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# CHAPTER 5

## CUMULATIVE EFFECTS

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### 5.1 INTRODUCTION

Cumulative impacts are effects on the environment that result from implementing any one of the alternatives, in combination with other actions outside the scope of this EIS, either in the project area or within the region of influence on the project area. CEQ regulations (CEQ 1997) require a cumulative impact analysis because environmental conditions result from many different factors that act together. The total effect of any single action cannot be determined by considering it in isolation, but must be determined by considering the likely result of that action in conjunction with many other actions.

Evaluating potential impacts includes considering incremental impacts that could occur from the proposed project, as well as impacts from past, present, and reasonably foreseeable future actions. Management actions could be influenced by activities and conditions on adjacent public and private lands beyond the project area boundary; therefore, assessment data and information could span multiple scales, landownerships, and jurisdictions. These assessments involve determinations that often are complex and, to some degree, subjective.

#### 5.1.1 Cumulative Analysis Methodology

For the purposes of this EIS, the cumulative impacts are the sum of all past, present, and reasonably foreseeable future actions (RFFAs) resulting primarily from mining and mineral exploration, ROW construction and maintenance, commercial activities, public uses, and wildfire. Actions associated with these activities have occurred, are occurring, or are reasonably expected to occur within the geographic range of the cumulative effects analysis.

The purpose of this cumulative analysis is to evaluate the contributions of the proposed action, Alternative I, and the No Action Alternative to the cumulative environment.

A cumulative impact is defined under federal regulations as “...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individual minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7).

This chapter analyzes the potential cumulative impacts by the following:

- Defining the geographic areas considered for the cumulative impact analysis
- Providing an overview of relevant past and present actions in the project vicinity that may affect cumulative impacts
- Presenting the reasonably foreseeable actions in the geographic areas of consideration
- Determining whether there are adverse cumulative impacts associated with the resource areas analyzed in Chapter 3

Information used in the cumulative impacts assessment was gathered from the BLM’s LR2000 database and from internal BLM GIS data. The past and present actions are current as of January 2015. Changes after this date are not considered in this analysis.

The assessment was based on the following assumptions:

- US highways will continue to be maintained and improved based on NDOT’s annual budgeting and planning process. The BLM will continue to approve these actions
- Expired and closed leases have been restored or are undergoing restoration to historic ecological site descriptions; therefore, they are not included in the assessment or as part of the total acreage of disturbance

#### ***Assumptions for Cumulative Analysis***

Direct and indirect environmental consequences of the proposed action, Alternative I, and the No Action Alternative were evaluated in Chapter 4 for the various elements or resources; these have been brought forward for the cumulative impact analysis. Elements or resources analyzed in Chapter 4 and determined to have no measurable impacts from the proposed action, the No Action Alternative, or Alternative I were not carried forward into this chapter for analysis. These include the following: Native American Religious Concerns, wastes and materials (hazardous and solid), geology and minerals, lands and realty, transportation, and access and public safety.

#### *Geographic Areas of Evaluation*

The geographic area of evaluation, or the cumulative effects study area (CESA) is the spatial boundary within which the cumulative impacts analysis was undertaken. The extent of each CESA varies with each resource, based on the geographical or biological limits of that resource. As a result, the list of projects considered under the cumulative analysis varies according to the resource being considered. The geographic area of analysis is specified in the discussion of the cumulative impacts for each resource.

#### *Temporal Boundary of Evaluation*

A temporal boundary is the time frame during which the cumulative impacts are reasonably expected to occur. The temporal parameters for this cumulative effects analysis are the anticipated lifespan of the proposed project, beginning in 2016. It extends to at least five years, which is the minimum expected project life of the proposed project. More specifically, the temporal boundary is a five-to seven-year active mining life, including milling and leaching, and five years for reclamation and closure. The time frame over which the cumulative analysis was completed is as follows:

- Cultural resources length of active mining and ground disturbance, approximately seven years
- Air quality, general wildlife, raptors, vegetation, soils, and water resources length of active mining, milling, leaching, and reclamation and closure, approximately 12 years (through 2028)

#### *Description of CESA Boundaries*

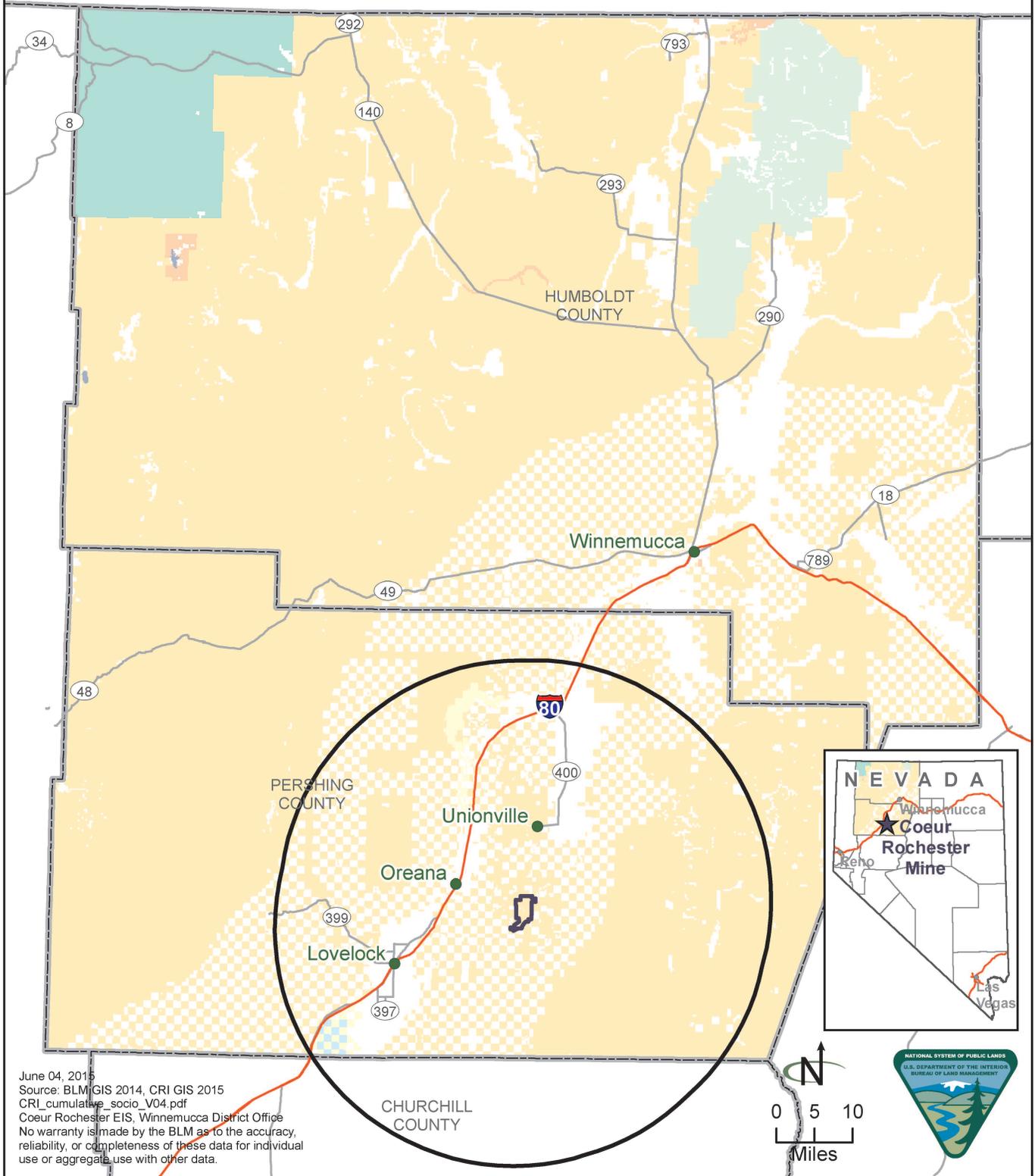
The geographical areas considered for the analysis of cumulative effects vary in size and shape to reflect each evaluated environmental resource and the potential area of impact. The descriptions of the CESA boundaries for the proposed action and Alternative I are described in **Table 5-1**, Cumulative Effect Study Areas by Resource. The CESA boundaries are shown in **Figure 5-1**, Cumulative Effects Study Areas, and **Figure 5-2**, Cumulative Effects Study Areas (Zoom in).

The CESA for air quality was determined to be a 50-kilometer (31-mile) radius around the center of the project area that was used to analyze the proposed action. The CESA includes 2,203,500 acres and is shown on **Figure 5-1** and **Figure 5-2**.

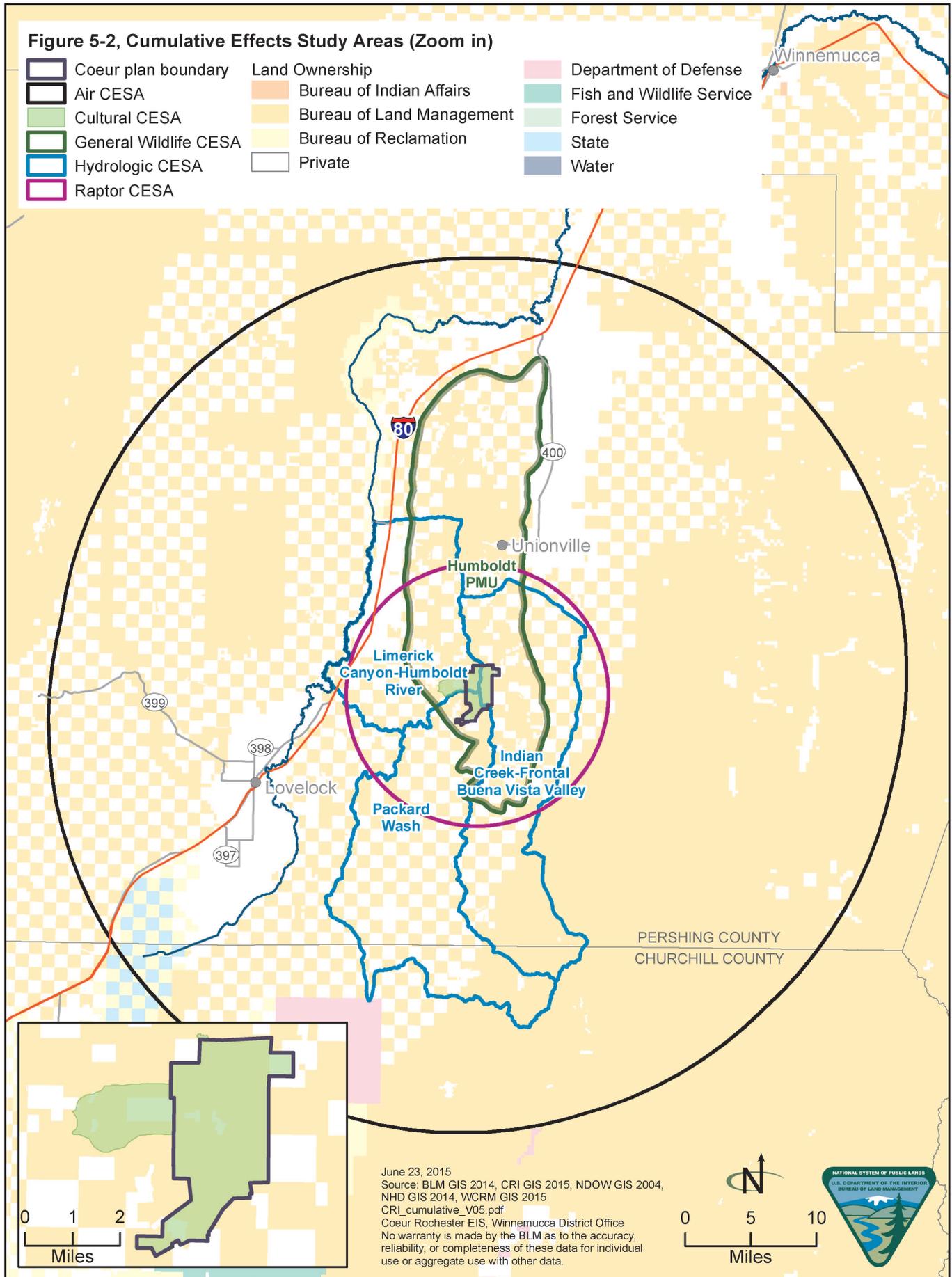
The CESA for cultural resources was determined to encompass 6,300 acres within and around the project area due to previous discoveries and the APE, as described in Chapter 4. This area encompasses historic and prehistoric areas of concern.

**Figure 5-1, Cumulative Effects Study Areas**

- |   |   |   |
|---|---|---|
|  Plan boundary                                       | <b>Land Ownership</b>   |  Department of Defense     |
|  Air CESA (50 km buffer of plan boundary)            |  Bureau of Indian Affairs  |  Fish and Wildlife Service |
|  Socioeconomic CESA (Pershing and Humboldt counties) |  Bureau of Land Management |  Forest Service            |
|   |  Bureau of Reclamation     |  State                     |
|   |  Private                   |  Water                     |



June 04, 2015  
 Source: BLM GIS 2014, CRI GIS 2015  
 CRI\_cumulative\_socio\_V04.pdf  
 Coeur Rochester EIS, Winnemucca District Office  
 No warranty is made by the BLM as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



**Table 5-1  
Cumulative Effect Study Areas by Resource**

<b>Resource</b>	<b>CESA Description</b>	<b>CESA Name</b>	<b>Size of CESA (Acres)</b>
Air quality	50-kilometer (31-mile) radius around the CRI plan boundary	Air CESA	2,203,500
Cultural resources	The area in the CRI Plan of Operations Boundary and the APE	Cultural CESA	6,300
Wildlife, Vegetation, Soils, Migratory Birds, Special Status Species	<u>NDOW's</u> Humboldt PMU	General Wildlife CESA	175,600
Raptors	10-mile buffer of the CRI plan boundary	Raptor CESA	201,100
Water resources	Based off the fifth-level watershed, NHD HUC 10	Hydrologic CESA	332,100
Social values and economics	The surrounding counties of Pershing and Humboldt	Socioeconomic CESA	10,064,640

The CESA for general wildlife, vegetation, soils, migratory birds, and special status species, with the exception of raptors, includes NDOW's Humboldt population management unit (PMU). This area encompasses the known historic and inactive greater sage-grouse leks in the vicinity of the plan boundary. The CESA includes approximately 175,600 acres and is shown on **Figure 5-2**.

The CESA for raptors is a 10-mile radius around the plan boundary, consistent with the survey area described in Chapter 4. This area encompasses existing and potential nesting habitat for golden eagles. This CESA includes approximately 201,100 acres and is shown on **Figure 5-2**.

The CESA for water resources is based on the fifth-level watershed or the NHD HUC 10, clipped on the north and west boundary at I-80 and the Humboldt River. This CESA encompasses 332,100 acres.

The CESA for social values and economics is all of Pershing and Humboldt Counties and is based on the assumption that most of the social and economic effects of the project would be concentrated in Lovelock, Imlay, and Winnemucca. This CESA includes 10,064,640 acres and is shown on **Figure 5-2**.

A cumulative data collection area was established, representing the maximum area of CESAs combined for resources that could be affected by quantifiable surface disturbance and resource development. Therefore, this area excludes the socioeconomic CESA. The cumulative data collection area is the air CESA shown on **Figure 5-2**.

The types of project-specific impacts on the resources evaluated in **Chapter 3** may also occur as a result of past actions, other present actions, and RFFAs. The potential cumulative effects from the past actions, present actions, and RFFAs are discussed in **Section 5.1.2**. The individual projects described in

**Section 5.1.2** comprise the past and present actions and the RFFAs identified by the BLM's Land and Mineral Legacy Rehost System (LR2000). RFFAs are pending actions identified by LR2000 in January 2015.

The projects described in **Section 5.1.2** are the following: grazing and agriculture, utilities and infrastructure, land development, mineral development and exploration, wildland fire, and geothermal leasing.

All of the projects and activities have the potential to impact the environmental resources of concern in all or portions of the various CESAs.

#### **5.1.2 Past, Present, and Reasonably Foreseeable Future Actions**

Past, present, and reasonably foreseeable future actions are considered in the analysis. The purpose is to identify whether and to what extent the environment has been degraded or enhanced, whether ongoing activities are causing impacts, and what are the trends for activities in and impacts on the area. Projects and activities are evaluated on the basis of proximity, connection to the same environmental systems, potential for subsequent impacts or activity, similar impacts, the likelihood a project will occur, and whether the project is reasonably foreseeable.

Projects and activities considered in the cumulative analysis were identified by BLM employees with local knowledge of the area. Additional information was obtained using the following:

- The BLM's LR2000 database (which records lands and mineral actions)
- Reports run in January 2015
- Agency records
- Current agency GIS records and analysis

The following past and present actions, which have impacted resources in the CESAs to varying degrees, have been identified and are outlined in **Table 5-2**, Past and Present Projects, Plans, or Actions in each Cumulative Effects Study Area, and **Table 5-3**, Reasonably Foreseeable Projects, Plans, or Actions in each Cumulative Effects Study Area.

The above tables outline all activities or projects by type and the total disturbance authorized or proposed. There are a number of major or specific actions included in the general data, which have been approved or constructed on federal lands in the CESAs. Project descriptions for these actions are outlined in **Table 5-4**.

**Table 5-2  
Past and Present Projects, Plans, or Actions in each Cumulative Effects Study Area<sup>1</sup>**

<b>CESA<sup>1</sup></b>	<b>A</b>	<b>C</b>	<b>G</b>	<b>R</b>	<b>H</b>
<b>Project Description</b>					
<b>Grazing and Agriculture</b>					
Irrigation facilities and water pipelines	5,212 acres	N/A <sup>2</sup>	137 acres	93 acres	2 acres
Fenced feeding operations and pipelines	364 miles, averaging 10 feet wide	9 miles, averaging 10 feet wide	35 miles, averaging 10 feet wide	27 miles, averaging 10 feet wide	53 miles, averaging 10 feet wide
<b>Utilities and Infrastructure</b>					
Roads	276 miles, averaging 40 feet wide	7 miles, averaging 40 feet wide	32 miles, averaging 40 feet wide	63 miles, averaging 40 feet wide	66 miles, averaging 40 feet wide
Railroads	14 miles, 200 feet wide	N/A	N/A	4 miles, 200 feet wide	6 miles, 200 feet wide
Communication sites	272 acres	N/A	5 acres	1 acre	2 acres
Telephone or telephone/telegraph line	182 miles, averaging 20 feet wide	N/A	N/A	9 miles, averaging 20 feet wide	33 miles, averaging 20 feet wide
Transmission line	235 miles, averaging 70 feet wide	10 miles, averaging 25 feet wide	34 miles, averaging 60 feet wide	51 miles, averaging 60 feet wide	66 miles, averaging 40 feet wide
Oil and gas pipelines	40 miles	N/A	N/A	N/A	N/A
<b>Mineral Development and Exploration<sup>3</sup></b>					
Mining and exploration plans of operation	1,662 acres	N/A	2,214 acres	360 acres	410 acres
Exploration notices	85 acres	5 acres	52 acres	48 acres	46 acres
Sand and gravel extraction	5,292 acres	N/A	245 acres	65 acres	389 acres
<b>Wildland Fires</b>					
1997-2011	476,667 acres	16 acres	41,779 acres	13,303 acres	13,224 acres
<b>Land Development</b>					
Land sales	2,491 acres	N/A	N/A	N/A	N/A
<b>Geothermal Leasing</b>					
Geothermal leases	33,654 acres	N/A	N/A	N/A	40 acres
Geothermal unitization site	170,146 acres	N/A	N/A	N/A	8,938 acres
Geothermal unit disturbance	470 acres	N/A	N/A	N/A	175 acres

<sup>1</sup>CESAs are denoted as follows: A is air, C is cultural, G is general wildlife, R is raptor, H is hydrologic

<sup>2</sup>N/A (not applicable) indicates that no past or present project, plan, or action exists in the CESA

<sup>3</sup>Past and present acres associated with the Coeur Rochester or Packard mines are not included

**Table 5-3**  
**Reasonably Foreseeable Projects, Plans, or Actions in each Cumulative Effects Study Area**

<b>Project Description</b>	<b>A</b>	<b>C</b>	<b>G</b>	<b>R</b>	<b>H</b>
<b>Grazing and Agriculture</b>					
Irrigation facilities and water pipelines	11 acres	N/A	11 acres	N/A	N/A
<b>Utilities and Infrastructure</b>					
Roads	489 acres	40 acres	199 acres	212 acres	225 acres
Railroads	10 acres	N/A	10 acres	N/A	NA
Communication sites	5 acres	N/A	N/A	N/A	N/A
Transmission line	589 acres	N/A	6 acres	6 acres	19 acres
Other BLM special designation: Lovelock Cave facilities	310 acres	N/A	N/A	N/A	N/A
Other airport lease	993 acres	N/A	N/A	N/A	N/A
<b>Mineral Development and Exploration</b>					
Mining and exploration plans of operation	435 acres	N/A	403 acres	N/A	N/A
Exploration notices	36 acres	N/A	N/A	N/A	N/A
Sand and gravel extraction operations	190 acres	N/A	N/A	78 acres	78 acres
<b>Land Development</b>					
Land sales	2,956 acres	N/A	N/A	N/A	N/A
<b>Geothermal Leasing</b>					
Geothermal unitization site	60 acres	N/A	N/A	N/A	N/A

<sup>1</sup>CESAs are denoted as follows: A is air, C is cultural, G is general wildlife, R is raptor, H is hydrologic

<sup>2</sup>N/A (not applicable) indicates that no reasonably foreseeable project, plan, or action exists in the CESA

**Table 5-4**  
**Major Projects, Plans, or Actions in each Cumulative Effects Study Area**

<b>Project</b>	<b>CESAs</b>	<b>Description</b>	<b>Status</b>
Leach Hot Springs Geothermal Unit	A	Geothermal exploration operations totaling 70 acres of disturbance through the construction of up to 12 well pads, for a maximum total of 36 exploration wells, and improvements to existing and construction of new on-lease access roads and other improvements	Authorized in 2011
Coyote Canyon Geothermal Unit	A	Construction and operation of a 70-megawatt utility-grade power plant totaling 60 acres of disturbance, including the construction of production and injection wells, pipelines, a 230-kV gen-tie line, and support facilities	Authorized in 2010
Dixie Valley Geothermal Unit	A	A 64-megawatt double-flash utility-grade power plant constructed in 1988. Total acreage of disturbance is unknown	Constructed in 1988
Dixie Meadows Geothermal Unit	A	Geothermal exploration totaling 82 acres of disturbance from the drilling of temperature gradient wells, observation wells, and production wells at up to 20 locations	Authorized in 2011
Humboldt House Geothermal Unit	A	Expansion and deepening of a reserve and test pit totaling 0.81 acre of disturbance	Authorized in 2008

**Table 5-4  
Major Projects, Plans, or Actions in each Cumulative Effects Study Area**

<b>Project</b>	<b>CESAs</b>	<b>Description</b>	<b>Status</b>
New York Canyon	A, H	Construction and operation of a 70-megawatt utility-grade power plant totaling 175 acres of disturbance, including the construction of production and injection wells, an airstrip and airplane hangar, pipelines, a 26-mile 230-kV gen-tie line, and support facilities	Authorized in 2013
Unionville Wildland Urban Interface	A, R, G	Expansion of two fuel breaks around the town of Unionville. The Northside fuel break is 3.4 miles long and 50 feet wide and occupies 20.6 acres. This fuel break will be expanded to 100 feet wide and will occupy 20.5 acres. The Southside fuel break will be 3.5 miles long and 100 feet wide and will occupy 41.2 acres.	Authorized in 2014
Dune Glen Fire	A	Emergency stabilization and rehabilitation after 135 acres burned	Authorized in 2013
Restoration and rehabilitation regarding cheatgrass stand failure	A	Research to determine if the phenomenon of cheatgrass stand replacement failure (die-off) represents an opportunity for native restoration of severely invaded areas in the Great Basin, disturbing roughly 6 acres	Authorized in 2012
Florida Canyon Mine	A, G	The proposed South Expansion Project involves the expansion of an open pit; construction and operation of a heap leach pad; expansion of a waste rock storage facility; construction of various haul roads and access roads; and closure/reclamation of proposed facilities, totaling approximately 1,288 acres (693 acres of BLM-administered land and 595 acres of private land owned by FCMI)	Authorized in 2014
Relief Canyon Mine	A, G, R, H	Proposed disturbance of an additional 395 acres for additional facilities, including crushing and growth media stockpiles	Pending authorization

## 5.2 CUMULATIVE IMPACT ANALYSIS FOR THE PROPOSED ACTION

The cumulative impacts analysis for each resource area is provided below. The analysis describes the intensity or severity of the cumulative impacts, including the magnitude, geographic extent, duration, and frequency of the impacts. The magnitude of the impact reflects its relative size or amount, the geographic extent considers how widespread the impact may be, and the duration and frequency refer to whether the impact is a one-time event, intermittent, or chronic. In addition, the depth of discussion for cumulative impacts varies by resource; resources with a greater potential for cumulative effects are discussed in greater detail, while resources with less potential for cumulative effects are discussed on less detail.

The cumulative impact of past, present, and reasonably foreseeable projects, combined with the expansion of the mine under each alternative, is discussed below.

### 5.2.1 Air and Atmospheric Resources

The CESA for air and atmospheric resources is the air quality CESA, which includes a 50-kilometer (31-mile) radius around the project area and consists of approximately 2,203,500 acres.

#### **Past and Present Actions**

Before the implementation of the federal CAA, few if any measures to control or minimize impacts on air quality were required. Most mining operations were of smaller scale and consisted of underground operations with small disturbance footprints.

Most air quality impacts from these operations consisted of the generation of fugitive dust during exploration road building, trenching, and mining, as well as agricultural operations and travel on dirt roads. Present actions in the air quality CESA likely to be contributing to air quality impacts are wildland fire, dispersed recreation, ROW construction and maintenance, mineral exploration and mining, industrial operations (i.e., construction facilities, power generation facilities, generators), and transportation networks (see **Table 5-2**, above). These activities are principally contributing point source particulate matter emissions and fugitive dust; however, products of combustion are also emitted.

Three operating mines are in the air quality CESA and are regulated under BAPC operating permits. The Gold Acquisition Corp. Relief Canyon mine stationary emission sources, as outlined in Permit No. AP1041-2441, are waste rock and wet and dry ore material transfers, ore crushing and stockpiling, gold precipitation circuits, a propane boiler, milling, and baghouses.

The EP Minerals Colado Plant diatomaceous earth and perlite mine stationary emission sources, as outlined in Permit No. AP1499-0279.02, are crushing, material transfers, material classification and drying, bulk loading and packaging, baghouses, material sizing and blending, wood chipping, pallet cleaning, and fuel storage.

The Florida Canyon Mine stationary emission sources, as outlined in Permit No. AP10612442, are loaders, rock hoppers, crushing, conveyors, radial stackers, lime silos, furnace, kilns, steam boilers, and mercury retorts. These permits specify emission limits for air pollutants in order to control the contributions of pollutants to the air basin.

**Table 5-5**, Air Quality Criteria Pollutant Emissions from Existing Operations within a 50-Kilometer (31-Mile) Radius of the Proposed Project Area, provides a summary of the air quality criteria pollutant emissions from existing mining operations in a 50-kilometer (31-mile) radius of the project area. Emissions are those sources that have air quality operating permits from the BAPC, along with estimated PTE emissions from the proposed action.

**Table 5-5  
Air Quality Criteria Pollutant Emissions from Existing Operations within a 50-Kilometer  
(31-Mile) Radius of the Proposed Project Area**

Emission Sources	Cumulative Emissions (tons per year)						
	PM	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC
Florida Canyon Mine	1,258.57	305.74	35.70	4.49	189.32	308.10	16.67
Gold Acquisition Corp. Relief Canyon Mine	71.03	33.32	30.36	1.60	90.60	51.56	1.72
EP Minerals Colado Plant	100.48	99.32	99.32	99.00	98.40	97.13	29.21
Proposed action project total	1,447.65	489.36	59.22	3.81	644.41	619.37	52.96
<i>Total</i>	<i>2,877.08</i>	<i>927.38</i>	<i>224.38</i>	<i>108.89</i>	<i>1,022.32</i>	<i>1,075.79</i>	<i>100.60</i>
<b>Project Cumulative Contribution</b>	<b>50.29%</b>	<b>52.73%</b>	<b>26.29%</b>	<b>3.49%</b>	<b>62.99%</b>	<b>57.54%</b>	<b>52.68%</b>

Historic wildland fires (1997 to 2011) have burned approximately 476,667 acres in the air quality CESA, which is approximately 21.6 percent of the CESA. Approved mineral exploration and mining notices and plans of operations, as well as mineral material disposal sites, total approximately 7,039 acres of surface disturbance, which is approximately 0.32 percent of the air quality CESA. ROWs, land development permits, and geothermal leases cover approximately 42,209 acres, which is approximately 1.92 percent of the CESA (see **Table 5-2**).

The ROWs, land development permits, and geothermal leases were issued for facilities that have the potential to create surface disturbance or to impact air quality. Impacts on air quality from dispersed recreation could not be quantified.

#### **RFFAs**

RFFAs in the air quality CESA that may contribute to impacts on air quality are wildland fire, dispersed recreation, ROW construction and maintenance, mineral exploration, and mining, including mineral material disposal sites, industrial operations (i.e., construction facilities, power generation facilities, and generators), and transportation networks (see **Table 5-3**).

Air quality impacts from these actions include generation of fugitive dust during hard rock mining and exploration. Emissions may also be generated from processing facilities, burning of fossil fuels by heavy equipment and other vehicles, vehicle travel on paved and unpaved roads, fugitive dust from travel on unpaved roads, and wildland fires. Some of these emissions would be localized and subject to BAPC air quality permits and compliance, development of mitigation measures, and implementation of operational performance standards. Others would be more long term and basin wide and would not be subject to BAPC permitting.

### **Cumulative Impacts**

Each of the identified individual projects in the air quality CESA, including existing and proposed mining operations, emit air pollutants. The existing and proposed mining operations are the major sources of quantifiable criteria pollutants in the CESA. In accordance with the BLM's request, criteria PTE emissions from the Gold Acquisition Corp. Relief Canyon Mine and EP Minerals Colado Plant were introduced into a cumulative modeling analysis using AERMOD.

The Florida Canyon project PTE emissions were excluded from the cumulative modeling analysis due to the distance from the proposed action. Mining operations are characterized by fugitive emissions with limited atmospheric residence times, so distance is the primary factor for determining the potential of emissions to result in a cumulative impact with another facility. Due to the distance between the Florida Canyon Mine and CRI, those emissions were excluded, while the emission from Gold Acquisition Corp. Relief Canyon Mine and EP Minerals Colado Plant operations were included.

Cumulative AERMOD modeling results indicate that the ambient concentrations for all modeled criteria pollutants would be below the applicable NAAQS. The maximum PTE emissions from each of the facilities' BAPC permits were introduced into the AERMOD model as a single surface-based area source at the center of each existing facility. The maximum reasonably foreseeable emissions for CRI were also introduced, and the total cumulative impacts were assessed at receptors along the boundary for CRI. Maximum impacts were influenced primarily by CRI emissions and showed little influence from the cumulative sources.

A detailed description of the cumulative modeling method is provided in the air quality study prepared for this project (Stantec 2015).

The proposed action's contribution to the cumulative air quality environment would not result in cumulative impacts that would exceed the NAAQS. The reasonably foreseeable future actions detailed in **Table 5-3** would result in additional emissions similar to those currently emitted by existing operations in the air quality CESA. In addition, the major sources of pollutants in the CESA would operate under permit conditions established by the BAPC. Cumulative impacts from all modeled scenarios are shown in **Table 5-6**, Stage III Operation and Access Road Construction, Cumulative Analysis, to **Table 5-10**, Two Large Emergency Generators, Cumulative Analysis.

**Table 5-6**  
**Stage III Operation and Access Road Construction, Cumulative Analysis**

Pollutant	Averaging Period	Background ( $\mu\text{g}/\text{m}^3$ )	Model Results Stage III HLP Op, Road Construct ( $\mu\text{g}/\text{m}^3$ )	Total ( $\mu\text{g}/\text{m}^3$ )	NAAQS Standard ( $\mu\text{g}/\text{m}^3$ )	Percent of Standard
PM <sub>2.5</sub> <sup>a</sup>	24-hr	7	12.90	19.90	35	56.87
PM <sub>2.5</sub> <sup>d</sup>	Annual	2.4	2.82	5.22	12	43.50
PM <sub>10</sub> <sup>b</sup>	24-hr	10.2	95.99	106.19	150	70.79
SO <sub>2</sub> <sup>c</sup>	1-hr	0	36.89	36.89	196	18.82
SO <sub>2</sub> <sup>d</sup>	3-hr	0	21.46	21.46	238	9.02
NO <sub>2</sub> <sup>a,e</sup>	1-hr	0	173.05	173.05	188	92.05
NO <sub>2</sub> <sup>d,e</sup>	Annual	0	14.98	14.98	100	14.98
CO <sup>d</sup>	1-hr	0	1,534.52	1,534.52	40,000	3.84
CO <sup>d</sup>	8-hr	0	771.65	771.65	10,000	7.72

<sup>a</sup> 8th high value averaged over modeled period (with plume depletion for particulates)

<sup>b</sup> Highest 3rd high over two years modeled (with plume depletion)

<sup>c</sup> 4th high value average over two years modeled

<sup>d</sup> Highest 1st high (averaged over two years modeled for PM<sub>2.5</sub>)

<sup>e</sup> Using OLM

**Table 5-7**  
**Stage III Operation, Stage V Construction and Topsoil Removal/Piling, Cumulative Analysis**

Pollutant	Averaging Period	Background ( $\mu\text{g}/\text{m}^3$ )	Model Results Stage III HLP Op, Road Construct ( $\mu\text{g}/\text{m}^3$ )	Total ( $\mu\text{g}/\text{m}^3$ )	NAAQS Standard ( $\mu\text{g}/\text{m}^3$ )	Percent of Standard
PM <sub>2.5</sub> <sup>a</sup>	24-hr	7	21.54	28.54	35	81.54
PM <sub>2.5</sub> <sup>d</sup>	Annual	2.4	5.05	7.45	12	62.05
PM <sub>10</sub> <sup>b</sup>	24-hr	10.2	101.27	111.47	150	74.31
SO <sub>2</sub> <sup>c</sup>	1-hr	0	36.97	36.97	196	18.86
SO <sub>2</sub> <sup>d</sup>	3-hr	0	21.47	21.47	238	9.02
NO <sub>2</sub> <sup>a,e</sup>	1-hr	0	184.22	184.22	188	97.99
NO <sub>2</sub> <sup>d,e</sup>	Annual	0	17.60	17.60	100	17.60
CO <sup>d</sup>	1-hr	0	1,622.69	1,622.69	40,000	4.06
CO <sup>d</sup>	8-hr	0	841.98	841.98	10,000	8.42

<sup>a</sup> 8th high value averaged over modeled period (with plume depletion for particulates)

<sup>b</sup> Highest 3rd high over two years modeled (with plume depletion)

<sup>c</sup> 4th high value average over two years modeled

<sup>d</sup> Highest 1st high (averaged over two years modeled for PM<sub>2.5</sub>)

<sup>e</sup> Using OLM

**Table 5-8**  
**Stage V Operation, With Use of the New Stage V Conveyor, and Concurrent Construction of the Stage IV Expansion, Cumulative Analysis**

Pollutant	Averaging Period	Background ( $\mu\text{g}/\text{m}^3$ )	Model Results Stage III HLP Op, Road Construct ( $\mu\text{g}/\text{m}^3$ )	Total ( $\mu\text{g}/\text{m}^3$ )	NAAQS Standard ( $\mu\text{g}/\text{m}^3$ )	Percent of Standard
PM <sub>2.5</sub> <sup>a</sup>	24-hr	7	20.09	27.09	35	77.41
PM <sub>2.5</sub> <sup>d</sup>	Annual	2.4	4.57	6.97	12	58.10
PM <sub>10</sub> <sup>b</sup>	24-hr	10.2	129.08	139.28	150	92.86
SO <sub>2</sub> <sup>c</sup>	1-hr	0	36.93	36.93	196	18.84
SO <sub>2</sub> <sup>d</sup>	3-hr	0	21.47	21.47	238	9.02

**Table 5-8**  
**Stage V Operation, With Use of the New Stage V Conveyer, and Concurrent Construction**  
**of the Stage IV Expansion, Cumulative Analysis**

Pollutant	Averaging Period	Background ( $\mu\text{g}/\text{m}^3$ )	Model Results Stage III HLP Op, Road Construct ( $\mu\text{g}/\text{m}^3$ )	Total ( $\mu\text{g}/\text{m}^3$ )	NAAQS Standard ( $\mu\text{g}/\text{m}^3$ )	Percent of Standard
NO <sub>2</sub> <sup>a,e</sup>	1-hr	0	180.42	180.42	188	95.97
NO <sub>2</sub> <sup>d,e</sup>	Annual	0	16.87	16.87	100	16.87
CO <sup>d</sup>	1-hr	0	1,602.94	1,602.94	40,000	4.01
CO <sup>d</sup>	8-hr	0	797.20	797.20	10,000	7.97

<sup>a</sup> 8th high value averaged over modeled period (with plume depletion for particulates)

<sup>b</sup> Highest 3rd high over two years modeled (with plume depletion)

<sup>c</sup> 4th high value average over two years modeled

<sup>d</sup> Highest 1st high (averaged over two years modeled for PM<sub>2.5</sub>)

<sup>e</sup> Using OLM

**Table 5-9**  
**Particulate Concentrations from Development of All Ancillary Facilities, Final Construction**  
**and Disturbance Regions, Cumulative Analysis**

Pollutant	Averaging Period	Background ( $\mu\text{g}/\text{m}^3$ )	Model Results Stage III HLP Op, Road Construct ( $\mu\text{g}/\text{m}^3$ )	Total ( $\mu\text{g}/\text{m}^3$ )	NAAQS Standard ( $\mu\text{g}/\text{m}^3$ )	Percent of Standard
PM <sub>2.5</sub> <sup>a</sup>	24-hr	7	6.27	13.27	35	37.91
PM <sub>2.5</sub> <sup>d,c</sup>	Annual	2.4	0.43	2.83	12	23.57
PM <sub>10</sub> <sup>b</sup>	24-hr	10.2	99.36	109.56	150	73.04

<sup>a</sup> 8th high value averaged over modeled period

<sup>b</sup> Highest 3rd high over two years modeled

<sup>c</sup> Annual PM<sub>2.5</sub> includes plume depletion

<sup>d</sup> Highest 1st high (averaged over two years modeled for PM<sub>2.5</sub>)

**Table 5-10**  
**Two Large Emergency Generators, Cumulative Analysis**

Pollutant	Averaging Period	Background ( $\mu\text{g}/\text{m}^3$ )	Model Results Stage III HLP Op, Road Construct ( $\mu\text{g}/\text{m}^3$ )	Total ( $\mu\text{g}/\text{m}^3$ )	NAAQS Standard ( $\mu\text{g}/\text{m}^3$ )	Percent of Standard
PM <sub>2.5</sub> <sup>a</sup>	24-hr	N/A	N/A	N/A	N/A	N/A
PM <sub>2.5</sub> <sup>d</sup>	Annual	N/A	N/A	N/A	N/A	N/A
PM <sub>10</sub> <sup>b</sup>	24-hr	N/A	N/A	N/A	N/A	N/A
SO <sub>2</sub> <sup>c</sup>	1-hr	0	34.13	34.13	196	17.41
SO <sub>2</sub> <sup>d</sup>	3-hr	0	34.04	34.04	238	14.30
NO <sub>2</sub> <sup>a,e</sup>	1-hr	0	108.24	108.24	188	57.57
NO <sub>2</sub> <sup>d,e</sup>	Annual	0	2.93	2.93	100	2.93
CO <sup>d</sup>	1-hr	0	5.04	5.04	40,000	0.01
CO <sup>d</sup>	8-hr	0	1.99	1.99	10,000	0.02

<sup>a</sup> 8th high value averaged over modeled period (with plume depletion for particulates)

<sup>b</sup> Highest 3rd high over two years modeled (with plume depletion)

<sup>c</sup> 4th high value average over two years modeled

<sup>d</sup> Highest 1st high (averaged over two years modeled for PM<sub>2.5</sub>)

<sup>e</sup> Using OLM

The social cost of carbon, which is an estimate of the anticipated future damages from GHG emissions, is discussed in **Section 4.6**, Social Values and Economic Values. Estimating SCC is complex; therefore, cumulative effects associated with present actions and RFFAs are not quantified here. Future impacts can be anticipated, however, based on the IWG statement that, “the SCC increases over time because future emissions are expected to produce larger incremental damages as physical and economic systems become more stressed in response to greater climatic change” (IWG 2013).

### 5.2.2 Cultural Resources

The CESA for cultural resources encompasses the APE as discussed in **Section 3.3** and the remainder of the project area (also known as the POA 10 Plan of operations boundary) and consists of 6,300 acres, as depicted in **Figure 5-2**.

#### *Past and Present Actions*

Past and present actions that have potentially impacted cultural resources are mining and mineral exploration, livestock grazing, ROWs for road construction and maintenance, transmission lines, telephone/telegraph lines, and wildland fires, as outlined in **Table 5-3**. Impacts from these activities include loss of setting around the cultural resources and damage to cultural resources from surface-disturbing activities. Also, flooding following vegetation loss associated with fires and other influences has led to erosion and surface disturbance of artifacts. Prior development and surface disturbance in the cultural resources CESA may have degraded or resulted in the loss of some cultural resources, but not all of the impacts on cultural resources can be quantified. Impact on the RCD from the original Coeur Rochester Mine were mitigated through data recovery and the Museum exhibit at the Marzen House Museum in Lovelock.

Historic fires have burned approximately 16 acres (0.0025 percent of the CESA), past and present mineral exploration and mining notices or plans of operation have disturbed approximately 5 acres (less than 0.001 percent of the CESA), ROW disturbance totals about 7 miles of roads (0.001 percent of the CESA) and 10 miles of transmission lines (less than 0.002 percent of the CESA), and livestock grazing, which has resulted in 9 miles of associated linear features (e.g., fences and pipelines), occurs on portions of the CESA.

#### *RFFAs*

Reasonably foreseeable projects, plans, or actions in the cultural CESA are summarized in **Table 5-3**. The only potential increase in disturbance is due to utilities and infrastructure expansion, particularly ROW projects, including a 40-acre (0.006 percent of the CESA) expansion of the American Canyon Road. Continued reclamation of past mining and exploration activities could result in disturbance of cultural resources if proper mitigation and avoidance measures are not applied. Additionally, cultural resources are subject to general degradation over time as archeological and historical sites weather and erode, even if left undisturbed by current or future activities.

### *Cumulative Impacts*

There would be direct and indirect adverse impacts in accordance with the NHPA on sites CrNV-22-3545 and CrNV-02-401 even if mitigated. However, the intensity of adverse impacts would be reduced through BLM-proposed mitigation, as outlined in **Section 6.1.1**, which includes implementing a treatment plan.

There would be some residual audible and atmospheric impacts on the integrity of setting of the RCD and CrNV-02-401. Although there have been adverse direct and indirect impacts on the Rochester National Register Eligible District in the past from mining, fire, and floods in particular, major impacts from the Coeur Rochester Mine were mitigated through data recovery and the Marzen House Museum exhibit. The residual impacts from the proposed action do not incrementally increase the impacts on this National Register-eligible district and site.

### **5.2.3 Migratory Birds**

The CESA for migratory birds, with the exception of raptors, is the general wildlife CESA, as depicted on **Figure 5-2**. The general wildlife CESA is composed of NDOW's Humboldt PMU for greater sage-grouse and includes approximately 175,600 acres.

#### ***Past and Present Actions***

Past and present actions that have potentially impacted migratory birds are grazing and agricultural conversion, utilities and other ROW construction, mineral development and exploration, and wildland fires.

Generally, impacts on migratory birds from the actions described above could be due to loss or modification of vegetation that serves as nesting and foraging habitat, transportation and establishment of noxious weeds from ground-disturbing activities, harassment or disturbance of individual birds during critical breeding and nesting periods, and direct impacts on or injury or mortality of individuals from collision with vehicles or infrastructure, electrocution, drowning, poisoning from contact with industrial ponds, or removal or trampling of active nests, eggs, or fledglings.

Irrigation facilities and water pipelines associated with grazing and agricultural operations occupy approximately 137 acres in the general wildlife CESA (**Table 5-2**). Approximately 35 miles of fences with an average impacted width of 10 feet are in the general wildlife CESA, occupying approximately 42 acres (**Table 5-2**). Though these represent a relatively small proportion of the CESA, linear features like fences can have disproportionately large impacts on several species of migratory birds, including greater sage-grouse. This is due to habitat fragmentation, increased collision potential, and increased perching opportunities for raptor predators. This is further discussed in **Section 5.2.7**, Special Status Species.

Utilities and infrastructure are relatively widespread in the general wildlife CESA, as summarized in **Table 5-2**:

- Approximately 32 miles of roadways with an average width of 40 feet exist, occupying approximately 155 acres
- Approximately 34 miles of transmission lines with an average width of 60 feet exist, occupying over 247 acres of the CESA
- Communication sites, including towers and associated outbuildings occupy approximately five acres of the CESA

Transmission lines can have mixed impacts on migratory birds; they may provide additional nesting or perching opportunities for raptors, corvids, and other species, but they may also increase chances of avian electrocution. Roads may provide additional scavenging opportunities through road kill, but they increase the chances of bird injury or mortality via vehicle collision. Similarly, soil disturbances associated with these linear features can facilitate weed spread over many miles, reducing habitat quality for migratory birds.

Mineral development and exploration are widespread in the general wildlife CESA. Approximately 1,223 acres of mining and exploration plans, exploration notices, and sand and gravel extraction operations exist in the CESA, as summarized in **Table 5-2**. State and federal regulations require that surface disturbance associated with mineral activities are reclaimed after mining is complete; therefore, this acreage will eventually be reclaimed. Due to the relatively short-term temporal boundary for this cumulative impacts analysis, however, it is reasonable to assume that not all of these acres would be reclaimed in the temporal boundary of this analysis.

Wildland fires burned approximately 41,779 acres in the general wildlife CESA between 1997 and 2011 (**Table 5-2**). Wildfire fuels treatment projects also contribute to impacts in the general wildlife CESA; fuel breaks in the CESA will approximately double from 20 to 40 acres of vegetation impacts. Wildfire may have had the largest potential impact on migratory birds in the CESA due to widespread habitat destruction or modification and potential direct impacts on individuals or nests and the large area in the CESA burned. Wildfire is also intimately tied to loss of native habitat and spread of nonnative annual grasslands, which generally results in reduced nesting and foraging habitat quality and quantity for migratory birds.

No specific data exist quantifying potential impacts on migratory birds from grazing in the CESA. Portions of seven grazing allotments totaling 173,700 acres in the CESA area are grazed by cattle. Additionally, native and naturalized free-roaming species, including pronghorn antelope, mule deer, and wild horses, graze in the CESA. Impacts on migratory birds from grazing, particularly associated with cattle and introduced free-roaming species, include trampling of active nests, eggs, or fledglings and damage or ingestion of vegetation that serves

as nesting areas. This is particularly true in riparian areas near springs and streams, but it also applies in upland vegetation communities.

Similarly, no specific data exist quantifying potential impacts on migratory birds from off-highway vehicle (OHV) use in the CESA. OHV use also degrades vegetation, and unauthorized use of OHVs in vegetated areas off established roads or trails can crush active nests, eggs, or fledglings. Noise from OHVs can also prevent successful nesting and breeding.

### **RFFAs**

Reasonably foreseeable projects, plans, or actions in the general wildlife CESA are summarized in **Table 5-3**. The largest potential increase in disturbance is due to minerals exploration and development (403 acres), followed by utilities and infrastructure expansion, particularly ROW projects. This includes roads (199 acres) and to a lesser extent railroads (10 acres) and transmission lines (6 acres). Additional small-scale potential impacts are expansion of irrigation facilities and water pipelines (11 acres).

### **Cumulative Impacts**

The proposed action would impact approximately 371 acres<sup>1</sup> of undisturbed habitat in the project area. When added to the past, present, and reasonably foreseeable future action disturbance areas (see **Tables 5-2** and **5-3**), the cumulative total disturbance is 44,588 acres (representing 25 percent of the total CESA for general wildlife). Based on the above analysis and findings, incremental cumulative impacts on migratory birds as a result of the proposed action would represent an incremental disturbance of 0.2 percent within the CESA.

Impacts on migratory birds from the proposed action include loss or modification of vegetation that serves as nesting and foraging habitat, harassment or disturbance of individuals during breeding or nesting periods, and direct impacts on or injury or mortality of individuals from collision with vehicles or infrastructure, electrocution, drowning or poisoning from contact with industrial ponds, or removal or trampling of active nests, eggs, or fledglings. Potential impacts on migratory birds are fully described in **Section 4.4, Migratory Birds**.

Potential impacts would be minimized by adhering to CRI's environmental protection measures listed in **Chapter 2**. Breeding bird surveys would be conducted before surface disturbance during the nesting season (March 1 through August 31) to ensure impacts are avoided. Standard raptor protection designs, as outlined in Suggested Practice for Avian Protection on Power Lines

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<sup>1</sup> Impacts include both acres of vegetation that could be impacted by the proposed action in addition to acres of vegetation in areas authorized for disturbance. Total impacts excluding acres of disturbed or recently mined or quarried areas are 371 acres.

(APLIC 2006), would be incorporated into the design and construction of power lines. Open ponds would be covered to prevent drowning of migratory birds. Vegetation disturbed by mining would be reclaimed, with the exception of the open pit walls and public access road. Weeds would be treated in reclaimed areas. Because the proposed action is localized and discrete, those individuals that may avoid the project area should be able to successfully forage and breed in expansive adjacent, undisturbed areas of the CESA.

Based on the above analysis and findings, incremental impacts on migratory birds from the proposed action would represent approximately 0.2 percent of potential cumulative disturbance when added to past, present, and reasonably foreseeable future actions in the CESA.

#### **5.2.4 Surface Water and Groundwater Quality**

##### ***Past and Present Actions***

Past and present mining at the site has impacted water resources. The primary impact on groundwater quantity has been through dewatering, which would be exacerbated by water needs for an added heap leach process.

Groundwater quality impacts are primarily related to historical process leaks, which are subject to ongoing remedial activities.

##### ***RFFAs***

The proposed action would cause the American Canyon Spring to be covered, although an underdrain system would be installed to collect flows from springs and seeps in this area that would eventually be discharged into American Canyon. The covered areas would cause reduced infiltration and therefore reduced flow to American Canyon Spring that would be a permanent feature.

Surface water quality impacts would be mitigated by stormwater BMPs and are not materially different. Under the proposed action, a seasonal expression would appear in the pit that will gradually accumulate salts. The chemistry of that seasonal expression would be mitigated by the lime in the backfill.

The proposed action extends groundwater quantity impacts until sometime between 2110 and 2130, depending on the amount of groundwater actually used. Groundwater flow is permanently altered through creation of a groundwater sink in the eastern portion of the pit. The sink would be subject to permanent evaporation losses that are equivalent in the No Action Alternative and the proposed action. The proposed action exhibits minimal additional risk to groundwater quality, except in the vicinity of the pit backfill area where salts would concentrate as a result of evaporation.

##### ***Cumulative Impacts***

The site is geographically isolated such that groundwater and surface water impacts from past, present, and proposed mining at the site do not combine

with impacts from other projects. For example, there are no neighboring mines creating overlapping groundwater cones of depression or adding potential impacts on surface water.

### 5.2.5 Social Values and Economics

The CESA for social values and economics covers Pershing and Humboldt Counties and includes 10,064,640 acres (**Figure 5-1**).

#### **Past and Present Actions**

Past and present actions in the social values and economics CESA would be as described in Chapter 3. Ongoing land development, utilities and infrastructure, mineral development and exploration, and geothermal leasing would continue to impact population, demand for public services, employment opportunities, increased revenues, and expenditure for the communities in the CESA.

In addition to projects listed in **Table 5-4**, ongoing mining operations are occurring in Humboldt and Pershing Counties. Operations in Humboldt County are nine mining operations as of 2013 (Hycroft, Lone Tree Complex, Marigold, Rainbow Ridge, Royal Peacock, MIN-AD, Pinson, Turquoise Ridge, and Twin Creeks). Existing operations employ an estimated 1,860 workers and 580 contract employees. Pershing County included five operations in 2013 (Nassau, Colado, Florida Canyon, Sexton, and Sunrise Gold), with an estimated 203 company employees and 57 contract employees (Nevada Bureau of Mines and Geology 2014).

The level of impacts from ongoing land uses, including mines, is not quantified here as it would be impacted by such factors as the timing of construction and operations, the size of workforce, and the location or residence of workforce. Ongoing actions are considered to be part of the existing social and economic conditions.

#### **RFFAs**

RFFAs that may influence social and economic conditions are additional utilities and infrastructure, wildland fires, land development, mineral development and exploration, and geothermal leasing. Specific planned projects are discussed in **Table 5-4**. In addition, the level of employment at mines in the two-county CESA may change depending on such factors as market conditions for minerals.

#### **Cumulative Impacts**

The identified projects in the CESA, including the proposed action, could have an impact on social values and economics. As discussed in Chapter 4, the proposed action would add five to seven years of sustained direct mine and contractor employment in the two-county CESA and a temporary influx of 79 construction employees. Cumulative impacts, as a result of the proposed action when added to past and present actions and RFFAs, are expected to be minimal and beneficial for local employment levels and related social and economic conditions. The social cost of carbon, which is an estimate of the anticipated

future damages from GHG emissions, is discussed in **Section 4.6**, Social Values and Economic Values. Estimating SCC is complex; therefore, cumulative effects associated with present actions and RFFAs are not quantified here. Future impacts can be anticipated, however, based on the IWG statement that, “the SCC increases over time because future emissions are expected to produce larger incremental damages as physical and economic systems become more stressed in response to greater climatic change” (IWG 2013).

### 5.2.6 Soils

The cumulative effects study area for soil resources is the general wildlife CESA, as depicted in **Figure 5-2**. The general wildlife CESA is composed of NDOW’s Humboldt PMU for greater sage-grouse of approximately 175,600 acres.

#### **Past and Present Actions**

Past and present actions that have potentially impacted soils are mining and mineral exploration, geothermal development, livestock grazing, ROWs for road construction and maintenance, transmission lines, telephone/telegraph lines, and wildland fires, as outlined in **Table 5-3**. Impacts from these activities are damage to biological soil crusts, loss of soil productivity due to changes in soil compaction, chemical alteration, and soil loss due to erosion.

Historic fires have burned approximately 42,000 acres. Past and present mineral exploration and mining notices or plans of operation are approximately 1,200 acres. ROW disturbance totals about 65 miles, and livestock grazing occurs on portions of the CESA. Management after a fire includes emergency stabilization and rehabilitation, which includes seeding burned areas to reduce erosion.

State and federal regulations require project operators to provide financial assurance to guarantee that surface disturbance from mineral activities are reclaimed once the activities are complete. ROW disturbance for roads, power lines, and telephone lines are long-term disturbances, with maintenance often resulting in short-term disturbance. Livestock grazing in allotments follows the rangeland health standards and, if managed appropriately, does not result in excessive erosion.

#### **RFFAs**

Reasonably foreseeable projects, plans, or actions in the general wildlife CESA are summarized in **Table 5-3**. The largest potential increase in disturbance is due to minerals exploration and development (403 acres), followed by utilities and infrastructure expansion, particularly ROW projects. This includes roads (199 acres) and to a lesser extent railroads (10 acres) and transmission lines (6 acres). Additional small-scale potential impacts are from expanding irrigation facilities and water pipelines (11 acres). Continued reclamation of past mining and exploration activities would mitigate soils movement and productivity loss. Soil salvaged and used in reclamation would become viable and would be expected to return to pre-disturbance productivity once vegetation was

established. Seeding and revegetating areas that have been burned would reduce soil movement and loss.

#### **Cumulative Impacts**

The proposed action would disturb up to 231 acres (see **Table 2-2**) of undisturbed soils in the project area. When added to the past, present, and reasonably foreseeable future action disturbance areas (see **Tables 5-2** and **5-3**), the cumulative total disturbance represents less than 25 percent of the total CESA.

In addition, these impacts would be localized and minimized by environmental protection measures and BMPs. Over time, growth media salvage and reuse, recontouring, erosion and drainage controls, and revegetation are anticipated to restore similar or improved post-mining land use conditions on the disturbed areas in comparison to existing conditions. Based on the analysis and findings, incremental cumulative impacts on soils as a result of the proposed action would represent an incremental disturbance of 0.2 percent of the CESA.

#### **5.2.7 Special Status Species**

The CESA for special status plant and wildlife species, with the exception of raptors, is the general wildlife CESA (**Figure 5-2**). The general wildlife CESA is NDOW's Humboldt PMU and includes approximately 175,600 acres.

The CESA for raptors, including special status species raptors, is the raptor CESA (see **Figure 5-2**). The raptor CESA is a 10-mile radius around the project area, encompassing approximately 201,100 acres.

#### **Past and Present Actions**

Past and present actions that have potentially impacted special status species, including special status raptor species, are grazing and agricultural conversion, utilities and other ROW construction, mineral development and exploration, and wildland fires.

Generally, impacts on special status species from the actions described above could be due to loss of or modification of vegetation that serves as nesting, foraging, brooding, roosting, or denning habitat, loss of connectivity habitat for dispersal, transportation and establishment of noxious weeds from ground-disturbing activities, harassment or disturbance of individuals during breeding or nesting periods, noise disturbance, and direct impacts on or injury or mortality of individuals from collision with vehicles or infrastructure, electrocution, drowning or poisoning from contact with industrial ponds, or removal or trampling of active nests, burrows, eggs, fledglings, or young.

Irrigation facilities and water pipelines associated with grazing and agricultural operations occupy approximately 137 acres in the general wildlife CESA and 93 acres in the raptor CESA (**Table 5-2**). Approximately 35 miles of fences with an average width of 10 feet exist in the general wildlife CESA, occupying

approximately 42 acres; similarly, 27 miles of fences occupying approximately 33 acres occur in the raptor CESA (**Table 5-2**).

Linear features like fences can have disproportionately large impacts on greater sage-grouse, due to habitat fragmentation, increased collision potential, and increased perching opportunities for raptor predators. Agricultural conversion would not generally impact nesting opportunities for special status raptors, including golden eagle, but loss of native vegetation communities associated with agricultural conversion reduces available foraging habitat for these species.

Utilities and infrastructure are relatively widespread in the general wildlife and raptor CESAs, as summarized in **Table 5-2**:

- Roadways—32 miles (155 acres) in the general wildlife CESA; 63 miles (305 acres) in the raptor CESA
- Transmission lines—34 miles (247 acres) in the general wildlife CESA; 51 miles (371 acres) in the raptor CESA
- Communication sites—five acres in the general wildlife CESA; one acre in the raptor CESA
- Additional utilities and infrastructure past and present disturbances in the raptor CESA—four miles (97 acres) of railroad ROWs and nine miles (22 acres) of telephone line

Linear features, such as transmission lines, and communication towers can have disproportionately large impacts on greater sage-grouse, as described above. These features can have mixed impacts on special status raptor species; they may provide additional nesting or perching opportunities but may also increase chances of avian electrocution. Roads may provide additional scavenging opportunities for raptors through road kill but may increase the chances of raptor injury or mortality by vehicle collision. Soil disturbances associated with these linear features can facilitate weed spread over many miles, reducing habitat quality for special status species.

Mineral development and exploration are widespread in the general wildlife CESA but are less common in the raptor CESA. Approximately 1,223 acres of mining and exploration plans, exploration notices, and sand and gravel extraction operations exist in the general wildlife CESA, and 473 acres of these disturbances occur in the raptor CESA (**Table 5-2**). State and federal regulations require that surface disturbance associated with mineral activities be reclaimed after mining; therefore, this acreage will eventually be reclaimed. Due to the relatively short-term temporal boundary for this cumulative impacts analysis, however, it is reasonable to assume that not all of these acres would be reclaimed in the temporal boundary.

Wildland fires burned approximately 41,779 acres in the general wildlife CESA between 1997 and 2011 and 13,303 acres in the raptor CESA in the same period (**Table 5-2**). Wildfire fuels treatment projects also contribute to impacts in the general wildlife and raptor CESAs; existing fuel breaks in the CESAs would approximately double in total area from 20 to 40 acres of vegetation impacts. Wildfire may have had the largest potential impact on special status species in the CESA due to widespread habitat destruction, modification and potential direct impacts on individuals and nests and burrows, and the large area in the CESAs burned. Wildfire is also intimately tied to loss of native habitat and spread of nonnative annual grasslands, which generally represents lower nesting and foraging habitat quality for special status species.

No specific data exist quantifying potential impacts on special status species from grazing or OHV use in the CESA. Grazing allotments in the general wildlife CESA and potential impacts from grazing and OHV use are described in **Section 5.2.3, Migratory Birds**.

#### **RFFAs**

Reasonably foreseeable projects, plans, or actions in the general wildlife CESA are summarized in **Table 5-3** and are described above in **Section 5.2.3, Migratory Birds**.

Reasonably foreseeable projects, plans, or actions in the raptor CESA are also summarized in **Table 5-3** and are similar to those in the general wildlife CESA. However, the raptor CESA lacks potential impacts from expansion of irrigation facilities and water pipelines, railroads, and mineral development and expansion. Additional reasonably foreseeable projects, plans, or actions in the raptor CESA are sand and gravel extraction operations (78 acres).

#### **Cumulative Impacts**

The proposed action would impact approximately 371 acres<sup>2</sup> of undisturbed habitat in the project area. When added to the past, present, and reasonably foreseeable future action disturbance areas (see **Tables 5-2** and **5-3**), the cumulative total disturbance for the general wildlife CESA is 44,193 acres, and the cumulative total disturbance for the raptor CESA is 15,365 acres (representing 25 percent and 8 percent of the total CESA for general wildlife and raptors, respectively). Based on the above analysis and findings, incremental cumulative impacts on special status species as a result of the proposed action would represent an incremental disturbance of approximately 0.2 percent of both the general wildlife and raptor CESAs.

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<sup>2</sup> Impacts include both acres of vegetation that could be impacted by the proposed action in addition to acres of vegetation in areas authorized for disturbance. Total impacts excluding acres of disturbed or recently mined or quarried areas are 371 acres.

Impacts on special status species from the proposed action could include loss or modification of vegetation that serves as nesting, foraging, brooding, roosting, or denning habitat; loss of connectivity habitat for dispersal, transportation, and establishment of noxious weeds from ground-disturbing activities; harassment or disturbance of individuals during breeding and nesting periods; noise disturbance; and direct impacts on or injury or mortality of individuals from collision with vehicles or infrastructure, electrocution, drowning or poisoning from contact with contingency ponds, or removal or trampling of active nests, burrows, eggs, fledglings, or young. Potential impacts on special status species are fully described in **Section 4.12**, Special Status Species.

The proposed action would temporarily remove habitat for greater sage-grouse, and though no greater sage-grouse have been observed in the project area, this habitat removal would temporarily prevent potential use of this area by greater sage-grouse. The inactive Indian Creek lek north of the project area would not experience increased levels of ambient noise from the proposed action.

The removal of American Canyon Spring would impact modeled high potential Preble's shrew habitat. Since this is a permanent impact, the spring and associated wetland vegetation would not be reclaimed. Proposed mitigation includes seeding suitable habitat if the presence of Preble's shrew is noted in surveys. Impacts would also be mitigated via the 336 acres of springs and meadow areas that are being proposed for restoration as mitigation for greater sage-grouse. This is because this area would also be suitable habitat for Preble's shrew.

Impacts on raptors from the proposed action could include those impacts described above in **Section 5.2.3**, Migratory Birds; however, the most likely impact is temporary loss of foraging habitat as vegetation in the project area is removed. Eventual reclamation and revegetation would limit this impact on a temporary scale unless revegetation is unsuccessful, in which case additional mitigation would be required. Because the proposed action is localized and discrete and because of the relatively small amount of habitat that would be permanently lost relative to abundant adjacent habitat, those individuals that may avoid the project area should be able to successfully forage and breed in adjacent undisturbed areas of the raptor CESA.

Potential impacts would be partially minimized by adhering to CRI's environmental protection measures listed in **Chapter 2**. These include revegetation of most disturbed habitats, treatment of weeds in reclaimed areas, pre-disturbance breeding bird surveys, standard raptor protection designs, and burrowing owl clearance surveys. Additionally, recommended mitigation measures described in **Chapter 6** would further minimize potential impacts on special status species, including greater sage-grouse and Preble's shrew. However, loss of wetland vegetation associated with American Canyon Spring and the relatively small amount of lost vegetation associated with the open pit

walls, contingency ponds, and e-cells that would not be reclaimed are impacts that would not be minimized. When added to past, present, and reasonably foreseeable future actions in the CESA, incremental impacts would result.

Based on the above analysis and findings, incremental impacts on special status species from the proposed action would represent approximately 0.2 percent of potential cumulative disturbance when added to past, present, and reasonably foreseeable future actions in the CESA.

### 5.2.8 Vegetation and Invasive, Nonnative Species

The CESA for vegetation and invasive nonnative species is the general wildlife CESA (**Figure 5-1**). The general wildlife CESA is composed of NDOW's Humboldt PMU and is approximately 175,600 acres.

#### ***Past and Present Actions***

Past and present actions that have potentially impacted vegetation are grazing and agricultural conversion, utilities and other ROW construction, mineral development and exploration, and wildland fires.

Generally, impacts on vegetation from the actions described above could be due to loss or modification of unique vegetation communities, alterations in species composition and vegetation structure, transportation and establishment of noxious weeds, and soil disturbance, including compaction, topsoil removal, erosion, and loss of native seed banks.

Irrigation facilities and water pipelines associated with grazing and agricultural operations occupy approximately 137 acres in the general wildlife CESA (**Table 5-2**). Approximately 35 miles of fences with an average width of 10 feet exist in the general wildlife CESA, occupying approximately 42 acres (**Table 5-2**). Though these represent a relatively small proportion of the CESA, linear features such as fences are subject to periodic vegetation removal for maintenance. Linear disturbances also serve as conduits for weed distribution and establishment.

Utilities and infrastructure are relatively widespread in the general wildlife CESA, as summarized in **Table 5-2**. Approximately 32 miles of roadways with an average width of 40 feet exist, occupying approximately 155 acres. Approximately 34 miles of transmission lines with an average width of 60 feet exist, occupying over 247 acres of the CESA. Communication sites, including towers and associated outbuildings, occupy approximately five acres of the CESA. Again, these linear ROWs are subject to periodic vegetation removal for maintenance and serve as conduits for weed distribution and establishment.

Mineral development and exploration are widespread in the general wildlife CESA. Approximately 1,223 acres of mining and exploration plans, exploration notices, and sand and gravel extraction operations exist in the CESA, as summarized in **Table 5-2**. State and federal regulations require that surface

disturbance associated with mineral activities are reclaimed after mining, so this acreage would eventually be reclaimed with an approved seed mix. Due to the relatively short-term temporal boundary for this cumulative impacts analysis, however, it is reasonable to assume that not all of these acres would be reclaimed in the temporal boundary of this analysis.

Wildland fires burned approximately 41,779 acres in the general wildlife CESA between 1997 and 2011 (**Table 5-2**). Wildfire may have had the largest potential impact on vegetation in the CESA due to widespread habitat destruction or modification and the large area in the CESA burned. Wildfire is intimately tied to loss of native habitat and conversion to nonnative annual grasslands. Wildfire fuels treatments also contribute to impacts in the general wildlife CESA; fuel breaks in the CESA would approximately double in total area from 20 to 40 acres of vegetation impacts. These fuel breaks are subject to frequent and recurring removal of vegetation to maintain effectiveness.

No specific data exist quantifying potential impacts on vegetation from grazing in the CESA. Portions of seven grazing allotments totaling 173,700 acres in the CESA are grazed by cattle. Additionally, native and naturalized free-roaming pronghorn antelope, mule deer, and wild horses and burros graze in the CESA. Impacts on vegetation from grazing, particularly associated with cattle and introduced free-roaming species, are damage or removal of vegetation, damage to biological soil crusts, soils disturbance, erosion, and spread of weeds. This is particularly true in riparian areas near springs and streams.

Similarly, no specific data exist quantifying potential impacts on vegetation from OHV use in the CESA. Impacts from OHV use also degrade vegetation when unauthorized use of OHVs in vegetated areas off established roads or trails occurs. Impacts can include crushing vegetation, damaging biological soil crusts, disturbing soils, erosion, and spread of weeds.

#### **RFFAs**

Reasonably foreseeable projects, plans, or actions in the general wildlife CESA are summarized in **Table 5-3** and are described above in **Section 5.2.3**, Migratory Birds.

#### **Cumulative Impacts**

The proposed action would impact approximately 371 acres<sup>3</sup> of undisturbed vegetation in the project area. When added to the past, present, and reasonably foreseeable future action disturbance areas (see **Tables 5-2** and **5-3**), the cumulative total disturbance is 44,193 acres (representing 25 percent of the total CESA for general wildlife). Based on the above analysis and findings,

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<sup>3</sup> Impacts include both acres of vegetation that could be impacted by the proposed action in addition to acres of vegetation in areas authorized for disturbance. Total impacts excluding acres of disturbed or recently mined or quarried areas are 371 acres.

incremental cumulative impacts on vegetation as a result of the proposed action would represent an incremental disturbance of 0.2 percent within the CESA.

Impacts on vegetation from the proposed action potentially include loss of wetland vegetation associated with removal of American Canyon Spring, general vegetation removal, alterations in species composition and vegetation structure, transportation and establishment of noxious weeds, and soil disturbance, including compaction, topsoil removal, erosion, and loss of native seed banks. Potential impacts on vegetation are fully described in **Section 4.9**, Vegetation.

Potential impacts on vegetation would be minimized by reclamation and revegetation and by adhering to CRI's environmental protection measures listed in **Chapter 2**. These include revegetating most disturbed habitats and treating weeds in reclaimed areas. However, loss of wetland vegetation associated with American Canyon Spring and the relatively small amount of lost vegetation associated with the open pit walls, contingency ponds, and e-cells that would not be reclaimed are impacts that would not be minimized.

Based on the above analysis and findings, incremental impacts on vegetation from the proposed action would represent approximately 0.2 percent of potential cumulative disturbance when added to past, present, and reasonably foreseeable future actions in the CESA.

### 5.2.9 Wildlife

The CESA for wildlife, with the exception of raptors, is the general wildlife CESA (**Figure 5-1**). The general wildlife CESA is NDOW's Humboldt PMU and includes approximately 175,600 acres.

#### **Past and Present Actions**

Past and present actions that have potentially impacted wildlife are grazing and agricultural conversion, utilities and other ROW construction, mineral development and exploration, and wildland fires.

Generally, impacts on wildlife from the actions described above could be due to loss or modification of vegetation that serves as nesting, foraging, brooding, roosting, or denning habitat, loss of connectivity habitat for dispersal, loss of host plant species (i.e., nectar or larval host plants for invertebrates), transportation and establishment of noxious weeds from ground-disturbing activities, harassment or disturbance of individuals during breeding and nesting periods, noise disturbance, and direct impacts on or injury or mortality of individuals from collision with vehicles or infrastructure, electrocution, drowning or poisoning from contact with industrial ponds, or removal or trampling of active nests, burrows, eggs, fledglings, or young.

Irrigation facilities and water pipelines associated with grazing and agricultural operations occupy approximately 137 acres in the general wildlife CESA (**Table 5-2**). Approximately 35 miles of fences with an average width of 10 feet exist in

the general wildlife CESA, occupying approximately 42 acres (**Table 5-2**). Although these represent a relatively small proportion of the CESA, linear features like fences can have disproportionately large impacts on several species of wildlife, including greater sage-grouse, due to habitat fragmentation, increased collision potential, and increased perching opportunities for raptor predators. This is further discussed in **Section 5.2.7**, Special Status Species. Fences also fragment habitat and disrupt dispersal corridors for larger mammal species.

Utilities and infrastructure are relatively widespread in the general wildlife CESA, as summarized in **Table 5-2**. Approximately 32 miles of roadways with an average width of 40 feet exist, occupying approximately 155 acres. Approximately 34 miles of transmission lines with an average width of 60 feet exist, occupying over 247 acres of the CESA. Communication sites, including towers and associated outbuildings, occupy approximately five acres of the CESA. These linear features can aid in dispersal and establishment of weeds, degrading wildlife habitat and increasing direct impacts from vehicle strikes.

Mineral development and exploration are widespread in the general wildlife CESA. Approximately 1,223 acres of mining and exploration plans, exploration notices, and sand and gravel extraction operations exist in the CESA, as summarized in **Table 5-2**. State and federal regulations require that surface disturbance associated with mineral development be reclaimed after mining is complete; therefore, this acreage would eventually be reclaimed. Due to the relatively short-term temporal boundary for this cumulative impacts analysis, however, it is reasonable to assume that not all of these acres would be reclaimed in the temporal boundary of this analysis.

Wildland fires burned approximately 41,779 acres in the general wildlife CESA between 1997 and 2011 (**Table 5-2**). Wildfire fuels treatment projects also contribute to impacts in the general wildlife CESA; fuel breaks in the CESA would approximately double from 20 to 40 acres of vegetation impacts. Wildfire may have had the largest potential impact on wildlife in the CESA due to widespread habitat destruction or modification and potential direct impacts on individuals or nests and the large area in the CESA burned. Wildfire is also intimately tied to loss of native habitat and spread of nonnative annual grasslands, which generally represents lower nesting and foraging habitat quality for wildlife.

No specific data exist quantifying potential impacts on wildlife resulting from grazing or OHV use in the CESA. Grazing allotments in the general wildlife CESA and potential impacts from grazing and OHV use are described above in **Section 5.2.3**, Migratory Birds. In addition to the impacts described, noise from OHV use can disrupt movement patterns and foraging habits for wildlife species.

**RFFAs**

Reasonably foreseeable projects, plans, or actions in the general wildlife CESA are summarized in **Table 5-3** and are described above in **Section 5.2.3**, Migratory Birds.

**Cumulative Impacts**

The proposed action would impact approximately 371 acres<sup>4</sup> of undisturbed habitat in the project area. When added to the past, present, and reasonably foreseeable future action disturbance areas (see **Tables 5-2** and **5-3**), the cumulative total disturbance is 44,193 acres (representing 25 percent of the total CESA for general wildlife). Based on the above analysis and findings, incremental cumulative impacts on general wildlife as a result of the proposed action would represent an incremental disturbance of 0.2 percent within the CESA.

Impacts on wildlife from the proposed action include loss or modification of vegetation that serves as nesting, foraging, brooding, roosting, or denning habitat, loss of connectivity habitat for dispersal, loss of host plant species (i.e., nectar or larval host plants for invertebrates), transportation and establishment of noxious weeds from ground-disturbing activities, harassment or disturbance of individuals during breeding and nesting periods, noise disturbance, and direct impacts on or injury or mortality of individuals from collision with vehicles or infrastructure, electrocution, drowning or poisoning from contact with industrial ponds, or removal or trampling of active nests, burrows, eggs, fledglings, or young. Potential impacts on wildlife are fully described in **Section 4.10**, Wildlife.

Potential impacts would be minimized by reclamation and revegetation and by adhering to applicant's environmental protection measures listed in **Chapter 2**. However, temporal losses in wildlife habitat would be realized until habitats are revegetated. If revegetation is unsuccessful, habitat losses could become permanent unless additional mitigations are applied to revegetation. Though wildlife may be dissuaded from using the project area during operations, generally species would be able to return to these habitats once reclaimed. However, if altered habitat conditions are present after reclamation, these individuals may experience reduced foraging ability, reduced breeding success, and increased susceptibility to predation or disease. Further, project fencing would exclude larger wildlife like deer and pronghorn antelope from using undisturbed habitats in the project area. Covering all artificial ponds would prevent risk to wildlife from such facilities.

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<sup>4</sup> Impacts include both acres of vegetation that could be impacted by the proposed action in addition to acres of vegetation in areas authorized for disturbance. Total impacts excluding acres of disturbed or recently mined or quarried areas are 371 acres.

The proposed action would also result in the loss of a water source at the American Canyon Spring. Although the water is proposed to ultimately be discharged in American Canyon, the loss of American Canyon Spring and associated wetland vegetation would result in loss of potential habitat for small mammals and other wildlife.

Because the proposed action is localized and discrete and because of the relatively small amount of habitat that would be permanently lost due to the project relative to abundant adjacent habitat, those individuals that may avoid the project area should be able to successfully forage and breed in adjacent undisturbed areas of the CESA.

Potential impacts would be partially minimized by adhering to CRI's environmental protection measures listed in **Chapter 2**; these include revegetating most disturbed habitats, treating weeds in reclaimed areas, conducting pre-disturbance breeding bird and golden eagle surveys, and implementing standard raptor protection designs. However, loss of the water source at American Canyon Spring and the relatively small amount of lost habitat associated with the open pit walls, contingency ponds, and e-cells that would not be reclaimed are impacts that would not be minimized.

Based on the above analysis and findings, incremental impacts on wildlife from the proposed action would represent approximately 0.2 percent of potential cumulative disturbance when added to past, present, and reasonably foreseeable future actions in the CESA.

### 5.3 CUMULATIVE IMPACTS FROM THE NO ACTION ALTERNATIVE

#### 5.3.1 Air and Atmospheric Resources

The CESA for air and atmospheric resources is the air quality CESA, which includes a 50-kilometer (31-mile) radius around the project area and consists of approximately 2,203,468 acres.

##### ***Past and Present Actions***

Past and present actions under the No Action Alternative mirror those for the proposed action. The impacts are consistent with regard to total disturbed acres, total emissions, and cumulative effects. Details associated with the impacts are further discussed in **Section 5.2**.

##### ***RFFAs***

Reasonably foreseeable future actions under the No Action Alternative mirror those for the proposed action. The impacts are consistent with regard to total disturbed acres, total emissions, and cumulative effects. Details associated with the impacts are further discussed in **Section 5.2**.

**Cumulative Impacts**

As a result of the No Action Alternative, the existing and authorized CRI project would continue to operate under current operational conditions. Current mine operations are regulated by two State of Nevada air quality permits, Operating Permit No. API044-0063.04 and the Phase II Mercury Operating Permit to Construct No. API044-2242. Air emissions, and thus direct and indirect impacts on the ambient air quality from the existing project, would not increase over current levels and would be similar to those of the proposed action. Analogously, impacts associated with the No Action Alternative are similar or slightly lower than those modeled for the proposed action. As such, the No Action Alternative contribution to the cumulative air quality environment was not modeled because cumulative impacts would be less than the proposed action, which did not exceed the NAAQS.

**5.3.2 Cultural Resources****Past and Present Actions and RFFAs**

Under the No Action Alternative, mining and ore processing activities would continue in the existing project area, as previously authorized. All other cumulative activities discussed for the proposed action and summarized in **Table 5-3** would be the same as described for the proposed action.

**Cumulative Impacts**

When combined with the other past, present, and reasonably foreseeable future actions summarized in **Table 5-3**, the cumulative impacts of the No Action Alternative would be similar to but less than those for the proposed action.

**5.3.3 Migratory Birds****Past and Present Actions and RFFAs**

Under the No Action alternative, operation and maintenance activities would continue to impact migratory birds through authorized removal of vegetation in areas proposed for surface disturbance. Most of the surface disturbance associated with the No Action Alternative would be reclaimed, with the exception of the open pits and the main access road to the mine facilities and the public access roads.

**Cumulative Impacts**

Based on the above analysis and findings, incremental impacts on migratory birds as a result of ongoing activities under the No Action Alternative would be minimal when added to past, present, and reasonably foreseeable future actions in the CESA.

**5.3.4 Water Quality (Surface and Ground)****Past and Present Actions and RFFAs**

The No Action Alternative would not result in additional drainage and dewatering for additional heap leaching processing facilities. No surface water

quantity impacts have been noted from mining operations, and the No Action Alternative is not expected to produce impacts.

As with the Proposed Action, the No Action Alternative exhibits minimal additional risk to groundwater quality, except in the vicinity of the pit backfill area where salts would concentrate as a result of evaporation. The chemistry of that seasonal expression would be mitigated by the lime in the backfill.

Impacts on water quality under the No Action Alternative are the same as those discussed under the proposed action.

#### ***Cumulative Impacts***

Based on the above analysis and findings, incremental impacts on water resources as a result of ongoing activities under the No Action Alternative would be minimal when added to past, present, and reasonably foreseeable future actions in the CESA.

### **5.3.5 Social Values and Economics**

#### ***Past and Present Actions and RFFAs***

Past and present actions and RFFAs are the same as those discussed for the cumulative impacts under the proposed action.

#### ***Cumulative Impacts***

Under the No Action Alternative, the CRI Mine would cease operation in 2017. The economic stimulus associated with the CRI operation would continue at current levels through 2016, after which a reduction of approximately 90 percent of the current direct employment at the mine would follow the cessation of mining, a net reduction of approximately 310 employees. The contribution to cumulative impacts on the two-county CESA from mine employment and related economic stimulus would be reduced from current levels described under existing conditions.

### **5.3.6 Soils**

#### ***Past and Present Actions and RFFAs***

Under the No Action Alternative, operation and maintenance activities would continue to impact soils through authorized surface disturbance. Most of the surface disturbance associated with the No Action Alternative would be reclaimed, with the exception of the open pits and the main access road to the mine facilities and the public access roads.

#### ***Cumulative Impacts***

Based on the above analysis and findings, incremental impacts on soils as a result of ongoing activities under the No Action Alternative would be minimal when added to past, present, and reasonably foreseeable future actions in the CESA.

### 5.3.7 Special Status Species

#### ***Past and Present Actions and RFFAs***

Under the No Action Alternative, operation and maintenance activities would continue to impact special status species and raptor habitat, including greater sage-grouse habitat and golden eagle foraging habitat, through authorized removal of vegetation in areas approved for surface disturbance. Most of the surface disturbance associated with the No Action Alternative would be reclaimed, with the exception of the open pit walls and the main access road to the mine facilities and the public access roads. American Canyon Spring and the associated modeled high potential Preble's shrew habitat would not be directly impacted. Ambient noise levels at the inactive lek north of the project area would remain unchanged from current levels.

#### ***Cumulative Impacts***

Based on the above analysis and findings, incremental impacts on special status species and raptors as a result of ongoing activities under the No Action Alternative would be minimal when added to past, present, and reasonably foreseeable future actions in the CESAs.

### 5.3.8 Vegetation and Invasive, Nonnative Species

#### ***Past and Present Actions and RFFAs***

Under the No Action Alternative, operation and maintenance activities would continue to impact vegetation through authorized removal of vegetation in areas approved for surface disturbance. Most of the surface disturbance associated with the No Action Alternative would be reclaimed, with the exception of the open pits and the main access road to the mine facilities and the public access roads. Wetland vegetation associated with American Canyon Spring would not be directly and permanently impacted.

#### ***Cumulative Impacts***

Based on the above analysis and findings, incremental impacts on vegetation as a result of ongoing activities under the No Action Alternative would be minimal when added to past, present, and reasonably foreseeable future actions in the CESA.

### 5.3.9 Wildlife

#### ***Past and Present Actions and RFFAs***

Under the No Action Alternative, operation and maintenance activities would continue to impact wildlife through authorized removal of vegetation in areas approved for surface disturbance. Most of the surface disturbance associated with the No Action Alternative would be reclaimed, with the exception of the open pits and the main access road to the mine facilities and the public access roads.

**Cumulative Impacts**

Based on the above analysis and findings, incremental impacts on wildlife as a result of ongoing activities under the No Action Alternative would be minimal when added to past, present, and reasonably foreseeable future actions in the CESA.

## 5.4 CUMULATIVE IMPACTS FROM ALTERNATIVE I—PERMANENT MANAGEMENT OF PAG MATERIAL OUTSIDE OF THE ROCHESTER PIT

### 5.4.1 Air and Atmospheric Resources

The CESA for air and atmospheric resources is the air quality CESA, which includes a 50-kilometer (31-mile) radius around the project area and consists of approximately 2,203,468 acres.

**Past and Present Actions**

Past and present actions under Alternative I mirror those for the proposed action. The impacts are consistent with regard to total disturbed acres, total emissions, and cumulative effects. Details associated with the impacts are further discussed in **Section 5.2**.

**RFFAs**

Reasonably foreseeable future actions under Alternative I mirror those for the proposed action. The impacts are consistent with regard to total disturbed acres, total emissions, and cumulative effects. Details associated with the impacts are further discussed in **Section 5.2**.

**Cumulative Impacts**

As a result of Alternative I, material haul travel would be slightly reduced from the levels analyzed for the proposed action. As a result, emissions associated with this alternative would be similar to or slightly lower than those described for the proposed action. Analogously, impacts associated with Alternative I are similar to or slightly lower than those modeled for the proposed action. As such, the Alternative I contribution to the cumulative air quality environment was not modeled because cumulative impacts would be less than those under the proposed action, which did not exceed the NAAQS.

### 5.4.2 Cultural Resources

**Past and Present Actions and RFFAs**

Cumulative actions are the same as those described for the proposed action.

**Cumulative Impacts**

When combined with the other past, and present, and reasonably foreseeable future actions summarized in **Table 5-3**, the cumulative impacts of Alternative I would be the same as those described for the proposed action.

### 5.4.3 Migratory Birds

#### ***Past and Present Actions and RFFAs***

Alternative I would store PAG material permanently on the West and North RDSs, and reclaim it in place. The proposed storage location would be on disturbed land that does not provide habitat for migratory birds. The nature and type of disturbance caused by Alternative I would be similar to that described for the proposed action.

#### ***Cumulative Impacts***

Incremental impacts on migratory birds as a result of the proposed action under Alternative I would be minimal when added to past, present, and reasonably foreseeable future actions in the CESA.

### 5.4.4 Water Quality (Surface and Ground)

#### ***Past and Present Actions and RFFAs***

Cumulative actions are the same as those described under the proposed action.

#### ***Cumulative Impacts***

Cumulative effects under Alternative I for water quality are the same as those described for the proposed action.

### 5.4.5 Social Values and Economics

#### ***Past and Present Actions and RFFAs***

Cumulative actions are the same as those described under the proposed action.

#### ***Cumulative Impacts***

Impacts on social and environmental issues are the same as those discussed for the cumulative impacts under the proposed action.

### 5.4.6 Soils

#### ***Past and Present Actions and RFFAs***

Cumulative actions are the same as those described for the proposed action.

#### ***Cumulative Impacts***

Alternative I would store PAG material permanently on the West and North RDSs, and reclaim it in place. The nature and type of disturbance caused by Alternative I is similar to what was described for the proposed action. When added to past, present, and reasonably foreseeable future actions in the CESA, incremental impacts on soil resources would result under Alternative I.

#### 5.4.7 Special Status Species

##### ***Past and Present Actions and RFFAs***

Cumulative actions are the same as those described for the proposed action.

##### ***Cumulative Impacts***

Alternative I would store PAG material permanently on the West and North RDSs, and reclaim it in place. The proposed storage location would be on disturbed land that does not support native vegetation or special status species habitat. The nature and type of disturbance caused by Alternative I would be similar to what was described for the proposed action. When added to past, present, and reasonably foreseeable future actions in the CESA, incremental impacts on special status species would result under Alternative I.

#### 5.4.8 Vegetation and Invasive, Nonnative Species

##### ***Past and Present Actions and RFFAs***

Cumulative actions are the same as those described for the proposed action.

##### ***Cumulative Impacts***

Alternative I would store PAG material permanently on the West and North RDSs, and reclaim it in place. The proposed storage location would be on disturbed land that does not support native vegetation. The nature and type of disturbance caused by Alternative I is similar to what was described for the proposed action. When added to past, present, and reasonably foreseeable future actions in the CESA, incremental impacts on vegetation would result under Alternative I.

#### 5.4.9 Wildlife

##### ***Past and Present Actions and RFFAs***

Cumulative actions are the same as those described for the proposed action.

##### ***Cumulative Impacts***

Alternative I would store PAG material permanently on the West and North RDSs, and reclaim it in place. The proposed storage location would be on disturbed land that does not provide wildlife habitat. The nature and type of disturbance caused by Alternative I is similar to what was described for the proposed action. When added to past, present, and reasonably foreseeable future actions in the CESA, incremental impacts on special status species would result under Alternative I.