave stalks per acres is predicted to double to approximately 2.36, assuming that density of agaves per acre is equal to the density within the footprint of the Rosemont Project. Implementing this restriction on 7,500 acres of pasture with suitable agave density would yield an estimated 17,700 successfully flowering agave. Approximately 8,850 more than would be expected to flower under the current grazing regime and more than 1.5 times the annual number of flowering agave that would be removed by mine development.
the portal or collar of the mine to eliminate any access to the mine by wildlife. The wire will be placed over the entrance for between four and seven days before the mine is closed. The wire would be removed only immediately prior to closure.

A biological monitor will accompany closure crews during the closure of each mine feature. If gaps between the chicken wire and the perimeter of the portal or collar are noted, the chicken wire should be replaced for an additional four to seven days prior to closure. Once exclusions are in place a report will be submitted to the Arizona Game and Fish Department (AGFD), USFWS, and CNF within 48 hours documenting the closure with “before and after” photographs. Once the mines are closed a monitoring report will be submitted to the AGFD, USFWS, and CNF to document the mine closure.

3.2. Monitoring Known Lesser Long-nosed Bat Roosts in the Project Vicinity

Using methodology approved by AGFD and USFWS, the Helena Mine complex and Adit R2 will be monitored annually for lesser long-nosed bats through mine construction, and then once every 5 years until mine closure.

Temperature and relative humidity data loggers will be placed in the adits, and internal surveys will be conducted at both mines during the monitoring period. One evening emergence count will be conducted at the Helena Mine between late July and early September during the expected season of lesser long-nosed bat use, during each monitoring year.

Following the monitoring activities, a report will be prepared to present the results of that year’s survey. The key findings, such as microclimate data, emergence count, and internal survey findings will be summarized in this report and submitted to AGFD, USFWS, and Coronado National Forest.

3.3. Fencing of Known Lesser Long-nosed Bat Roosts in the Project Vicinity

3.3.1. Adit R-2 Fencing

WestLand has consistently observed lesser long-nosed bats using this feature as a day roost during surveys. The large amounts of yellow splatter suggest this adit may also be used as a night-roost.

Adit R-2 will be fenced to prevent access and disturbance by humans and maintain lesser long-nosed bat access. Adit R-2 is currently fenced with a four-strand barbed-wire fence as shown in Photo 1. Based on field observations, however, this adit has been consistently entered and used by humans since at least 2008. The new fence will be a 6-ft-tall vertical wrought iron fence with J hooks at the top to deter people from climbing over the fence. The wrought iron bars would be spaced every 5-3/8 inches, which is the largest opening that does not allow for human entry. Figure 3 depicts a conceptual layout of the protective fence around Adit R-2.
3.3.2. Helena Mine Fencing

The Helena Mine is a relatively large post-maternity roost for lesser long-nosed bats. More than 5,100 lesser long-nosed bats were counted at the Helena Mine complex in 2009, and approximately 4,650 lesser long-nosed bats were detected in 2011.

The Helena Mine entrances (R37A, B, and C, and 38A and B) will be fenced to prevent access and disturbance by humans and maintain lesser long-nosed bat access to these adits. Figure 4 depicts a conceptual outline of a protective fence around the two Helena Mine complexes. This fence will be a 6-ft-tall vertical wrought iron fence as described for Adit R-2, above.

3.4. Arizona Trail Relocation

The Arizona National Scenic Trail is an 807-mile-long nonmotorized, multiple-use recreation trail that stretches from the Mexico border to the Utah border. The trail is enjoyed by equestrians, hikers, and mountain bikers. The Santa Rita and Las Colinas passages of the Arizona National Scenic Trail are approximately 26 miles long through the Santa Rita Mountains (Arizona Trail Association 2009).

Rosemont has been working closely with the Arizona Trail Association to facilitate the relocation of a portion of the Arizona National Scenic Trail to limit visibility of the Helena Mine entrances to hikers, thus reducing possible disturbance to this lesser long-nosed bat post-maternity roost. The re-route will include abandonment of an existing portion of the Arizona Trail and replacement with a new portion located about one mile to the east. The new route will depart from the existing route just northeast of where the existing trail crosses Box Canyon Road, continuing east and north, and will rejoin the existing route at Mulberry Canyon (Figure 5).
4. REFERENCES


SWCA Environmental Consultants. 2012. Biological Assessment, Rosemont Copper Project, Santa Rita Mountains, Nogales Ranger District.


This map illustrates the presence of bats in the vicinity of the Chicago Mine. The map includes a legend indicating different types of bat presence, such as no evidence of bat use, noted insectivorous bat use, noted nectar feeding bat use, and noted nectar feeding and insectivorous bat use. The map also shows the footprint of the mine boundary and the boundaries of Rosemont Holdings.

**Legend**
- Rosemont Holdings Boundary
- Footprint of Mine Boundary
- BAT PRESENCE:
  - No Evidence of Bat Use
  - Noted Insectivorous Bat Use
  - Noted Nectar Feeding Bat Use
  - Noted Nectar Feeding and Insectivorous Bat Use

**Figure 1**
Lesser Long-nosed Bat Foraging Resources and Roosting Habitat Mitigation Measures
Mines to be Excluded and Closed
ROSEMONT COPPER COMPANY
Lesser Long-nosed Bat Foraging Resources and Roosting Habitat Mitigation Measures
Adit R-2 and Helena Mines
Figure 2
Figures 3: ROSEMONT COPPER COMPANY
Lesser Long-nosed Bat Foraging Resources and Roosting Habitat Mitigation Measures

LEGEND
- Adit R-2 Fence Boundary

Photo Source: PAG Pictometry, 2010

Adit R-2 Fencing
Figure 3
Helena Mine Fencing

Lesser Long-nosed Bat Foraging Resources and Roosting Habitat Mitigation Measures

ROSEMONT COPPER COMPANY

Photo Source: © 2010 DigitalGlobe © 2012 Microsoft Corporation

LEGEND

- Helena Mine Fence Boundary
- Mine Feature

Helena Mine Fencing
Figure 4
Lesser Long-nosed Bat Foraging Resources and Roosting Habitat Mitigation Measures

LEGEND
- Rosemont Holdings Boundary
- Arizona Trail
- Proposed Arizona Trail Relocation (SWCA)
- SR83

Photo Source: © 2010 DigitalGlobe Image courtesy of USGS © 2012 Microsoft Corporation
*Arizona Trail created from Google Earth
December 21, 2012

Mr. Larry Jones  
CORONADO NATIONAL FOREST  
300 W. Congress Street  
Tucson, Arizona  85701

RE: ROSEMONT COPPER PROJECT CONSERVATION MEASURES – SECTION 7 CONSULTATION  
WESTLAND PROJECT NO. 1049.21

Dear Mr. Jones:

Please find attached the following reports:

1) Biological Assessment Supplement Lesser Long-Nosed Bat Forage and Roost Connservation Measures;
2) Biological Assessment Supplement Cienega Creek Watershed Habitat Restoration and Enhancement Program; and
3) Grazing Management Conservation Measures

Please do not hesitate to contact me if you have any questions or require additional information.

Respectfully,

WestLand Resources, Inc.

Brian S. Lindenlaub
Principal

Attachments:

cc: Jean Calhoun, U.S. Fish and Wildlife Service, with Attachments  
Jason Douglas, U.S. Fish and Wildlife Service, with Attachments  
Kathy Arnold, Rosemont Copper Company, with Attachments