Environmental Assessment for the Sandia Ranger District Abandoned Mine Lands Remediation Project

Cibola National Forest, Bernalillo County, New Mexico
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Introduction

Document Structure
The Cibola National Forest (CNF) has prepared this environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA), Forest Service NEPA regulations at 36 CFR 220, and other relevant Federal and State laws and regulations. This EA discloses the direct, indirect, and cumulative environmental impacts that could result from the proposed action and the no action alternative. The document is organized into four parts:

- **Introduction:** This section includes information on the history of the project proposal, the purpose and need for the project, and the Agency’s proposal for achieving the purpose and need. This section also details how the CNF informed the public of the proposal and how the public responded.

- **Alternatives, including the Proposed Action:** This section provides a more detailed description of the proposed action alternative as well as the no action alternative. This discussion also includes possible mitigation measures.

- **Environmental Consequences:** This section describes the environmental effects of implementing the proposed action and other alternatives. Within each section, the existing condition is described first, followed by the effects of the no action alternative that provides a baseline for evaluation and comparison with the proposed action alternative.

- **Consultation and Coordination:** This section provides a list of agencies and persons consulted during development of the EA. It also includes a list of preparers.

Background
National Forest System lands across New Mexico have been subject to mining activities for decades and/or centuries. Only recently have mine operators been required to close and reclaim their facilities. As a result, the CNF has a legacy of unreclaimed facilities from past mining activities. This legacy consists of facilities such as open shafts, adits, and tunnels. These unreclaimed facilities are referred to as “features” and collectively their locations are termed “abandoned mine lands” (AMLs). A number of these features pose physical safety hazards to both humans and wildlife, and present a direct threat to those in their immediate vicinity.

Over the years, many of these features—while dangerous—posed little threat to the general population because they were relatively isolated and few knew of their existence or location. Now, with the expanding urban interface caused by the growing population of New Mexico, and the increasing use of all-terrain vehicles (ATVs), off-highway vehicles (OHVs), and other forms of 4-wheel drive vehicles, increasingly large numbers of the general public are now in contact with many of these once isolated features. At present, there are numerous mines and associated features on the Sandia Ranger District that have been abandoned by miners without safe closure and/or remediation.

Purpose and Need for Action
The purpose of this project is to reduce or eliminate physical safety hazards to the public and to protect wildlife that inhabit or may be harmed by AML features on the Sandia Ranger District of the CNF.
Introduction

This action is needed because many of the abandoned mining features present physical safety hazards to the public and wildlife that should be mitigated. In addition, it should be recognized that many of these features—abandoned for decades or centuries—are now part of the landscape. Some of these features have become home to a variety of wildlife and their closure or elimination could impact existing habitat. Furthermore, some of the abandoned mine features provide insight into historic mining, construction, and production techniques. While public safety is of paramount concern, modern remediation technologies offer opportunities that not only provide for public safety but also conserve and maintain wildlife habitat, cultural resources, and visual qualities.

This action responds to the goals and objectives outlined in the “Cibola National Forest Land and Resource Management Plan” (LRMP) to “Cooperate with other agencies in inventory of mined area rehabilitation needs and mitigation work.” in all management areas except 4 and 5 (LRMP chapter 4, pg. 73). Management Area 4 consists of the Black Kettle and McClellan Creek National Grasslands and Management Area 5 consists of the Kiowa and Rita Blanca National Grasslands. None of the sites identified for remediation in this document are in Management Areas 4 or 5.

Existing Condition

A total of 18 features in 7 areas distributed over the Sandia Ranger District have been identified for investigation and possible remediation. An additional three features were analyzed but were found to be outside of the Sandia Ranger District. Historical records also show two sites have been reported to the Regional AML coordinator for remediation; however, no evidence of the features could be located in the field. The areas are listed in table 1, and the individual features in each area and their proposed remediation are listed in table 2. These areas and their respective features were selected for remediation due to their proximity to urban areas, accessibility, visibility, and potential physical safety hazards to humans and wildlife. Refer to figures 1 to 6 for maps with feature locations.

Table 1. AML feature locations

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Type</th>
<th>Easting</th>
<th>Northing</th>
<th>Zone</th>
<th>Township</th>
<th>Range</th>
<th>Section</th>
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<td>3905831</td>
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<td>NS</td>
<td>NS</td>
<td>PB37</td>
</tr>
<tr>
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<td>Trench</td>
<td>368892</td>
<td>3905831</td>
<td>13</td>
<td>NS</td>
<td>NS</td>
<td>PB37</td>
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<tr>
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<td>Stope</td>
<td>368921</td>
<td>3905828</td>
<td>13</td>
<td>NS</td>
<td>NS</td>
<td>PB37</td>
</tr>
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<td>San Jose Adit 2</td>
<td>Adit</td>
<td>368705</td>
<td>3905741</td>
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<td>NS</td>
<td>NS</td>
<td>PB37</td>
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<tr>
<td>*6</td>
<td>N I-40 a Adit</td>
<td>Adit</td>
<td>370112</td>
<td>3881589</td>
<td>13</td>
<td>10N</td>
<td>5E</td>
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<tr>
<td>*7</td>
<td>N I-40 b Adit</td>
<td>Adit</td>
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<td>*8</td>
<td>N I-40 c Adit</td>
<td>Adit</td>
<td>370012</td>
<td>3881499</td>
<td>13</td>
<td>10N</td>
<td>5E</td>
<td>25</td>
</tr>
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<td>9</td>
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<td>Adit</td>
<td>369091</td>
<td>3906142</td>
<td>13</td>
<td>12N</td>
<td>5E</td>
<td>5</td>
</tr>
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<td>Pit</td>
<td>369054</td>
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<td>12</td>
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<td>Adit</td>
<td>374199</td>
<td>3878835</td>
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<td>5E</td>
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</tr>
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<td>Tunnel Canyon</td>
<td>Pit</td>
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<td>3879544</td>
<td>13</td>
<td>10N</td>
<td>5E</td>
<td>20</td>
</tr>
</tbody>
</table>
The conditions found at the AML sites identified in table 1 include open or collapsed shafts, adits, and open pits. Several features may occur at each location. These features are located adjacent to or near National Forest System roads, hiking trails, private lands, and other high use areas. The AML areas are attractive nuisances comprised of excavations that invite public visitation. Additionally, these areas often provide habitat for wildlife and frequently comprise cultural resources.

### Desired Condition

Through remediation activities, desired conditions of AML areas would: (1) ensure protection for the public and wildlife from injury associated with open mine features; (2) restrict access to AML areas susceptible to rock falls, collapse, and inadequate ventilation; (3) conserve and maintain cultural resources; and (4) maintain and protect wildlife habitat.

<table>
<thead>
<tr>
<th></th>
<th>Feature Type</th>
<th>Feature Name</th>
<th>UTM X</th>
<th>UTM Y</th>
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<th>Datum</th>
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<th></th>
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<td>P&amp;G Adit</td>
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<td>15</td>
<td>Stope</td>
<td>P&amp;G Stope</td>
<td>374203</td>
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<td>17</td>
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<td>Deadman Shaft</td>
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<td>3880731</td>
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<td>10N</td>
<td>5E</td>
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</tr>
<tr>
<td>18</td>
<td>Shaft</td>
<td>Mitch 1 Shaft</td>
<td>373114</td>
<td>3906692</td>
<td>13</td>
<td>12N</td>
<td>5E</td>
<td>03</td>
</tr>
<tr>
<td>19</td>
<td>Adit</td>
<td>Mitch 2 Adit</td>
<td>373161</td>
<td>3906617</td>
<td>13</td>
<td>12N</td>
<td>5E</td>
<td>03</td>
</tr>
<tr>
<td>20</td>
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<td>Mitch 3 Shaft</td>
<td>373362</td>
<td>3906349</td>
<td>13</td>
<td>12N</td>
<td>5E</td>
<td>03</td>
</tr>
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<td>21</td>
<td>Shaft</td>
<td>Mitch 4 Shaft</td>
<td>373643</td>
<td>3906099</td>
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<td>12N</td>
<td>5E</td>
<td>03</td>
</tr>
<tr>
<td><strong>22</strong></td>
<td>Shaft</td>
<td>York 1 Shaft</td>
<td>368703</td>
<td>3878180</td>
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<td>9N</td>
<td>5E</td>
<td>06</td>
</tr>
<tr>
<td><strong>23</strong></td>
<td>Adit</td>
<td>York 2 Adit</td>
<td>368703</td>
<td>3878180</td>
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<td>9N</td>
<td>5E</td>
<td>06</td>
</tr>
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<td><strong>24</strong></td>
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<td>Blue Sky Adit</td>
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<td>13</td>
<td>12N</td>
<td>5E</td>
<td>26</td>
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<td><em><strong>25</strong></em></td>
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<td>Canyon Del Aqua</td>
<td>369940</td>
<td>3904405</td>
<td>13</td>
<td>12N</td>
<td>4E</td>
<td>14</td>
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<td>Capulin</td>
<td>371690</td>
<td>3898506</td>
<td>13</td>
<td>12N</td>
<td>5E</td>
<td>33</td>
</tr>
</tbody>
</table>

* – These features were surveyed and found to be on non-Forest Service lands.
** – These features were remediated by the State in the early 1990s.
*** – These features had been reported, but could not be found.
Figure 1. General location map
Figure 2. Site location map: Tunnel Spring, San Jose, Canyon Del Agua
Figure 3. Site location map: Deadman’s Curve

<table>
<thead>
<tr>
<th>Land Status</th>
<th>AML Sites</th>
<th>FS</th>
<th>Private</th>
<th>State</th>
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</table>

**Sandia Closures**
**Abandoned Mine Lands Project**

Figure 3. Site location map: Deadman’s Curve
Figure 4. Site location map: Tunnel Canyon, Monkey Cave
Figure 5. Site location map: P&G, Tunnel Canyon

Land Status

AML Sites
Road Route
OTHER
USFS

Sandia Closures
Abandoned Mine Lands Project

Figure 5
P&G Tunnel Canyon Group
Figure 6. Site location map: Mitch Group
Proposed Action

The action proposed by the CNF to meet the purpose and need is to remediate safety hazards posed by the 18 AML features identified on the Sandia Ranger District. Site-specific actions proposed under this alternative follow.

Table 2. Proposed remediation action by feature

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Size</th>
<th>Type</th>
<th>Proposed Remediation</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Tunnel Spring 1</td>
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<td>Adit</td>
<td>Concreted Bat Gate</td>
</tr>
<tr>
<td>2</td>
<td>San Jose Adit</td>
<td>3’ x 4’</td>
<td>Adit</td>
<td>PUF - Backfill</td>
</tr>
<tr>
<td>3</td>
<td>San Jose Trench</td>
<td>17’ x 5’ x 27’</td>
<td>Trench</td>
<td>No Action</td>
</tr>
<tr>
<td>4</td>
<td>San Jose Stope</td>
<td>3’ x 6’</td>
<td>Stope</td>
<td>PUF - Backfill</td>
</tr>
<tr>
<td>5</td>
<td>San Jose Adit 2</td>
<td>5’ x6’ x 12’</td>
<td>Adit</td>
<td>PUF - Backfill</td>
</tr>
<tr>
<td>6</td>
<td>N I 40 a Adit</td>
<td>4’ x 3’</td>
<td>Adit</td>
<td>No Action</td>
</tr>
<tr>
<td>7</td>
<td>N I-40 b Adit</td>
<td>1’ x 3’</td>
<td>Adit</td>
<td>No Action</td>
</tr>
<tr>
<td>8</td>
<td>N I-40 c Adit</td>
<td>1’ x 3’</td>
<td>Adit</td>
<td>No Action</td>
</tr>
<tr>
<td>9</td>
<td>Tunnel Springs 3</td>
<td>1’ x 3’</td>
<td>Adit</td>
<td>PUF - Backfill</td>
</tr>
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<td>10</td>
<td>Tunnel Springs Pit</td>
<td>5’ x 4’ x 2’</td>
<td>Pit</td>
<td>Investigate False Bottom</td>
</tr>
<tr>
<td>11</td>
<td>Tunnel Springs 4</td>
<td>3’ x 6’ x 20’</td>
<td>Adit</td>
<td>Bat Gate</td>
</tr>
<tr>
<td>12</td>
<td>Monkey Cave</td>
<td>5’ x 3’</td>
<td>Adit</td>
<td>Concrete/Rock Bulkhead</td>
</tr>
<tr>
<td>13</td>
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<td>200 yds</td>
<td>Pit</td>
<td>Fence highwall</td>
</tr>
<tr>
<td>14</td>
<td>P &amp; G Adit</td>
<td>4’ x 2’</td>
<td>Adit</td>
<td>PUF - Backfill</td>
</tr>
<tr>
<td>15</td>
<td>P &amp; G Stope</td>
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<td>Stope</td>
<td>Investigate False Bottom</td>
</tr>
<tr>
<td>16</td>
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<tr>
<td>22</td>
<td>York 1</td>
<td>10’ x 6’</td>
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</tr>
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<td>York 2</td>
<td>6’ x 5’</td>
<td>Adit</td>
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</tr>
<tr>
<td>26</td>
<td>Capulin</td>
<td>Unknown</td>
<td>Unknown</td>
<td>No Action</td>
</tr>
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</table>

Table 2 indicates the most likely form of remediation to be used on each feature. However, the final analysis may indicate that the approved action may employ any of the remediation techniques for a specific feature as listed in the section titled “Alternatives, Including the Proposed Action” of this document. Incidental road and/or overland travel route regrading and revegetation would occur as appropriate for access and habitat restoration.

No attempts would be made under the proposed action to extensively regrade mined lands, or return mined areas to the approximate original contours of premining landscapes. The exception
to this would be where minimal regrading and revegetation of access roads and/or overland travel routes to AML features would occur.

This decision is consistent with the forest plan.

**Decision Framework**

The district ranger for the Sandia Ranger District is the deciding official with regards to the proposed action. The district ranger will review the proposed action in order to make the following decisions:

1. Whether the proposed action would have a significant environmental effect that requires additional NEPA analysis beyond the parameters of this EA.
2. Whether to implement the no action alternative (alternative 1), the proposed action alternative (alternative 2), or a modified proposed action.

**Public Involvement**

**Public Mailing Lists**

On February 16, 2011, a letter providing detailed information on the proposed action was sent to 988 individuals, groups, and news media. Recognizing that some pertinent individuals and organizations may have been missed during the initial scoping effort, another scoping letter was sent out on April 13, 2011, providing detailed information on the proposed action to approximately 33 individuals, groups, affected Indian tribes, as well as Federal and State agencies.

**Public Comments Received**

A total of six responses to these mailings were received (table 3). Copies of the letters are in the project file. A content analysis was conducted on the scoping comments. The content analysis is a compilation of comments received from public scoping into a table format and shows how comments were used to develop any significant or tracking issues, and any additional project design features or mitigation measures. All comments received to date and the response of the IDT to each comment or concern raised as well as how those comments or concerns were addressed in the analysis are presented in appendix A. Table 3 lists the names of those who chose to comment on the proposed action.

<table>
<thead>
<tr>
<th>Letter No.</th>
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<td>Bob Smith</td>
<td>Individual</td>
</tr>
<tr>
<td>2</td>
<td>03/31/11</td>
<td>Cathy Ottinger and David Farnum</td>
<td>Individuals</td>
</tr>
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<td>3</td>
<td>03/31/11</td>
<td>David Buckhout and David Farnum</td>
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<td>4</td>
<td>03/31/11</td>
<td>Ron and Su Rymarz</td>
<td>Individuals</td>
</tr>
<tr>
<td>5</td>
<td>04/14/11</td>
<td>Jennifer Shepherd</td>
<td>Center for Biological Diversity</td>
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<tr>
<td>6</td>
<td>04/26/11</td>
<td>John Kretzmann</td>
<td>NM AML Department</td>
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</table>
Introduction

**Issue Development**

An issue is defined for this purpose as a point of disagreement, debate, or dispute over a proposed action based on environmental effects. The ID team, in their review of comments made during the public scoping period, did not identify any issues with the proposed action that required development of additional alternatives (see appendix A). The proposed action is designed to meet the stated purpose and need for the project, and the project specific desired conditions.

The following section describes and compares the no action (alternative 1) and the proposed action (alternative 2), and includes a description of mitigation measures to be incorporated into the proposed action.
Alternatives, Including the Proposed Action

No Action – Alternative 1
Under the no action alternative, remediation of safety hazards associated with the 18 AML features identified on the Sandia Ranger District would not occur.

The Proposed Action – Alternative 2
The proposed action would remediate safety hazards posed by the 18 identified AML features on the Sandia Ranger District and restore natural forest resources at each location by conducting the following site-specific actions.

Investigation for False Bottoms
The bottoms of features 10 and 15 would be verified in order to determine whether backfill or any other closure method could be structurally supported prior to closure. Site appropriate closure methods using information obtained from these verifications would be determined by the CNF and could be any of the methods described below.

Closure by Concrete Cap
A concrete cap would be used to close feature 12. This feature is a well known opening and is subject to frequent visitors. Because of the threat of vandalism, the feature will be closed with concrete.

Closure by Polyurethane Foam and Backfill
Polyurethane foam (PUF) would be used to close features 2, 4, 5, 14, 19, and 20. The PUF would then be topped with native backfill. Prior to closure, bats and other animals, which may be inside the adits and shafts, would be expelled from the features using smoke generators.

Closure by Polyurethane Foam and Backfill in Warm Season
PUF would be used to close feature 9 in the warm season. The warm season is defined for this purpose as the beginning of May through the end of September. The PUF would then be topped with native backfill.

Closure by Polyurethane Foam and Backfill with Added Measures
Shaft collars located at features 16, 17, 18, and 21 will be covered for a period of at least 2 weeks with 1-inch mesh netting at night to exclude bats during the warm season. The warm season is defined for this purpose as the beginning of May through the end of September. Immediately after the 2-week exclusion, PUF would be used to close shafts then topped with native backfill.

Closure with Bat-Friendly Gate within the Sandia Wilderness
A bat-friendly gate will be installed at feature 1 in order to provide human health and safety while allowing continued bat use and habitat maintenance. Horizontal bars for the bat gate will be cut to length outside of the wilderness. Bars will be concreted into place using concrete mixed onsite and rock close to the adit portal. Concrete will be mixed using nonmechanized equipment.
Alternatives, Including the Proposed Action

**Closure with Bat-Friendly Gate**
A bat-friendly gate will be installed at feature 11 in order to provide human health and safety while allowing continued bat use and habitat maintenance.

**Fence**
A fence built to range specifications would be constructed along the high wall of feature 13.

**Incidental Access Road Regrading**
For roadway reconditioning, the minimum work would be employed on any access roads to allow for passage of equipment and haul trucks, and to repair any damage done during remediation activities.

**No Action**
No action is recommended for feature 3. Feature 3 is a cut into the hillside leading to an adit (feature 2). The cut into the hillside does not appear to pose a significant safety threat.

Noteworthy: No action is also recommended for features 6–8 and 22–26. No action is recommended for features 6–8 because they are not on Forest Service land. No action is recommended for features 22–24 because they have already been remediated\(^1\) and features 25 and 26 were not located during field reconnaissance. However, they are mentioned in this document for the record; showing the Forest Service has taken these features into consideration when making its decision.

**Mitigation**
Mitigation measures were developed from agency experience and field-related resource information. These are to be incorporated into the proposed action.

1. **Wildlife**. In order to minimize any potential affect remediation activities may have on wildlife species using a feature as habitat, remediation activities would consist of a range of closure means depending on the feature and its use. Mitigation measures for wildlife include: (1) closure by any means at any time; (2) closure by any means in the warm season, from May 1 through September 30; (3) closure by any means at any time after visual inspection to insure no unexpected residents are trapped; (4) closure with bat compatible structure with construction occurring at any time, but the adit portal being left unobstructed at night; and (5) closure by any means following a 2-week bat exclusion from May 1 through September 30, where the shaft collar is covered with 1-inch mesh netting. Refer to the evaluation report by Dr. Altenbach in the project record for more detail and a description of which means is appropriate for each feature.

2. **Compliance with Laws and Regulations**. All remediation activities would be in compliance with all applicable Federal, State, and local environmental laws and regulations.

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\(^1\) “Archaeological Survey of Fifteen Abandoned Mine Sites in the Tijeras and Placitas Mining Districts, Bernalillo and Sandoval Counties, New Mexico,” J. Scott Geister, Archaeology Notes No. 1, 1990, Office of Archaeological Studies.
regulations including, but not limited to, the Clean Water Act (33 U.S.C. 1251 et seq.), Clean Air Act (42 U.S.C. 7401 et seq.), Endangered Species Act (16 U.S.C. 1531 et seq.), and the National Historic Preservation Act (16 U.S.C. 470 et seq.). All necessary Federal, State, and local permits and authorizations would be obtained by the contractor(s) and provided to the CNF prior to initiation of all AML feature remediation activities.

3. **Erosion Control.** All remediation work would incorporate mitigation measures (i.e., best management practices) to prevent the movement of soil and formation of rills and gullies.

4. **Hazardous Materials/Waste.** Hazardous materials used for remediation activities would be stored in accordance with the Forest Service Manual and any applicable Federal, State, and local laws and regulations. Hazardous waste derived from remediation activities would be properly disposed of off National Forest System lands and done in accordance with applicable Federal, State, and local laws and regulations.

5. **Cultural Resources.** Of all the sites recorded, only one was determined eligible to the National Register of Historic Places (NRHP). A rock structure found in association with mine features 14–16 is eligible for inclusion in the NRHP; although the mining features themselves are not. Care will be taken to avoid the rock structure by all actions connected to remediating features 14–16. The proposed minimal access road reggrading for passage of equipment and haul trucks to some of the AML areas will occur along alignments that have been determined not to be eligible for inclusion in the NRHP. If previously undiscovered cultural resources (historic or prehistoric objects, artifacts, or sites) are exposed as a result of operations, those operations would not proceed until notification is received from the forest archaeologist that provisions for mitigating unforeseen impacts as required by 36 CFR 228.4(e) and 36 CFR 800 have been complied with.

6. **Noxious Weeds.** All seed mixes to be used for reclamation would be required to be certified “weed free” of seeds listed on the CNF weed list. All equipment would be cleaned prior to use to remove dirt, plant parts, and material that could carry noxious weed seed, and cleaned off National Forest System lands. Only equipment cleaned and inspected would be allowed to operate in remediation activities.

7. **Resource Protection.** Remediation activities would be conducted in a manner that protects and conserves forest resources to the greatest extent possible by using equipment (i.e., front end loaders, tractors, haul trucks, etc.) that is appropriately sized and/or is the smallest equipment practical to accomplish the work; limiting all forms of surface disturbance to the greatest extent possible; ensuring that equipment remains on existing roads or previously disturbed areas; and taking all necessary precautions to protect flora, fauna, and cultural resources.

8. **Fire.** The operator will comply with all applicable Federal and State fire laws and regulations. All reasonable measures to prevent and suppress fires in the project area will be taken by employees, contractors, and/or subcontractors. All vehicles and equipment will have spark arrestors, carry fire suppression tools, and have chemical extinguishers. Onsite smoking will be according to USFS rules and no smoking materials will be discarded on the ground. All USFS fire safety rules and guidelines will be followed.

9. **Air Quality.** In order to reduce the disturbance of particulate matter during remediation activities, a minimum of off-road travel will be permitted.
Alternatives, Including the Proposed Action

10. **Wilderness.** In order to provide safety to the public by eliminating access to features within the wilderness and maintain wilderness character, all mechanized equipment will remain outside wilderness. Remediation of features within the wilderness will be conducted without any mechanized equipment.

**Comparison of Alternatives**

Table 4 provides a comparison of the summary of effects between the no action (alternative 1) and the proposed action (alternative 2).

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>No Action</th>
<th>Alternative 1</th>
<th>Proposed Action</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Features Remediated</td>
<td>None</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Hazards to Public and Wildlife</td>
<td>Features would remain accessible to the public.</td>
<td>Safety hazards to the public and wildlife would be mitigated with closure methods.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural Resources</td>
<td>Features would remain “as is” and entry to underground areas would remain intact.</td>
<td>It is anticipated that the proposed action would result in no adverse direct or indirect affects to cultural resources associated with AML features.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wildlife</td>
<td>Underground habitat would remain accessible to unrestricted human traffic.</td>
<td>It is anticipated that the proposed action could have minor and discountable direct and indirect affects on individuals and their habitats, but would not contribute to the loss of viability of wildlife, or contribute to a trend toward Federal listing of any wildlife species.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetation</td>
<td>Vegetation would remain “as is” as any regrading or earthwork associated with the project would be minimal.</td>
<td>It is anticipated that the proposed action could result in both beneficial and adverse direct and indirect affects to vegetation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Quality</td>
<td>Air quality would remain unchanged.</td>
<td>It is anticipated that the proposed action could result in minor and localized direct and indirect effects to air quality.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Quality</td>
<td>No change.</td>
<td>It is anticipated that the proposed action would not result in direct or indirect impacts on water resources.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual Resources</td>
<td>No change.</td>
<td>It is anticipated that the proposed action could result in direct and indirect beneficial and minor adverse effects to visual resources.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Environmental Consequences

This section establishes baseline conditions for physical and biological environments within the affected project area for each alternative, and identifies potential changes with an analysis of direct and indirect effects of each alternative. The means by which potential effects would be reduced or mitigated are described, followed by an analysis of the cumulative effects for each alternative.

To better understand the comparison between the no action and proposed action alternatives, it is important to understand the nature of the sites that would be subject to remediation efforts. In general, AMLs are radically altered areas on the landscape. Many contain adits, shafts, and pits, many with a corresponding waste rock dump that often extends downslope from the excavated feature (see figure 7 below).

![Figure 7. Typical AML landscape feature (typical adit)](image1)

To better understand the comparison between the no action and proposed action alternatives, it is important to understand the nature of the sites that would be subject to remediation efforts. In general, AMLs are radically altered areas on the landscape. Many contain adits, shafts, and pits, many with a corresponding waste rock dump that often extends downslope from the excavated feature (see figure 7 below).

![Figure 8. Typical AML remediation with PUF (typical adit)](image2)
Environmental Consequences

The photos that comprise figure 8 above show the mine feature before installation of PUF and after installation of PUF. Note the PUF is covered with a rock facing for protection.

![Figure 8. The photos that comprise figure 8 above show the mine feature before installation of PUF and after installation of PUF. Note the PUF is covered with a rock facing for protection.](image)

**Figure 9. Typical AML remediation with bat-friendly gate (typical adit)**

The photos that comprise figure 9 show the mine feature before and after installation of a bat-friendly gate. All bat-friendly gates in Region 3 are fitted with locking removable bars.

Cultural Resources

Existing Conditions

Although the earliest record of mining in the region dates to 1667, it was not until 1829 that the first New Mexican gold rush occurred in the Ortiz Mountains. Mines in the Ortiz Mountains experienced steady production of gold throughout the 1930s. Mining also played an important economic role in the Cerrillos District during the late 19th and early 20th centuries. In 1889 after the Atchison, Topeka and Santa Fe Railroad extended a spur line from the main line at Waldo to Madrid, the Cerrillos District boomed because base metal ores such as copper, lead, and zinc could be shipped cheaply to smelters and outlying markets (Elston 1967). After 1880 many small, short-lived mills and smelters sprang up in Santa Fe and Sandoval Counties, and over 1,000 mining claims were registered (Warren 1974; Northrup 1959).

Gold was also mined in the Sandia Mountains, but the area never really experienced a mining boom like in the Ortiz Mountains and Cerrillos Hills because of smaller deposits. Indeed, Kelley and Northrup (1975) indicate that the quartzite bed in the gneiss along Tijeras Canyon was prospected for gold, but it is doubtful that more than traces were found.

By 1890 the peak of precious metals mining was over, and coal became the economic mainstay of the area. Although mining of coal and base metal ores occurred in the Tijeras Canyon and Placitas Mining Districts, major economic booms were never realized there because of their marginal reserves and remoteness from rail systems (Geister 1990:9).
The Tijeras Canyon Mining District extends from the southern end of the Manzano Mountains to the northern edge of Torrance County. Historically, this district has included or was alternately known as the Soda Springs, Hell Canyon, and/or the Coyote Canyon Mining District. This district has produced fluorspar, gold, lead, and silver, and there has been some prospecting for copper.

The Placitas Mining District extends from the northern boundary of the Tijeras Canyon Mining District to the northern end of the Sandia Mountains in Bernalillo and Sandoval Counties. The overall geology is similar for both mining districts.

After World War II, coal production in the area declined as diesel and new heating fuels became more prominent. This caused the mining industry to assume a nonmetallic base, including sand and gravel, cement scoria, clay, pumice, and gypsum (Elston 1967).

Two heritage resource projects have taken place for the Sandia Ranger District Abandoned Mine Lands Remediation Project. Report No. 2011-03-076, “Cultural Resources Inventory and Assessment of Seven Mining Areas Containing 17 Features Proposed for Closure on the Sandia Ranger District, Cibola National Forest, Bernalillo and Sandoval Counties, New Mexico,” documented the survey of 85 acres, with 100 percent pedestrian coverage. During the course of the survey, two sites (AR-03-03-05-923 and AR-03-03-05-924) and five isolated mining features were newly recorded. Two previously recorded sites (AR-03-03-05-235 and AR-03-03-05-708) were revisited and had their site records updated. Five isolated mining features were also documented. Report No. 2011-03-076B, “Sandia Abandoned Mine Closures, Request for Clearance Based on Previous and New Survey,” documented the survey of 5 acres, with 100 percent coverage. That survey documented one isolated mining feature and provided heritage resources clearance for the Sandia Ranger District Abandoned Mine Lands Remediation Project.

Tribal Consultation

The Cibola National Forest currently consults with 12 American Indian Tribes and 1 Navajo Chapter that may have used and may continue to use the lands managed by the Sandia Ranger District for traditional cultural or religious activities, and that might attach religious or cultural significance to properties on those lands. These include: The Pueblos of Acoma, Zuni, Iselta, Sandia, Santo Domingo, Santa Ana, San Felipe, San Ildefonso, Cochiti, Jemez, and Zia, the Navajo Nation, and the To’ohajilee Navajo Chapter.

Tribal consultation pursuant to Section 106 of the National Historic Preservation Act was initiated in February 2011. The project was included in the forest’s annual project consultation letter, intended to introduce projects and initiate government-to-government consultation. The letter described the project and illustrated locations of the proposed remediation work. Followup consultation meetings were held with the Pueblos of Acoma, Zuni, Isleta, Jemez, and Navajo Nation between May and September of 2011.

Consultation pursuant to the National Environmental Policy Act was initiated in mid April 2011 when the forest mailed the tribes a scoping letter. The forest did not receive any tribal responses.

During the government-to-government consultation meetings, the Pueblos of Acoma, Isleta, Jemez, and the Navajo Nation did not express any concerns about the project. None of the locations proposed for remediation have been identified as traditional cultural properties. No tribe has expressed concern that the proposed project would have an effect upon sites of cultural and
Environmental Consequences

religious significance, or impact traditional cultural activities in the Sandia Mountains. Refer to the project record for a summary list of tribal consultation.

Direct and Indirect Effects

No Action – Alternative 1

Under the no action alternative, remediation of safety hazards associated with the 18 abandoned mine land features identified on the Sandia Ranger District would not occur and the mining features would continue to endanger the public and wildlife.

The Proposed Action – Alternative 2

The proposed action would remediate safety hazards posed by the 17 identified abandoned mine land features on the Sandia Ranger District and would restore natural forest resources at each location by conducting the following site-specific actions:

Direct/Indirect Effect: If the proposed action alternative is selected there would be no effect to sites AR-03-03-05/235/LA78242, AR-03-03-05-923/LA170589, AR-03-03-05-924/LA170590, and Isolated Features 1–6. There would be a no adverse effect to site AR-03-03-05-708/LA142660, per consultation with the New Mexico State Historic Preservation Officer.

Mitigation Measures: Protection and avoidance measures for site AR-03-03-05-708/LA143660 have been stipulated in Heritage Resources Report No. 2011-03-076B.

Wildlife

Existing Conditions

The abandoned mine lands (AML) features identified on the Sandia Ranger District of the Cibola National Forest in Bernalillo and Sandoval Counties of New Mexico are located in two management areas (MAs): MA 1 and 2. The San Jose and Tunnel Springs features are located in MA 1 and all of the remaining features are located in MA 2. Refer to figures 11 and 12 for MA locations.

MA 1 is the Sandia Mountain Wilderness and is composed of over 37,000 acres. Vegetation varies from desert grassland through spruce-fir forests. The forest plan states the management emphasis for wildlife is to maintain or improve wildlife diversity and ecosystem health. The most common animals in MA 1 are mule deer, black bear, raccoons, bobcats, and various species of squirrels. There are also many birds of prey that live in and migrate through the Sandia Mountain Wilderness including golden eagles, peregrine falcons, and different species of hawks. Other birds such as roadrunners, Stellar’s jays, ravens, and canyon wrens can also be found in these mountains. The upper-most portion of the Sandia Mountains has significant tree cover made up mostly of spruce and fir, with mixed conifer and ponderosas pine forests dominating the middle elevations, and pinyon-juniper woodlands at lower elevations. A closure order requires that designated areas in MA 1 be closed to public entry from March 1 to August 15 to protect sensitive species during this key use period.
Figure 10. Mining districts
MA 2 is the Sandia Ranger District exclusive of MA 1, the Department of Defense and Department of Energy military withdrawal lands. The area encompasses almost 45,000 acres and contains numerous recreation sites: the Sandia Peak Tram, Sandia Peak Ski Area, and the Sandia Crest Observation Site. Major vegetation types include desert grasslands and montane shrub, pinyon-juniper woodlands, ponderosa pine and mixed conifer forests, as well as riparian areas located predominantly along Las Huertas and Cedro Creeks. Figures 13 and 14 show the biotic communities associated with all of the features in the proposed action.

Many different types of wildlife use abandoned mines, either for permanent or temporary habitat. Barn owls are commonly found in abandoned mines in the southern part of New Mexico, and a mine shaft provides a relatively safe nesting location difficult for predators to access. Rattlesnakes can sometimes be found near the entrance to a mine adit, going in and out of the mine depending on their temperature preference. Some other species that find temporary homes in abandoned mines include ringtails and javelina.

When considering the closure of abandoned mines, the principal wildlife concern is the protection of bats and their habitat. Abandoned mines can provide microclimates similar to caves, suitable for rearing young, hibernation, and rest stops during migration in the spring and fall. There are 43 species of bats found in the U.S., with 27 of these in New Mexico of which 19 are listed as a species of concern by the U.S. Fish and Wildlife Service, 3 are considered threatened, and 1 is considered endangered. An internal bat survey of the features has been conducted to determine which features may be home to existing bats and should be protected for the habitat they provide. Two of the features listed for remediation provide limited use by bats as night roosts; however, none of the features are being used as hibernacula. All of the features are to be remediated using either bat compatible enclosures (gates) or polyurethane foam (PUF).

The Tunnel Springs 4 feature contained scattered guano from a small *Myotis* and insect parts indicative of night roosting activity. Tunnel Springs 1 also contained evidence of bat roosting activity and both Tunnel Springs 1 and 4 will be remediated using bat-compatible enclosures.

To insure that individual bats and other animals are not harmed by remediation activities not involving bat-compatible enclosures, the features will be heavily smoke bombed and covered with 1” mesh screen for a period of 2 weeks prior to initiating remediation. In addition, work will be done only during the timeframe of May 1 through September 30.

### Threatened and Endangered Species

The U.S. Fish and Wildlife Service list of threatened, endangered, and proposed species which may occur in Bernalillo and Sandoval Counties was reviewed to determine potential wildlife and plant species which may occur in the assessment area. Refer to the project level biological evaluation report in the project record for a more detailed description of threatened, endangered, and proposed wildlife species and critical habitat occurring in the project area. No threatened, endangered, or proposed wildlife species—including the Mexican spotted owl (MSO)—is known to occur or has potential habitat in the project area. No known MSO protected activity centers (PACs) or designated critical habitat occur within the project boundary; or potential restricted habitat of mixed conifer forest. Species whose habitats do not occur in the project area were not considered further.
Environmental Consequences

Figure 11. North management area map

Explanation
- Forest Boundary
- AML Site
- Management Area
  - 1
  - 2

Sandia Closures
Abandoned Mine Lands Project

Figure 11
North Area Management Area Map
0 0.5 1 2 3 4 Miles

Figure 11. North management area map
Figure 12. South management area map

Sandia Closures
Abandoned Mine Lands Project
Figure 13. North biotic community map
Figure 14. South biotic community map
**Sensitive Species**

The Regional Forester’s Sensitive Species List for the Southwestern Region was reviewed to determine potential wildlife or plant species which may occur in the assessment area. The yellow-billed cuckoo was analyzed as a candidate species above, as was the bald eagle. Refer to the project level biological evaluation report in the project record for a more detailed description of sensitive species. Sensitive wildlife species which may occur or have potential habitat in the project area are listed in table 5. Surveys were conducted in the project area for bat species in June 2011.

**Table 5. Potential sensitive species**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Group</th>
<th>Habitat Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spotted bat</td>
<td>Euderma maculatum</td>
<td>Mammal</td>
<td>This species is a cliff dweller that roosts in rock cracks and crevices within forested areas near open water. Surveys have been conducted for this species in the project area.</td>
</tr>
<tr>
<td>Pale Townsend’s big-eared bat</td>
<td>Corynorhinus townsendii pallescens</td>
<td>Mammal</td>
<td>Conifer forests strongly associated with the availability of caves or cave-like roosting habitat (mines, buildings, etc.) provide habitat for the Townsend’s big-eared bat. Surveys have been conducted for this species in the project area.</td>
</tr>
</tbody>
</table>

**Management Indicator Species**

The LRMP identified 13 forestwide management indicator species (MIS) to estimate the effects planned activities may have on wildlife forestwide and project level habitat and populations. All 13 MIS species were considered for this analysis, but only those species whose habitat occurs in the project area were considered further. Table 6 describes the habitat type, existing habitat trends, management indicator species, and existing MIS population trends. Refer to the forestwide MIS report in the project record for a more detailed description of MIS species and their habitat associations, habitat trends, and population trends (USDA Forest Service 2005).

**Table 6. Habitat types, MIS, and forestwide habitat and population trends**

<table>
<thead>
<tr>
<th>Management Indicator Species</th>
<th>Existing Forestwide Population Trend</th>
<th>Habitat Type</th>
<th>Existing Forestwide Habitat Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black bear</td>
<td>Stable</td>
<td>Spruce-fir</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixed conifer</td>
<td>Stable</td>
</tr>
</tbody>
</table>

**Migratory Birds**

On January 10, 2001, Executive Order 13186 was signed placing emphasis on conservation of migratory birds, supplementing the Migratory Bird Treaty Act which has been in effect since the early 1900s. Effects to migratory birds are analyzed in the following manner: (1) effects to highest priority birds listed by Partners in Flight (Partners in Flight 2007); (2) effects to important bird areas (IBAs); (3) effects to important overwintering areas. Refer to the CIF breeding bird report for 2010 and supplement for 2011 for additional details (USDA Forest Service 2010).
Environmental Consequences

Direct and Indirect Effects

No Action – Alternative 1

The no action alternative would have no affects to wildlife. With no features being altered; those providing bat habitat would continue to provide it subject to human visitation. Other wildlife would also continue to use the habitat associated with the features as long as human activities do not preclude access to or suitability of the habitat.

The Proposed Action – Alternative 2

In order to minimize potential effects remediation activities may have on species using a feature, smoke generators would be used to expel wildlife prior to closure by backfilling, concrete cap, or polyurethane foam. The aforementioned closure methods would not be implemented on AML features that currently provide significant habitat for bats. Instead, these features would be remediated with a bat-friendly gate. Additionally, remediation activities would only occur during the periods specified for each feature (consistent with the forest plan), minimizing the potential to affect bats using features for maternity roosts or during hibernation.

Installing bat gates on those features identified as quality bat habitat would improve the quality of the habitat for bats primarily by excluding or eliminating the disturbance effects of humans in the habitat. By implementing the project during the specified operating periods, impacts to maternity roosts would be minimized and impacts to hibernacula would be avoided. The operating periods are during the times that bats are most mobile and capable of finding an alternative roosting location if necessary. These timing restrictions lessen the likelihood of injury or mortality to any bats that may be using the mine features.

It is anticipated that the proposed action could have minor and discountable direct and indirect effects on individuals and their habitats. The ingress and egress of bats, birds, and other small animals of AML features could be impacted to some degree by the use of bat-friendly gates, as these structures would partially close feature openings. In order to enter or exit a feature, individuals would need to successfully avoid the structures in flight or on the ground. Gates will eliminate access for larger animals wishing to use the AML features as a den or place of refuge. Habitat inside AML features with bat-friendly gates would essentially shift from one utilized by larger and smaller individuals to one primarily used by smaller animals. Forest users’ visitation of underground AML features currently exists, however, the extent of disturbance to individuals and their habitats as a result of human visitation is unknown. Closure of an AML feature with a bat-friendly gate would exclude forest users from underground AML features and effectively improve the quality of the habitat by removing the disturbance caused by humans.

The complete closure of features could reduce potential habitat, but habitat in use would largely be protected. The majority of species which would be impacted by the proposed action are mobile and, therefore, it is anticipated that species which are flushed out would relocate elsewhere. The extent of disturbance caused by forest users to AML underground features is not known, however, closure of features would result in decreased visitation, which in turn could result in decreased human disturbance to both individuals and their habitats. With the: (1) use of smoke generators to flush out any remaining individuals; (2) institution of timing restrictions on remediation activities; (3) ability of mobile species to exit features prior to closure; and (4) decrease of human visitation to underground AML features, the proposed project would not contribute to the loss of viability of wildlife, or contribute to a trend toward Federal listing of any wildlife species.
Environmental Consequences

Threatened and Endangered Species

Direct and Indirect Effects

No Action - Alternative 1
No effect to species or its habitat.

The Proposed Action – Alternative 2
No effect to species or its habitat.

Sensitive Species

Direct and Indirect Effects

No Action - Alternative 1
No impact on the species.

The Proposed Action – Alternative 2
There are no cliff faces suitable for spotted bat roosting in the project area or hibernacula. The project area could be used occasionally for roosting, and light direct and indirect impacts could potentially occur. Since the Pale Townsend’s big-eared bat’s habitat range is so wide, it is probable that it occurs within the project area, although the total number of individuals is likely low. No roosting habitat with congregations of bats, summer maternity roosts, or winter hibernacula were found in association with mine features being remediated, thus overall impacts (if any) are expected to be insignificant. Table 7 shows differences between alternative 1 and alternative 2.

<table>
<thead>
<tr>
<th>Species</th>
<th>No Action</th>
<th>Alternative 1</th>
<th>The Proposed Action</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spotted Bat</td>
<td>No impact on the species.</td>
<td>May impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pale Townsend’s big-eared bat</td>
<td>No impact on the species.</td>
<td>May impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Management Indicator Species

Direct and Indirect Effects

No Action - Alternative 1
Physical safety hazards to wildlife would not be remediated. Project level effects to individuals are possible; however, these would not likely have significant effects to populations. Mines may be occasionally used as habitat for bedding and/or hibernation sites. Disturbance due to humans attracted to mine sites would continue in the long term. No effect to forestwide population or habitat trends.

The Proposed Action - Alternative 2
Physical safety hazards to wildlife would be mitigated, benefitting individuals, but reducing bedding and/or hibernation sights at the project level, causing insignificant effects to the species.
Environmental Consequences

and habitat. Disturbance due to human presence would increase in the short term due to project activities, while reducing human presence in the long term. No effect to forestwide population or habitat trends.

### Table 8. Summary of alternatives effects for MIS

<table>
<thead>
<tr>
<th>Management Indicator Species</th>
<th>No Action</th>
<th>Alternative 1</th>
<th>The Proposed Action</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Habitat Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Habitat Quantity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Population Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Habitat Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Population Habitat Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Black bear**
- No effect to project level habitat quality. Individuals may be impacted by physical hazards.
- No effect to project level habitat quantity (spruce-fir, mixed conifer). Individuals may use mines as habitat infrequently.
- No effect to forestwide population or habitat trends. Individuals may be less impacted by physical hazards.
- No effect to project level habitat quantity (spruce-fir, mixed conifer). Individuals may lose slight habitat availability.

**Migratory Birds**
**Direct and Indirect Effects**

**No Action - Alternative 1**
No effect to priority species.

**The Proposed Action - Alternative 2**
No effect to priority species.

There are no designated IBAs affected by the project. The nearest IBA is the HawkWatch observation site on the south end of the Sandia Mountains.

Important overwintering areas have not yet been designated on the forest, thus, none would be impacted by project implementation.

**Vegetation**
**Existing Conditions**
Sparse to nonexistent vegetation exists at the majority of the AML areas proposed for remediation. Mining operations historically did not conserve topsoil and instead dumped waste rock directly onto undisturbed lands. Waste rock dumps generally contain little to no desirable substrate for plant germination. Some of the AML areas in the proposed action currently support disturbance adapted vegetation, with many of these species being noxious weeds or other undesirable plant species.
Environmental Consequences

Direct and Indirect Effects
No Action – Alternative 1
The no action alternative would have no effect on vegetation.

The Proposed Action – Alternative 2
It is anticipated that the proposed action could result in both beneficial and adverse direct and indirect affects to vegetation. Equipment used to close the features could damage or destroy some plants. However, as remediation activities conclude, public visitation would likely drop as access to underground workings would cease, which would decrease the spread of noxious weed seed.

Additionally, in order to prevent the spread of noxious weed seed, all equipment will be cleaned off National Forest System lands prior to use to remove dirt, plant parts, and material that could carry noxious weed seed. Only equipment cleaned and inspected will be allowed to operate in remediation activities. Additionally, equipment would remain on existing roads and/or previously disturbed areas and would be appropriately sized in order to avoid damaging or destroying plants. With implementation of the aforementioned mitigation measures, it is anticipated that affects to vegetation from the proposed action would be minimal.

Air Quality
Existing Conditions
All of the AML sites occur within Bernalillo and Sandoval Counties. The New Mexico State Air Quality Bureau (AQB) has determined that these counties are attainment areas for SO2, CO, O3, PM10, and PM2.5 air quality standards. New Mexico lists only three nonattainment areas: Sunland Park, Anthony, and Grant County. In addition, there are two more areas that meet air quality standards by a slim margin: Dona Ana County and San Juan County. A nonattainment area is an area that fails to meet the National Ambient Air Quality Standards (NAAQS).

Direct and Indirect Effects
No Action – Alternative 1
The no action alternative would have no effect on current air quality. Dust and particulate matter would continue to be generated as it is currently.

The Proposed Action – Alternative 2
It is anticipated that the proposed action could result in direct and indirect effects to air quality, as it calls for backfilling several features with previously disturbed onsite materials. The movement of these disturbed soils would result in a minor, short-term release of dust and particulate matter into the air. Incidental road regrading for access and repair would result in a minor, short-term release of dust and particulate matter into the air, and release of minor amounts of carbon dioxide emissions from construction equipment into the air.

In order to reduce the disturbance of particulate matter during remediation activities, road regrading activities would be conducted in coordination with periodic soil watering to reduce the generation of dust and particulate matter into the air, and all surface disturbance would be kept to an absolute minimum. Remediation activities would require the use of construction equipment at a feature for a short timeframe, typically 1 to 3 days. This short timeframe would result in a
Environmental Consequences

minimal amount of carbon dioxide released into the air. With implementation of the aforementioned mitigation measures, and the short timeframes for completion of remediation activities, it is anticipated that effects to air quality from the proposed action would be minimal.

Water Quality
Existing Conditions
AML features such as waste rock dumps, adits, and shafts can contribute to water quality problems by exposing mineralized rocks (often containing sulfur compounds) to the effects of weathering. This weathering action frees metals and other elements/compounds that can then find their way to streams and rivers. In addition, underground mine workings can tap into groundwater sources producing a constant discharge of often undesirable water to surface water features.

The entire project is within the Rio Grande–Albuquerque watershed and the specific HUC2 6 subunits are Las Huertas Creek, Outlet San Pedro Creek, Upper Tijeras Arroyo, and Middle Tijeras Arroyo. These units are shown in figure 15. Table 9 lists the total acreage in each subunit and an estimate of the project size in acres and as a percentage of the entire subunit.

Surface water quality is affected by concentrations of pollutants from point sources of effluents such as septic tanks or industrial discharges. Although there are impaired streams in the project area, there is no indication that any of the features listed in the proposed action contribute to this impairment. The investigation of the features to be remediated in the proposed action did not show any of the features to be discharging or containing any water. Additionally there is no evidence of rills or gullies that would indicate periodic or intermittent discharges. The U.S. Environmental Protection Agency (EPA) indicates that three streams in the project area are impaired. The impaired streams are San Pedro Creek, Las Huertas Creek, and the Tijeras Arroyo (see figure 15). These streams are impaired for a variety of reasons ranging from agriculture, urbanization, channel diversion, and storm water runoff.³

Table 9. Acreage of sixth-code watersheds in the project area

<table>
<thead>
<tr>
<th>HUC Number (HUC6)</th>
<th>HUC6 Name</th>
<th>Acres in Watershed</th>
<th>Project Acres in Watershed</th>
<th>Project Acres as Percent of Watershed</th>
</tr>
</thead>
<tbody>
<tr>
<td>130202010610</td>
<td>Las Huertas Creek</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;0.003%</td>
</tr>
<tr>
<td>130202010502</td>
<td>Outlet San Pedro Creek</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;0.001%</td>
</tr>
<tr>
<td>130202030201</td>
<td>Upper Tijeras Arroyo</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;0.001%</td>
</tr>
<tr>
<td>130202030202</td>
<td>Middle Tijeras Arroyo</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Surface water quality is affected by concentrations of pollutants from point sources of effluents such as septic tanks or industrial discharges. Although there are impaired streams in the project area, there is no indication that any of the features listed in the proposed action contribute to this impairment. The investigation of the features to be remediated in the proposed action did not show any of the features to be discharging or containing any water. Additionally there is no evidence of rills or gullies that would indicate periodic or intermittent discharges. The U.S. Environmental Protection Agency (EPA) indicates that three streams in the project area are impaired. The impaired streams are San Pedro Creek, Las Huertas Creek, and the Tijeras Arroyo (see figure 15). These streams are impaired for a variety of reasons ranging from agriculture, urbanization, channel diversion, and storm water runoff.³

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² A hydrologic unit is a drainage area delineated to nest in a multilevel, hierarchical drainage system. Its boundaries are defined by hydrographic and topographic criteria that delineate an area drained by a river system, a reach of a river and its tributaries in that reach, a closed basin(s), or a group of streams forming a coastal drainage area. Each hydrologic unit is identified by a unique hydrologic unit code consisting of 2 to 12 digits based on the 6 levels of classification in the hydrologic unit system.

³ 2008 Water Quality Reports, U.S. Environmental Protection Agency
Figure 15. Project area hydrologic map
Environmental Consequences

Direct and Indirect Effects
No Action – Alternative 1
The no action alternative would have no effect on current water quality as the features under consideration are dry and, in general, away from surface water sources.

The Proposed Action – Alternative 2
It is anticipated that the proposed action will not result in direct or indirect effects to water quality, as the features are dry and the remediation methods are stable and resist decomposition.

Visual Quality
Existing Conditions
A component of the current landscape character is the degree to which alterations created by management activities are already evident. This existing visual condition defines how natural or altered the present landscape looks (as opposed to the visual quality objectives, which define how natural the landscape should look). The AML areas, although still predominately natural in appearance, have a visual condition indicative of past and present human activities. Waste rock dumps, collapsed shafts, and adits all contribute to creating a landscape that is not completely natural in appearance. However, these alterations do not dominate the landscape at any of the features in the proposed action, and the overall condition of the landscape is relatively unaffected by their presence.

The features identified for remediation occur in two visual quality levels (see figure 16). The applicable levels are “retention” and “partial retention.” Each level establishes a limit to the number of acres that are allowed a variation in visual quality. Retention allows a ± 2 percent alteration in the foreground and a ± 5 percent alteration in the middle and background. Partial retention allows a ± 5 percent alteration in the foreground and a ± 10 percent alteration in the middle and background.

Direct and Indirect Effects
No Action – Alternative 1
The no action alternative would have no effect on visual resources. Views retain evidence of mining and mining related activities.

The Proposed Action – Alternative 2
It is anticipated that the proposed action could result in direct and indirect beneficial and adverse effects to visual resources, as it calls for the installation of PUF, cement cap, and the construction of bat-friendly gates. The installation of PUF, and subsequently covering the material with soil and/or rocks, would reduce the evidence of human activities by removing shafts and adits and enhancing the visual quality by restoring a more natural appearance. Additional closure techniques such as concrete caps and bat-friendly gates would have minimal adverse impacts on visual resources due to their size and location on the landscape. Although, as these structures age and are covered with an oxidized patina, they are far less noticeable and will not attract undue visual attention.
Figure 16. Project area VQO map
Wilderness
Existing Conditions
Sandia Mountain Wilderness is located east of the Albuquerque metropolitan area and was established by an act of Congress in 1978. It contains slightly less than 39,000 acres and because of its proximity to Albuquerque enjoys high levels of dispersed recreational usage. The principal recreation use is hiking, and the wilderness contains approximately 150 miles of hiking trails.

The dominant rock type in Sandia Mountain Wilderness and the Sandia Mountains in general is granite with a limestone cap at the crest. Prior to its establishment as a wilderness, various mining and exploration ventures occurred, but little mineral production was reported during the mining era.

Today, remnants of this mining period remain and consist of adits, shafts, and trenches. Many of these features are located along or are visible from the system of hiking trails that cross the wilderness. One feature in particular, an adit in the Tunnel Springs complex, shows evidence of high visitation and lies directly along a popular hiking route.

Sandia Mountain Wilderness is designated as Management Area 1 (MA1) in the Cibola National Forest management plan. The plan states the management emphasis of the wilderness as dispersed recreation managed within established capacities and compatible with the needs of important wildlife species.

Sandia Mountain Wilderness is subject to the Wilderness Act of 1964 (Pub. L 88–577). The act protects designated areas from commercial enterprises, construction of roads, any kind of mechanical transport (including motor vehicles, motorized equipment, and motorboats), and construction of any structure or installation (16 U.S.C. 1131–1136 § 4(c)).

There are exceptions to this protection as regulations permit certain prohibited activities under special circumstances. One of these provisions can allow an otherwise restricted activity as part of certain kinds of forest stewardship: “…such measures may be taken as may be necessary in the control of fire, insects, and diseases, subject to such conditions as the Secretary deems desirable.” (16 U.S.C. 1131–1136 § 4(d) (1))

Direct and Indirect Effects
No Action – Alternative 1
The no action alternative would have no effect on wilderness values. No action may have an adverse effect on the “natural” character of the wilderness in that bat populations may be affected by human entry into their habitat.

The Proposed Action – Alternative 2
The proposed action involves the remediation of five features located in the Sandia Mountain Wilderness. Remediation of these features involves the installation of a bat-friendly gate at feature 1, PUF covered with an earthen cap at features 2, 4, and 5, and no action to be taken at feature 3.

Although a primary objective of the remediation is to provide for human health and safety, an additional goal of the remediation action is to limit human visitation in underground workings.
that provide habitat for bats. Limiting human visitation to these underground areas reduces the possibility that contagions would be spread across the various features.

The proposed action is in compliance with both the Wilderness Act and the forest plan. By limiting the spread of contagions, the proposed action is consistent with 16 U.S.C. 1131-1136 § 4(d) (1) and by providing for the safety of hikers while remaining compatible with the needs of wildlife.

Work under the proposed action would not involve any type of mechanized equipment within the wilderness. The installation of PUF would not require any mechanical tools and the PUF face will be covered with earth and rocks to protect the polyurethane foam from degradation from the sun’s ultraviolet rays.

**Cumulative Effects**

A cumulative effect is an impact to the environment that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions. The selection of spatial and temporal boundaries on the cumulative effects analyses in this EA are based both on the natural boundaries of the resources of concern and the period of time that the proposed action’s impacts will persist.

The geographic boundary for cumulative impacts considered in this EA is the immediate vicinity of the individual features themselves. The temporal boundary is 2012 when work will occur. The geographic and temporal boundaries together comprise the “analysis area” for the cumulative effects analysis.

Past, present, and reasonably foreseeable human actions that might result in cumulative effects with the proposed action (excluding Sandia Mountain Wilderness) include mining and mineral exploration; routine road and trail maintenance; new road and trail construction; noxious weed management; fuels reduction projects such as tree thinning or prescribed burns; and recreational activities such as hunting, dispersed camping, ATV use, hiking, and horseback riding.

Outside the Sandia Mountain Wilderness, mining and mineral exploration, and new road and trail construction are activities which could occur in the foreseeable future. Currently there is no ongoing mining and/or mineral exploration occurring, and given the lack of production from the mining districts in the project area, it is unlikely that mining and mineral exploration will occur in the foreseeable future. Inside Sandia Mountain Wilderness, mining and mineral exploration is prohibited.

**Cultural Resources**

The no action alternative would not result in any cumulative effects on cultural resources.

There are no other projects planned within the area of potential effect (APE) of the Sandia Ranger District Abandoned Mine Lands Remediation Project that would have an effect on heritage resources resulting in no cumulative effects to archaeological resources.

**Wildlife Resources**

The no action alternative will not result in any cumulative effects on wildlife.
Environmental Consequences

The proposed action alternative could directly and indirectly affect wildlife in the analysis area at a minor and discountable level and, therefore, a slight amount of cumulative effects could occur as a result of project activities. Routine road and trail maintenance, fuels reduction projects, and recreational visitation are ongoing activities within the analysis area. In the foreseeable future these activities are not expected to change in frequency or intensity due to the proposed action. Cumulative effects to wildlife as a result of the proposed action are expected to be insignificant and discountable and will not likely result in the loss of viability or a trend toward Federal listing of any wildlife species.

**Vegetation**

The no action alternative would not result in any cumulative effects on vegetation.

The proposed action could, at a minimal level, directly and indirectly affect vegetation in the analysis area and, therefore, cumulative effects could occur. Routine road and trail maintenance, noxious weed management, fuels reduction projects, and recreational activities are ongoing activities within the analysis area. In the foreseeable future these activities are not expected to change in frequency or intensity due to the proposed action. Cumulative effects to vegetation as a result of the proposed action are expected to be beneficial or minimal and, therefore, significant cumulative effects are not expected to occur.

**Air Quality**

The no action alternative would not result in any cumulative effects to air quality.

The proposed action would, at a minimal level, directly or indirectly affect air quality in the analysis area and, therefore, cumulative effects could occur. Routine road and trail maintenance, noxious weed management, fuels reduction projects, and recreational activities are ongoing activities within the analysis area. In the foreseeable future these activities are not expected to change in frequency or intensity due to the proposed action. Cumulative effects to air quality as a result of the proposed action are expected to be de minimis, or at a level that is too small to be concerned with, therefore, significant cumulative effects are not expected to occur.

**Water Quality**

The no action alternative would not result in any cumulative effects on water quality.

The proposed action would not directly or indirectly affect water quality in the analysis area and, therefore, cumulative effects would not occur. Routine road and trail maintenance, noxious weed management, fuels reduction projects, and recreational activities are ongoing activities within the analysis area. In the foreseeable future these activities are not expected to change in frequency or intensity due to the proposed action.

**Visual Quality**

The no action alternative would not result in any cumulative effects on visual resources.

The proposed action would result in direct or indirect beneficial and adverse effects to visual resources and, therefore, cumulative effects could occur. Routine road and trail maintenance, noxious weed management, fuels reduction projects, and recreational activities are ongoing
activities within the analysis area. In the foreseeable future these activities are not expected to change in frequency or intensity. Cumulative effects to visual resources as a result of the proposed action are expected to be beneficial or minimal, therefore, significant cumulative effects are not expected to occur.

**Wilderness**

The no action alternative would not result in any cumulative effects on Sandia Mountain Wilderness.

The proposed action could, at a minimal level, directly and indirectly affect wilderness in the analysis area and, therefore, cumulative effects could occur. Recreational activities are ongoing within the analysis area. Wilderness values may be impaired for the duration of the project; specifically visitor’s opportunities for solitude may be impaired due to noise and activity associated with mine closures. However, project duration (1 to 3 days) and project completion during low use periods (weekdays) may significantly reduce these potential impacts. In the foreseeable future, these activities are not expected to change in frequency or intensity due to the proposed action. Cumulative effects to wilderness as a result of the proposed action are expected to be beneficial or minimal and, therefore, significant cumulative effects are not expected to occur.
Consultation and Coordination

Agencies and Persons Consulted
New Mexico Energy, Minerals and Natural Resources Department, Mining and Minerals Division, Abandoned Mine Land Program

New Mexico State Historic Preservation Officer

U.S. Fish and Wildlife Service

American Indian Tribes: Pueblo of Acoma, Zuni, Isleta, Sandia, Santo Domingo, Santa Ana, San Ildefonso, San Felipe, Zia, Cochiti, Jemez, the Navajo Nation, and the To’hajilee Navajo Chapter

ID Team Members

<table>
<thead>
<tr>
<th>Role</th>
<th>Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID Team Leader</td>
<td>Calvin Parson, Geologist</td>
</tr>
<tr>
<td>Project Manager</td>
<td>William Medina, Assistant Regional Environmental Engineer</td>
</tr>
<tr>
<td>Wildlife Biologist</td>
<td>Zack Parsons, Wildlife Biologist</td>
</tr>
<tr>
<td>Heritage Resources</td>
<td>Cliff Nicoll, Assistant Forest Archaeologist</td>
</tr>
<tr>
<td>Wilderness/Trails Specialist</td>
<td>Kerry Wood, Program Manager</td>
</tr>
<tr>
<td>Tribal Relations</td>
<td>Cynthia Benedict, Tribal Liaison</td>
</tr>
</tbody>
</table>

EA for the Sandia RD Abandoned Mine Lands Remediation Project
### Appendix A. Summary of Public Comments

<table>
<thead>
<tr>
<th>Comment No. and Source</th>
<th>Comment</th>
<th>Resource Area</th>
<th>Issue</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bob Smith</strong></td>
<td>I think it is a good idea to reclaim the abandoned mines on the Sandia Ranger District</td>
<td>Engineering</td>
<td>No</td>
<td>Comment recognized.</td>
</tr>
<tr>
<td>1</td>
<td>I think the Forest Service should place a gate with a pad lock on the La Luz Mine and allow schools to use the mine as a historical tool, and give kids tours of the mine.</td>
<td>Engineering</td>
<td>No</td>
<td>The La Luz Mine is on tribal land adjacent to the forest and is not proposed as a feature to be reclaimed through this project. This comment is beyond the scope of this project.</td>
</tr>
<tr>
<td><strong>Cathy Ottinger and David Farnum</strong></td>
<td>We request that you keep and/or add us to the mailing list for the Sandia Abandoned Mine Lands Remediation Proposal Project and NEPA review.</td>
<td>NEPA</td>
<td>No</td>
<td>A letter was sent to them notifying them that they would be added to the mailing list.</td>
</tr>
<tr>
<td>2</td>
<td>Where on your Web site (<a href="http://fs.usda.gov.cibola">http://fs.usda.gov.cibola</a>) can information be found concerning the Sandia Abandoned Mine Lands (AML) Remediation?</td>
<td>NEPA</td>
<td>No</td>
<td>In the letter sent to them, an email address was provided notifying them where they could view NEPA projects including the Sandia Abandoned Mine Lands Remediation project.</td>
</tr>
<tr>
<td><strong>David Buckhout and David Farnum</strong></td>
<td>We request that you keep and/or add us to the mailing list for the Sandia Abandoned Mine Lands Remediation Proposal Project and NEPA review.</td>
<td>NEPA</td>
<td>No</td>
<td>A letter was sent to them notifying them that they would be added to the mailing list.</td>
</tr>
<tr>
<td>2</td>
<td>Where on your Web site (<a href="http://fs.usda.gov.cibola">http://fs.usda.gov.cibola</a>) can information be found concerning the Sandia Abandoned Mine Lands (AML) Remediation?</td>
<td>NEPA</td>
<td>No</td>
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</tr>
<tr>
<td><strong>Ron and Su Rymarz</strong></td>
<td>We request that you keep and/or add us to the mailing list for the Sandia Abandoned Mine Lands Remediation Proposal Project and NEPA review.</td>
<td>NEPA</td>
<td>No</td>
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<td>Where on your Web site (<a href="http://fs.usda.gov.cibola">http://fs.usda.gov.cibola</a>) can information be found concerning the Sandia Abandoned Mine Lands (AML) Remediation?</td>
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<td>No</td>
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</tr>
</tbody>
</table>
## Appendix A. Summary of Public Comments

<table>
<thead>
<tr>
<th>Jennifer Shepherd</th>
<th>1</th>
<th>NEPA</th>
<th>No</th>
<th>Comment recognized.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Email Auto reply) - Thanks for your message. I’ll be out of the office until Monday, April 18th and will look forward to responding to your email when I return.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>John Kretzmann</th>
<th>1</th>
<th>NEPA</th>
<th>No</th>
<th>Comment recognized.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The New Mexico Abandoned Mine Lands (AML) Program supports the Forest Service project to safeguard abandoned mines in the Sandia Mountains, while preserving bat habitat in the underground workings.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>