3.10 Social and Economic Values

The social and economic values assessment focuses on socioeconomic aspects potentially affected by project construction and operations.

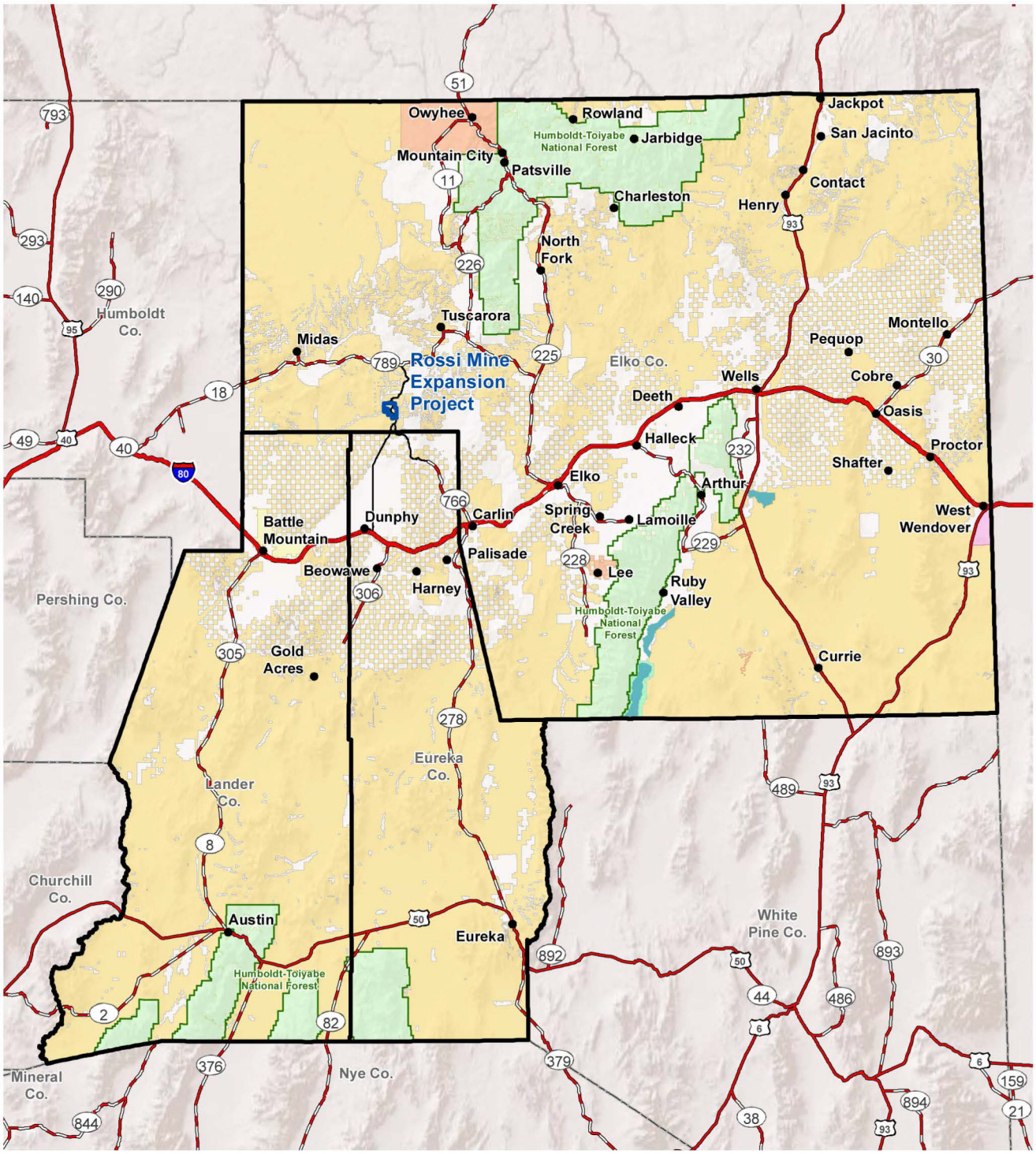
3.10.1 Affected Environment

The study area for direct and indirect impacts, and the CESA for this project are the counties of Elko, Eureka and Lander, and the communities in these counties within commuting distance from the project sites and where the project-related labor force may reside (**Figure 3.10-1**). Elko County is included because the project expansion area is in this county. Elko County provides some services to the project and would receive tax collections associated with mine expansion. In addition, approximately 12 percent of the current Rossi Mine workforce reside in the communities of Elko and Spring Creek, in Elko County (HES 2014a). Eureka County provides some services along the access roads leading to the mine from Dunphy (Boulder Valley Road) and from Carlin (Nevada SR 766). Lander County is included because approximately 88 percent of the current Rossi Mine workforce reside in the community of Battle Mountain (HES 2014a). Two other communities within the same general area are in commuting distance from the project site and were included in this section as well for analysis, Carlin (Elko County) and Crescent Valley (Eureka County). **Table 3.10-1,** below, shows the distance from the communities considered in the study area and the Rossi Mine site.

Table 3.10-1. Travel Distance from Communities in the Study Area to the Rossi Mine Site

County and Community	Distance from Rossi Mine (miles)
Elko County	
Carlin	35
Elko	57
Spring Creek	71
Lander County	
Battle Mountain	57
Eureka County	
Dunphy	32
Crescent Valley	61

Source: HES 2014a.



Proposed Project Boundary
Socio-economics Cumulative Effects Study Area
City or Town

Land Status
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Department of Defense
- Fish and Wildlife Service
- Forest Service
- State
- Private

Source: BLM 2015g, SRK 2014a, USCB 2014d.

Rossi Mine Expansion Project EIS

Figure 3.10-1

Socio-economics Cumulative Effects Study Area

0 5 10 15 20 40 Miles
0 5 10 15 20 40 Kilometers
1:2,000,000

N

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K:\Projects_4\Halliburton\00391_15_RossiMineEIS\Figures\Doc\EIS\03_DEIS_ApprovalToPrint\Ch_03\ROS_Figure_03-10-1_SocioEconomics.mxd

3.10.1.1 Population and Demography

Elko County has an estimated population of 54,998 and is the fourth most populous county in Nevada. Lander and Eureka counties have considerably less population, 6,708 and 2,067, respectively (**Table 3.10-2**). Of the three counties, Elko County grew the most in the 1990-2000 period, Eureka County grew the most in the 2000-2010 period, and Lander County is projected to have the most growth in the period 2000-2015 on a percent growth basis. Lander County's population actually declined between 1990 and 2010 (**Table 3.10-2**). The largest community in the study area is the city of Elko, within Elko County, with a population of 20,613, followed by the community of Spring Creek, with a population of 13,926, which is located about 15 miles southeast of the city of Elko. Together, the communities of Elko and Spring Creek concentrate over 50 percent of the population of the study area.

Table 3.10-2. Population in the Study Area, 1990–2015

County and Community	1990	2000	2010	2015	Average Annual Percentage Change, 1990-2000	Average Annual Percentage Change, 2000-2010	Average Annual Percentage Change, 2010-2015
Elko County	**33,530**	**45,291**	**48,818**	**54,993**	**3.05%**	**0.75%**	**2.41%**
Carlin	2,220	2,161	2,368	2,668	-0.27%	0.92%	2.41%
Elko	14,736	16,708	18,297	20,613	1.26%	0.91%	2.41%
Spring Creek	5,866	10,548	12,361	13,926	6.04%	1.60%	2.41%
Lander County	**6,266**	**5,794**	**5,775**	**6,708**	**-0.78%**	**-0.03%**	**3.04%**
Battle Mountain	3,542	2,967	3,635	4,222	-1.76%	2.05%	3.04%
Eureka County	**1,547**	**1,651**	**1,987**	**2,067**	**0.65%**	**1.87%**	**0.79%**
Dunphy	NA	NA	NA	NA	NA	NA	NA
Crescent Valley	NA	NA	392	408	NA	NA	0.79%

Sources: USCB 1990; USCB 2000; USCB 2010; Nevada State Demographer's Office 2014 (for 2015 projections).

Note: To estimate the current population for the communities in the study area, BLM assumed the average annual percentage changes in population for communities during the period of 2010-2015 are the same as those for their respective counties.

Table 3.10-3 shows the projected population in the study area for the period 2010-2030. Elko County is projected to have the highest growth rates in the study area between 2010 and 2020, with Eureka County having the highest growth rate between 2020 and 2030. The communities of Elko and Spring Creek are projected to continue to concentrate over 50 percent of the population of the study area.

Table 3.10-3. Population in the Study Area, 2010–2030

County and Community	2010	2020	2025	2030	Average Annual Percentage Change, 2010-2020	Average Annual Percentage Change, 2020-2030
Elko County	**48,818**	**57,449**	**58,253**	**57,939**	**1.64%**	**0.85%**
Carlin	2,368	2,786	2,907	2,577	1.64%	0.85%
Elko	18,297	21,529	22,460	19,913	1.64%	0.85%
Spring Creek	12,361	14,545	15,173	13,453	1.64%	0.85%
Lander County	**5,775**	**6,574**	**6,037**	**5,908**	**1.30%**	**-1.06%**
Battle Mountain	3,635	4,136	3,922	3,268	1.30%	-1.06%
Eureka County	**1,987**	**2,126**	**2,299**	**2,543**	**0.68%**	**1.81%**
Dunphy	NA	NA	NA	NA	NA	NA
Crescent Valley	392	419	459	469	0.68%	1.81%

Sources: USCB 2010 (for 2010 data); Nevada State Demographer's Office 2014 (for projections).

Note: To estimate the future population for the communities in the study area, BLM assumed the average annual percentage changes in population for communities during the period of 2010-2030 are the same as those for their respective counties.

3.10.1.2 Employment and Income

The largest economy in the study area is that of Elko County that concentrates over 85 percent of the private establishments and paid employees (**Table 3.10-4**). Mining drives the economy of the study area and is the largest employer. Other important sectors include accommodation and food services, retail trade, health care and social assistance, construction, transportation and warehousing and professional services (**Table 3.10-4**).

Table 3.10-4. Establishments and Employment by Industry, 2013[1]

Industrial Sector	Elko County		Lander County		Eureka County	
	Establishments	***Paid Employees***	***Establishments***	***Paid Employees***	***Establishments***	***Paid Employees***
Mining, Quarrying, and Oil and Gas Extraction	3%	25%	2%	17%-33%	18%	57%-83%
Construction	10%	6%	11%	2%	9%	0%-1%
Retail Trade	14%	11%	23%	16%	16%	1%-6%
Transportation and Warehousing	4%	3%	5%	13%	7%	1%-6%
Professional, Scientific, and Technical Services	9%	3%	1%	0%-1%	7%	0%-1%
Health Care and Social Assistance	11%	7%	8%	7%-17%	4%	0%-1%
Accommodation and Food Services	14%	25%	15%	6%	18%	3%
Other	35%	19%	34%	0%	22%	0%

Source: USCB 2013.

Note: By place of work.

[1] **Table 3.10-4** uses USCB County Business Patterns data. These data do not include government workers and may undercount employment relative to other sources such as the BLS Quarterly Census of Employment and Wages and the Bureau of Economic Analysis data (BEA 2016).

Table 3.10-5 shows total employment and wages for 2014, by place of work, including employment with federal, state and local governments. Some employment is not captured by these data, such as proprietors, the unincorporated self-employed and some farm and domestic workers. Wages include most forms of compensation, including benefits such as health insurance, and including money withheld for income taxes.

Table 3.10-5. Total Employment and Earnings by Place of Work, 2014

Area	Employment	Earnings
Elko	22,264	$1,056,803,425
Eureka	4,422	$397,492,697
Lander	3,507	$243,905,783
Total	**30,193**	**$1,698,201,905**

Source: BLS 2015a.

Table 3.10-6 shows the labor force in the study area. Over 85 percent of the labor force of the study area resides in Elko County, which also has the lowest unemployment rate. The unemployment rate has been declining in the study area since its recent peak in 2010 (**Figure 3.10-2)**.

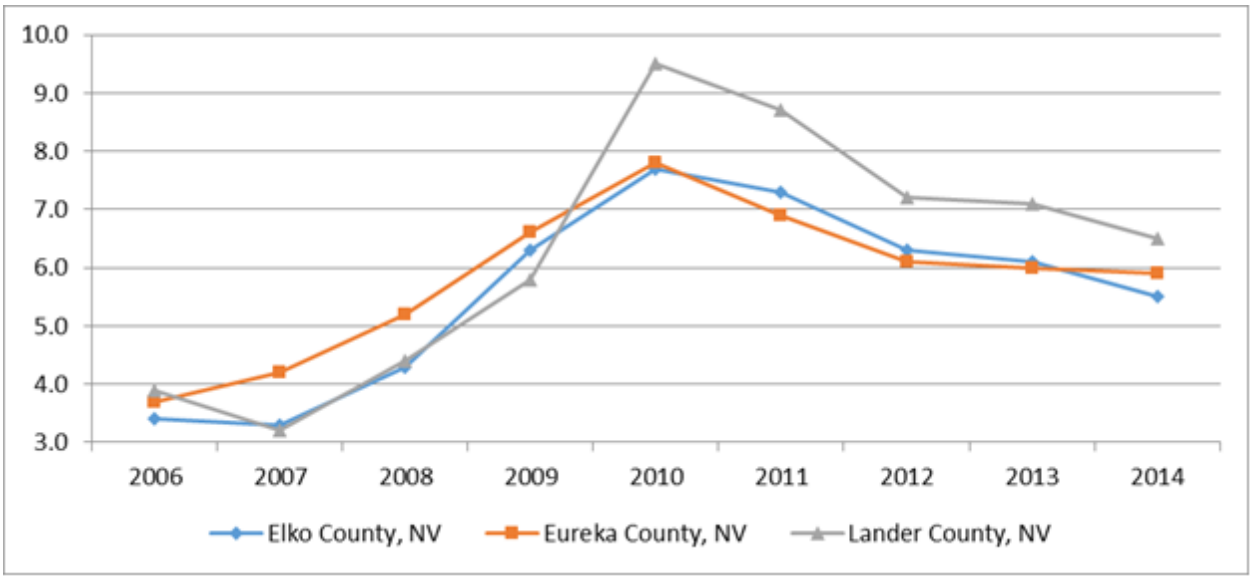
Table 3.10-6. Labor Force, 2014

Industrial Sector	Elko County	Lander County	Eureka County
Labor Force	28,175	3,360	1,071
Employed	26,631	3,143	1,008
Unemployed	1,544	217	63
Unemployment Rate	5.5%	6.5%	5.9%

Source: BLS 2015b.

Note: By place of residence

Figure 3.10-2. Unemployment Rates, 2006–2014



Source: BLS 2015b.

Per capita income in the study area tends to be higher than average per capita incomes for the state of Nevada. However, per capita incomes declined in Elko and Eureka counties between 2012 and 2014, compared to a growth in the state as a whole (**Table 3.10-7**).

Table 3.10-7. Per Capita Income, 2014

Area	2012	2013	2014
Elko	$42,340	$41,530	$41,702
Eureka	$35,574	$33,182	$34,531
Lander	$48,561	$49,219	$51,055
Nevada	$39,436	$39,223	$40,742

Source: BEA 2015.

Note: by place of residence.

3.10.1.3 Housing

Table 3.10-8 shows the number of housing units available in communities within commuting distance of the project site. The communities of Elko and Spring Creek concentrate most of the housing units in the study area. As of 2014, housing units vacant and available for rent or for sale were located in the communities of Elko and Carlin. Many of the vacant housing units in the study area are for seasonal, recreational or occasional use (USCB 2014a).

Table 3.10-8. Housing Availability, 2014

County and Community	Total Housing Units	Occupied (%)	Vacant		
			Total	*For Rent*	*For Sale*
Elko County					
Carlin	1,061	75.30%	262	30	15
Elko	7,332	91.60%	615	154	19
Spring Creek	4,699	99.10%	41	0	0
Lander County					
Battle Mountain	1,410	84.40%	220	0	0
Eureka County					
Dunphy	N/A	N/A	N/A	N/A	N/A
Crescent Valley	232	71.10%	67	0	0

Source: USCB 2014a.

In addition to long-term housing units, hotels, motels and Recreational Vehicles (RV) and mobile home parks are also available in the study area. **Table 3.10-9** provides a partial list. The largest number of hotel and motel rooms is located in the city of Elko. There are a considerable number of RV and mobile home parks in the communities of Carlin and Battle Mountain.

Table 3.10-9. Temporary Housing Availability, 2013

County and Community	Hotels and Motels		RV and Mobile Home Parks	
	Establishments	*# Rooms*	*Establishments*	*# of Spaces/Pads*
Elko County				
Carlin	2	80	13	N/A
Elko	32	2,500	6	500
Lander County				
Battle Mountain	7	277	9	449
Eureka County				
Crescent Valley	0	0	1	N/A

Source: HES 2014a.

3.10.1.4 Community Facilities and Services

Water Supply and Treatment

Water supply in Battle Mountain is provided by the Lander County and Water District #1. As of 2011, new wells and storage tanks were expected to allow considerable expansion of services. In the city of Elko water production capacity was 14.5 million gallons per day (mgd) in 2011 with use ranging between 3 mgd and 13 mgd. Spring Creek Utilities provides water to Spring Creek and Brentwood subdivisions using public wells. Carlin's water is sourced from one deep-water well and several natural springs. Peak production capacity is approximately 1.4 mgd with actual production average approximately half that much. Crescent Valley has two wells totaling 550 gpm and average daily demand was 136 gpm with peak of 232 gpm (HES 2014a).

Battle Mountain's wastewater treatment facility has capacity to treat 0.8 mgd with current use estimated at around 0.4 mgd. The City of Elko water reclamation facility has capacity of 4.5 mgd with current use estimated at 3.5 mgd. Carlin uses two lagoons with rapid infiltration basins. Spring Creek and Crescent Valley use private sceptic systems (HES 2014a).

Solid Waste

Solid waste facilities in the study area have between 20 to 30 (Eureka County) and 200 (City of Elko) years remaining of useful life. As of 2010, Battle Mountain's solid waste facility had a useful life of 50 years remaining. (HES 2014a).

Law Enforcement

The Elko County Sherriff's Department provides law enforcement in the Rossi Mine area. The Nevada Highway Patrol provides law enforcement on state highways, and the municipalities of Carlin and Elko maintain police departments. The Lander County Sheriff's Department provides law enforcement services in Battle Mountain. The Elko County Sheriff's Department provides law enforcement services in Spring Creek and maintains a substation in the area. The Eureka County Sheriff's Department maintains a substation in Crescent Valley staffed with three sworn law enforcement personnel, who provides law enforcement services to the northern part of the county (HES 2014a).

Emergency Response

The BLM Elko District Office's fire suppression organization employs over 70 permanent, career seasonal, and temporary Seasonal employees. The City of Elko Fire Department has two staff officers, one fire prevention bureau specialist, one administrative technician and eight career firefighters supported by 24 volunteer positions when fully staffed. The Spring Creek Volunteer Fire Department maintains two fire stations in the Spring Creek area. The Spring Creek area is served by a fire protection district that is administered by the Nevada Division of Forestry in accordance with NRS 473. The district was formed in order to provide fire protection for the unincorporated portions of Elko County. The Carlin Volunteer Fire Department (CVFD) is directed by a Chief appointed by the City Council with up to 35 members. CVFD serves Carlin and assists in surrounding communities with fire suppression services and ambulance transport services at the Emergency Medical Technician (EMT) Intermediate level. The Battle Mountain Volunteer Fire Department has an all-volunteer staff of 25 officers and firefighters. Eureka County provides a facility, equipment, training, and supplies for an all-volunteer fire department and EMT/ambulance services in Crescent Valley. In 2010, there were 17 volunteers stationed in Crescent Valley. Fire stations with 10 volunteers each are located in Beowawe and Dunphy (HES 2014a).

Elko County Ambulance Service is the primary service provider for Elko County. The Battle Mountain Ambulance Service is a volunteer organization with 25 emergency medical technicians and three ambulances. In Eureka County's Crescent Valley area, all medical emergencies are transported to Elko, the closest emergency facility (HES 2014a).

Health Care and Education

The Northeastern Nevada Regional Hospital (NNRH) located in Elko has 75 rooms and operates a 24-hour emergency room, a full-service laboratory, an intensive care unit, magnetic resonance imaging and computerized aerial tomography scan capabilities, and provides most major medical specialty services. The Carlin Community Health Center provides service in family medicine, preventative health, women's health, children's health and immunizations, health education, prenatal and newborn care, and pharmacy services. The Battle Mountain General Hospital and clinic has 23 beds, an emergency/trauma suite, laboratory, x-ray, respiratory therapy, and physical therapy facilities. Eureka County maintains a health clinic in Crescent Valley, which is staffed one or two days per week by a physician, a medical assistant and administrative staff (HES 2014a).

The Elko County School District operates four elementary schools, an intermediate school, a middle school, and a high school in Elko; two elementary schools, a middle school, and a high school in Spring Creek; and an elementary school, a junior high school, and a high school in Carlin. The Lander County School District operates two elementary schools, a junior high school, and a high school in Battle Mountain. The Eureka County School District operates an elementary school in Crescent Valley; junior high and high school students are bused to Carlin. Total student enrollment in fall of 2012 was 10,113 in the Elko school district, 1,093 in the Lander school district, and 266 in the Eureka school district (HES 2014a).

3.10.1.5 Public Finance

County and city governments in the study area are funded mostly by property taxes and intergovernmental transfers from state and federal sources. **Table 3.10-10** shows general fund revenues for the three counties in the study area for the fiscal year (FY) 2012–2013. In all counties, at least 45 percent of revenues were from intergovernmental transfers, with at least another 30 percent from property taxes.

Table 3.10-10. County Revenues in the Study Area, Fiscal Year 2012–2013

	Elko County	Lander County	Eureka County
General Fund Revenues	**$41,225,802**	**$19,190,726**	**$15,169,005**
Property Taxes	$12,545,451	$7,764,170	$5,109,733
Intergovernmental Transfers	$21,913,833	$8,644,149	$8,049,750
Other	$6,766,518	$2,782,407	$2,009,522

Source: HES 2014a.

Intergovernmental transfers include the distribution to counties, cities and school districts of sales taxes generated in those counties, cities and school districts. In FY 2013, the sales tax rate for Elko and Eureka counties was 6.85 percent. In Lander County it was 7.10 percent (Nevada Department of Taxation 2013).

Table 3.10-11 shows that cities relied more strongly than counties on other local taxes and fees than on property taxes, although property taxes were still over 10 percent of total city revenues.

Table 3.10-11. City Revenues in the Study Area, Fiscal Year 2012–2013

	City of Elko	City of Carlin
Budgeted Annual Revenues	**$22,653,095**	**$2,599,941**
Property Taxes	$3,676,885	$312,789
Intergovernmental Transfers	$12,544,743	$1,816,577
Other	$6,431,467	$470,575

Source: HES 2014a.

In addition to funding county general funds, county property taxes typically contribute to proprietary funds as well, such as those for ambulance, solid waste and other services. **Table 3.10-12** shows a breakdown of county property tax rates between the general fund and other (proprietary) funds. The rates are expressed in percentages.

Table 3.10-12. County Property Tax Rates, Fiscal Year 2012–2013

	Elko County	Lander County	Eureka County
General Fund	0.5512	1.2303	0.5580
Other	0.2874	0.6940	0.2878
Total	**0.8386**	**1.9243**	**0.8458**

Source: HES 2014a.

Note: Rates are dollars of taxes per $100 of assessed value.

Table 3.10-13 shows estimated assessed valuations and tax rates for property taxes in the counties, cities and towns in the study area. Properties taxed include proceeds of minerals, net of costs directly involved in their production. Actual property tax collections would likely be less than the multiplication of the assessed values shown and tax rates, because of abatements allowed on actual property taxes.

Table 3.10-13. Property Tax Assessed Valuations and Rates, Fiscal Year 2015–2016

	Assessed Valuation	Estimated Net Proceeds of Minerals	Total Assessed Valuation	City or Town Tax Rate	County Tax Rate	School Tax Rate	Special Districts Tax Rate	State Tax Rate	Total Property Tax Rate
Elko County	**$1,786,375,922**	**$115,561,277**	**$1,901,937,199**	**-**	**0.8386**	**1.5000**	**0.0537**	**0.1700**	**2.5623**
City of Elko	$482,366,245	$23,000	$482,389,245	0.9200	0.8386	1.5000	0.0537	0.1700	3.4823
City of Carlin	$34,150,020	-	$34,150,020	1.1480	0.8386	1.5000	0.0537	0.1700	3.7103
Lander County	**$705,976,617**	**$462,548,330**	**$1,168,524,947**	**-**	**1.9243**	**0.7500**	**0.5109**	**0.1700**	**3.3552**
Battle Mountain Town	$48,209,863	-	$48,209,863	0.0500	1.9243	0.7500	0.5109	0.1700	3.4052
Eureka County	**$863,783,668**	**$667,116,835**	**$1,530,900,503**	**-**	**0.8458**	**0.7500**	**0.0085**	**0.1700**	**1.7743**
Crescent Valley Town	$3,968,368	-	$3,968,368	0.2153	0.8458	0.7500	0.0085	0.1700	1.9896

Source: Nevada Department of Taxation 2015.

3.10.1.6 Social Values

As described in Section 3.10.1.2, Employment and Income, mining drives the economy of the study area. Other sectors of importance for employment and earnings may be to some extent driven by mining activities, such as the accommodation and food services sector. Much of the land in the study area is public land. For example, Elko County has 86.5 percent of its lands under the jurisdiction of federal agencies (Elko County 2008). Activities consistent with this land ownership are, therefore, also of particular importance to the study area, such as grazing and outdoor recreation. Elko County's public land base is also increasingly valued for open space amenities, such as its wildlife and viewshed (Elko County 2008).

At the same time as local populations value the quality of life acquired through their traditional livelihoods, counties in the study area have been interested in the diversification of their economies, to ensure economic stability. An example of this interest is the recently completed Northeastern Nevada Regional Railport and Industrial Park (NNRR) near Elko. Elko County-owned, it functions as a multimodal trans-loading facility, the largest in the state. It has direct access to I-80 and is served by both the Union Pacific and Burlington Northern railroads. It also includes an industrial park served by utilities, which is suitable for most light-industrial or manufacturing applications (NNRDA No Date).

3.10.2 Environmental Consequences

There are two main drivers of socioeconomic impacts associated with the Proposed Action and alternatives. The first one is the increased employment, local expenditures and production during construction, during the extended period of operations and during reclamation. The second is the reduced availability of public lands for other uses during construction and during the extended period of operations. These two drivers have the potential to affect earnings by the workforce in the study area, the population of the study area, the demand for housing and public services, local fiscal revenues and social values.

3.10.2.1 Proposed Action

Under the Proposed Action, construction of open pits, WRDFs, haul and access roads, and ancillary and supporting facilities would be completed as mining progresses. The costs of construction of these components and the associated construction employment are, therefore, distributed over the 8 years of proposed mining activities. Ancillary and supporting facilities include office buildings and storage facilities, lighting at the newly developed areas, a power line extension, a new fuel farm, and various water related infrastructure work as described in Section 2.3, Proposed Action.

Table 3.10-14 shows current employment at the mining site and expected employment with expanded production during the 8-year expansion period. Operations employment varies with production and the current employment numbers shown in the table are those for July of 2013. Under the PoO, these magnitudes would be expected though 2018. The magnitudes shown under the expanded production would be expected to start in 2018, so there is some overlap between the two scenarios. During the expanded production period, employment would range between 24 and 60 at the jig plant and between 60 and 300 mining contractors, depending on barite ore production levels. The employment numbers shown in the table are the upper end of that range and are the numbers used as an upper bound for analysis. The increase in trucking/road maintenance contractor employees was assumed proportional to the increase in jig plant operators. Construction personnel could range between 3 and 50 construction workers.

Table 3.10-14. Proposed Action Associated Annual Employment

	Current Number of Employees	Employees under Expanded Production and Construction (Up To)
Halliburton geologists, engineers and jig plant operators	24	60
Mining contractors	60	300
Trucking/road maintenance contractor employees	9	23
Construction workers (short-term)		50
Total Annual Employment	**93**	**433**

Sources: HES 2014a; SRK 2014a.

Note: Increase under expanded production assumed proportional to increase in jig plant operators.

In addition to an increase and extension in Rossi Mine employment, the Proposed Action would also represent an expected increase in production and local expenditures. Current levels of production are confidential information. However, under the Proposed Action production costs are estimated to average about $533 million a year over the 8-year period, including any expenses with labor. This includes costs with ore mining and crushing and with jigging, hauling, water and reclamation, although reclamation expenses are likely to extend beyond the 8-year period (HES 2015e).

The main uses of the public lands in the project area are mining and grazing. The Proposed Action would increase disturbance in this area and potentially displace grazing activities. However, the one grazing allotment in this project area is the Twenty-Five Allotment. This allotment has a total of 309,390 acres of public land and 214,693 acres of private land for a total of 524,083 acres. Cattle and horse are permitted to graze on public lands within this allotment by one livestock owner, the 25 Ranch LLC (HES 2014b). The project area represents less than 1 percent of the total acreage available in Twenty-Five Allotment, and public lands within the project area represent little more than 1.1 percent of public lands in the allotment. Because the area within the PoO boundary is a small share of the area available for grazing in the allotment, there would be no loss of economic activity as a result of the Proposed Action, and that cattle and horse grazing would likely be shifted to other parts of Twenty-Five Allotment. Expansion of the mine would result in suspending some Animal Unit Months (AUM) in the Twenty-Five Allotment (see Section 3.16, Range Resources). A potential economic impact of the Proposed Action on current economic activities making use of lands in the project area, would be the potential for accidental collision or harm to grazing cattle and horses, from operating machinery and trucks in the area.

Employment and Earnings

Under the Proposed Action, a total of up to 433 employees would be expected to be working at the site, whether directly employed by Halliburton, or employed by mining, transportation or construction contractors. The actual number would vary considerably depending on market demand for barite, but would be expected to be no less than the current employment of 93 employees (**Table 3.10-14**). **Table 3.10-15** shows the expected Proposed Action share of the total employment and wages in the study area. The expected share would range from 0.3 percent to 1.4 percent of total study area employment and from 0.4 percent to 2.1 percent of total study area labor earnings, depending on annual production. Production is subject to market demand. The fact that labor earnings associated with the Proposed Action are likely a higher share of study area labor earnings than the share of Proposed Action associated employment relative to total study area employment, reflects the relatively high labor earnings expected from the Proposed Action relative to average labor earnings in the study area.

Table 3.10-15. Proposed Action Share of Study Area Employment and Wages, On Site Employment

	Total Employment (range)		Estimated Average Annual Wages	Total Labor Earnings (range)	
Proposed Action On Site Employment and Payroll (range)	**93**	**433**		**$7,584,129**	**$35,182,063**
Halliburton geologists, engineers and jig plant operators	24	60	$85,425	$2,050,200	$5,125,500
Mining contractors	60	300	$85,425	$5,125,500	$25,627,500
Trucking/road maintenance contractor employees	9	23	$45,381	$408,429	$1,043,763
Construction workers		50	$67,706	$0	$3,385,300
Total Employment and Labor Earnings in the Study Area (2014)	**30,193**			**$1,698,201,905**	
Proposed Action Share of Employment and Labor Earnings in Study Area (range)	**0.3%**	**1.4%**		**0.4%**	**2.1%**

Sources: **Table 3.10-14**; BLS 2015a.

In addition to the on-site employment, the Proposed Action would generate employment indirectly, through processing at the Dunphy Mill, and through providers of services, input and equipment. As of December of 2015 there were 20 Halliburton employees at the Dunphy Mill (HES 2015e). To the extent that production at the Rossi Mine increases over the 8-year Proposed Action period, the number of associated employees at the Dunphy Mill would also be expected to increase.

The extent of the local indirect impact on employment and earnings through providers of services, input and equipment, depends on the extent to which providers are local, the extent to which the suppliers of the providers are local, and so on along the supply chain. Information provided by Halliburton (HES 2015e) indicate that first round providers are largely local. These include equipment retailers (e.g., loader and truck dealers), providers of various types of services (e.g., portable toilets, laundry, fuel, engineering and environmental services, drilling services, transportation, waste disposal services) with most of these providers located in Elko. The providers of these providers, however, may often not be local (e.g., equipment manufacturers). The Proposed Action would also support additional employment through the local expenditures of the Rossi Mine workforce and the mine's local service providers. This is often called "induced employment."

A quantitative estimate of the indirect and induced employment and earnings generated by the Proposed Action (the multiplier effect), can be obtained by using factors estimated in a 2007 study of the economic impacts of hard rock mining in the Elko Micropolitan Statistical Area (Price and Harris 2007). The Elko Micropolitan Statistical Area consists of Elko and Eureka counties. Because Lander County is not included, the multiplier effect in that study is likely slightly less than the multiplier effect in the study area for this EIS. Also, the 2007 study uses 2004 multipliers obtained from the Impact Analysis for Planning (IMPLAN) regional economic model. These multipliers are estimated based on inter-industry and regional trade data and are updated regularly. Current multipliers could be slightly different. The 2007 study still provides a reasonable reference because mining's economic impact on the local area has not substantially changed since the report was published. Based on this study, every direct job in hard rock mining in the Elko and Eureka counties area would support an additional 0.86 indirect and induced jobs. In addition, every dollar of labor earnings would support an additional $0.36 of a dollar in indirect and induced labor earnings. The lower multiplier for earnings reflects the relatively high earnings of hard rock mining workers compared to workers in sectors of indirect and induced employment. **Table 3.10-16** shows the total Proposed Action share of employment and labor earnings in the study area, including indirect and induced effects. The numbers for induced employment in **Table 3.10-16** may be

overestimated because most of the additional employment is expected to be taken by the workforce already in the study area (see the next sections, "Population, Housing, and Public Services," for a discussion). To the extent that this workforce has some form of income (e.g., unemployment insurance), the increase in earnings (and consequently the increase in associated local expenditures) could be less.

Table 3.10-16. Proposed Action Share of Study Area Employment and Wages including Indirect and Induced Effects

	Total Employment (range)		Total Labor Earnings (range)	
Proposed action on site employment and payroll (range)	93	433	$7,584,129	$35,182,063
Potential indirect and induced employment and labor earnings (order of magnitude)	80	372	$2,730,286	$12,665,543
Total Proposed Action associated employment and labor earnings	173	805	$10,314,415	$47,847,606
Total Employment and labor earnings in the Study Area (2014)	**30,193**		**$1,698,201,905**	
Proposed Action Share of Employment and labor earnings in Study Area (range), including indirect and induced effects	**0.6%**	**2.7%**	**0.6%**	**2.8%**

Sources: **Table 3.10-14**; Price and Harris 2007.

Some additional direct and indirect induced employment and earnings impacts would be associated with a potential increase in employment at the Dunphy Mill during the Proposed Action 8-year period, and with reclamation activities that extend beyond the 8-year Proposed Action period.

Population

The impact of the Proposed Action on population depends largely on the extent to which production would be raised above current levels. As previously noted, this depends on market demand. Current production levels generate employment at the levels reflected by the lower end of the range shown in **Table 3.10-15** and **Table 3.10-16**. With this level of production, the Proposed Action would not attract new workers to the study area and would have no effect on population when compared to current conditions. At higher production levels, additional workers would be needed on site, up to the higher end of the range shown in **Table 3.10-15**. This would constitute up to 340 more workers than current conditions. The extent to which this would have an impact on population depends on the extent to which these workers are available to be hired from the local communities or would need to be brought from outside the study area. In addition, if this number of workers is maintained for long periods, workers are more likely to move to the area with their families than if work is short-term.

As shown in **Table 3.10-6**, there were 1,824 unemployed workers in the study area in 2014. There are no data available on the potential occupation of unemployed workers. However, if the potential sector of employment for the unemployed were distributed similarly to the distribution of the employed workforce in Elko County in **Table 3.10-4,**[1] there would be 456 unemployed potential workers for the mining, quarrying and oil and gas sector, 109 unemployed potential workers for the construction sector and 54 unemployed potential workers for the transportation and warehousing sector. It is expected that the great majority of the additional employees needed would be hired locally. This is more likely, the more the peak levels of employment are not sustained and actual employment fluctuates over the 8-year period, as expected. Therefore, impacts on the local population from the Proposed Action would be negligible.

[1] *Elko County's distribution was used due to the undisclosed numbers for Lander and Eureka counties.*

Housing and Public Services

Because impacts on the local population are expected to be negligible, any incoming workers would not be expected to generate a perceptible increase in demand for housing and public services. To the extent that a portion of the Proposed Action labor force does move into the study area for short or long periods of time, **Table 3.10-9** shows that there are over 3,800 hotel and motel rooms and RV and mobile home spaces or pads in the study area, and **Table 3.10-8** shows that there were over 180 housing units for rent in 2014. The current housing and short-term stay infrastructure is expected to be able to accommodate any incoming workers associated with the Proposed Action.

Because demand for public services is proportional to population, and because the Proposed Action is not expected to lead to a perceptible increase in population in the study area, any increase in demand for public services is expected to be negligible.

Local Fiscal Revenues

As discussed in Section 3.10.1.5, Public Finance, the main source of local tax revenues are property taxes. In 2013, the Rossi Mine paid $8.5 thousand in property taxes to Elko County. An additional $54.7 thousand were paid by the Dunphy Mill (HES 2015e). These values correspond to approximately 0.5 percent of Elko County property tax collections of FY 2012-2013 (as shown in **Table 3.10-10**). Because of expansions in subsequent years, the contribution of the Rossi Mine and Dunphy mill to local property taxes increased. In 2014 and 2015, the Rossi Mine paid an average of $88.7 thousand in property taxes to Elko County and the Dunphy Mill paid an average of $207.4 thousand (HES 2015e). Because property taxes include net proceeds of minerals, the Proposed Action would not only extend the contribution of the Rossi Mine to local property taxes for the production period, but also increase the contribution to the extent that the volume of production increases.

In addition to property taxes, local expenditures associated with the Proposed Action would pay sales taxes. A portion of sales tax collection is distributed to the counties, cities and school districts where they are collected.

Social Values

The Proposed Action would extend mining activity in the study area. This would contribute to the continuation of mining as a main form of livelihood to the local population, and would tend to reinforce existing social values rather than alter them.

3.10.2.2 Reconfiguration Alternative

Under the Reconfiguration Alternative, the socioeconomic impacts would be indistinguishable from those of the Proposed Action.

3.10.2.3 Livestock Fencing Alternative

Under the Livestock Fencing Alternative, the socioeconomic impacts would be largely indistinguishable from those of the Proposed Action and Reconfiguration Alternative, but there would be a reduced likelihood of accidental impacts to livestock grazing in the surrounding area. The livestock fence would be removed once the mine is reclaimed and revegetation is determined successful by the BLM and NDEP.

3.10.2.4 No Action Alternative

Under the No Action Alternative, current production levels of the Rossi Mine would be expected to be phased out in 2017 and 2018. As shown in **Table 3.10-15** and **Table 3.10-16**, the current contribution of the Rossi Mine to local employment and labor earnings is estimated to be between 0.3 percent and 0.4 percent of the employment and labor earnings of the study area, and approximately 0.6 percent when indirect and induced effects are considered. Impacts on housing and public services would depend on whether current employees directly or indirectly employed by the Rossi Mine would remain in the study area and find alternative employment or would leave the study area, reducing demand for

housing and public services. Current property taxes paid by the Rossi Mine and the Dunphy Mill would be reduced and the increase in sales tax that would be associated with the Proposed Action would not be realized.

3.10.3 Cumulative Impacts

As described in Section 3.10.1, the CESA for socioeconomics is the same as the study area and includes the counties of Elko, Eureka and Lander, and the communities in these counties within commuting distance from the mine and where the project related labor force may reside (**Figure 3.10-1**). The past, present, and RFFAs are discussed in Section 3.2, Past, Present, and Reasonably Foreseeable Future Actions. RFFAs for mining and exploration activities are identified in **Table 3.2-1**; their locations are shown in **Figure 3.2-1** and **Figure 3.2-2**. **Figure 3.2-2** also illustrates some ROW actions.

The socioeconomic effect of past and present actions for the Rossi Mine are reflected in the affected environment described in Section 3.10.1. Therefore, any cumulative effects with the assessed action alternatives are reflected in the discussion of environmental consequences in Section 3.10.2. The discussion below focuses on RFFAs.

As previously discussed, there are two main drivers of socioeconomic impacts associated with the Proposed Action and alternatives: a) increased employment, local expenditures and production; and b) reduced availability of public lands for other uses. RFFAs that would have a cumulative effect on local employment, expenditures and production include mining operations, exploration activities, grazing and agriculture, oil, gas and geothermal leasing and utility and infrastructure development.

BLM (BLM 2012a, BLM 2010c) projected employment at major mines for residents of the Elko Micropolitan Statistical Area (MSA). Employment projections for 2015, 2020, and 2025 are reflected in **Table 3.10-17**. Mining employment is expected to decline through 2025 based on the projections for these major mines. Expansion of the Rossi Mine would be expected to help offset some projected reduction in mining employment from other mines listed in **Table 3.10-17** in 2020 and 2025. Development or expansion of other nearby smaller exploration properties or mines not included in the projections in **Table 3.10-17** also may add to local mining employment and help offset the projected decline in mining employment depending on market conditions.

Table 3.10-17. Projected Employment for Residents of Elko MSA[1] at Mine Facilities in the Carlin Trend and TS Power Plant

Mine	Year 2015		Year 2020		Year 2025	
	Total	***Elko MSA***	***Total***	***Elko MSA***	***Total***	***Elko MSA***
Newmont Carlin Trend (less Midas with Genesis)	1722	1722	788	788	71	71
Barrick Betze Pit	333	320	114	109	14	13
Barrick Meikle	450	432	0	0	0	0
Barrick Overhead and Processing	289	277	218	207	162	155
Barrick Contractor Employees	400	384	200	192	75	72
Barrick Cortez	685	521	155	118	0	0
Newmont Midas[4]	0	0	0	0	0	0
Hollister Underground Mine	216	15	216	15	216	15
Barrick Bald Mountain	260	166	25	16	0	0
Jerritt Canyon	Unk[2]		Unk		Unk	
TS Power Plant	65	46	65	46	65	46
Arturo Mine	358	358	50	50	0	0
Rossi Mine[3]	93	11	383	46	383	46
Totals with Rossi Mine Expansion	**4871**	**4252**	**2214**	**1587**	**986**	**418**
Totals without Rossi Mine Expansion	**4871**	**4252**	**1831**	**1541**	**603**	**372**
Net Due to Rossi Mine Expansion	**0**	**0**	**383**	**345**	**383**	**345**

Sources: BLM 2012a; BLM 2010c; **Table 3.10-14**.

[1] Elko MSA = Encompasses Elko, Spring Creek, Carlin, and the adjacent unincorporated communities in Elko County.
[2] Unk = Unknown
[3]Approximately 88% of the Rossi Mine workforce resides in Battle Mountain in Lander County (HES 2014a).
[4]Currently operated by Klondex Mines Ltd.

In addition to mining, other activities are also expected to contribute to cumulative impacts on employment, expenditures and production. Exploration activities, grazing and agriculture, oil, gas and geothermal leasing and utility and infrastructure construction are expected to continue at levels similar to what occurred in the past.

Past, present, and RFFAs that would have a cumulative effect on the availability of public lands for public uses include mining operations, exploration activities, grazing and agriculture, oil, gas and geothermal leasing, and utility and infrastructure development. Most of these activities are expected to continue at past and present levels, with the possible exception of mining operations, which are anticipated to decline somewhat as some of the major mature mines begin to undergo closure and reclamation.

3.10.4 Potential Monitoring and Mitigation Measures

No monitoring or mitigation measures for socioeconomic impacts are recommended.

3.10.5 Residual Impacts

The socioeconomic effects would last for the duration of the project. Any public and private investment in infrastructure, homes, and businesses from revenues generated by the project would have economic life after the end of the project.

3.11 Recreation and Wilderness

3.11.1 Affected Environment

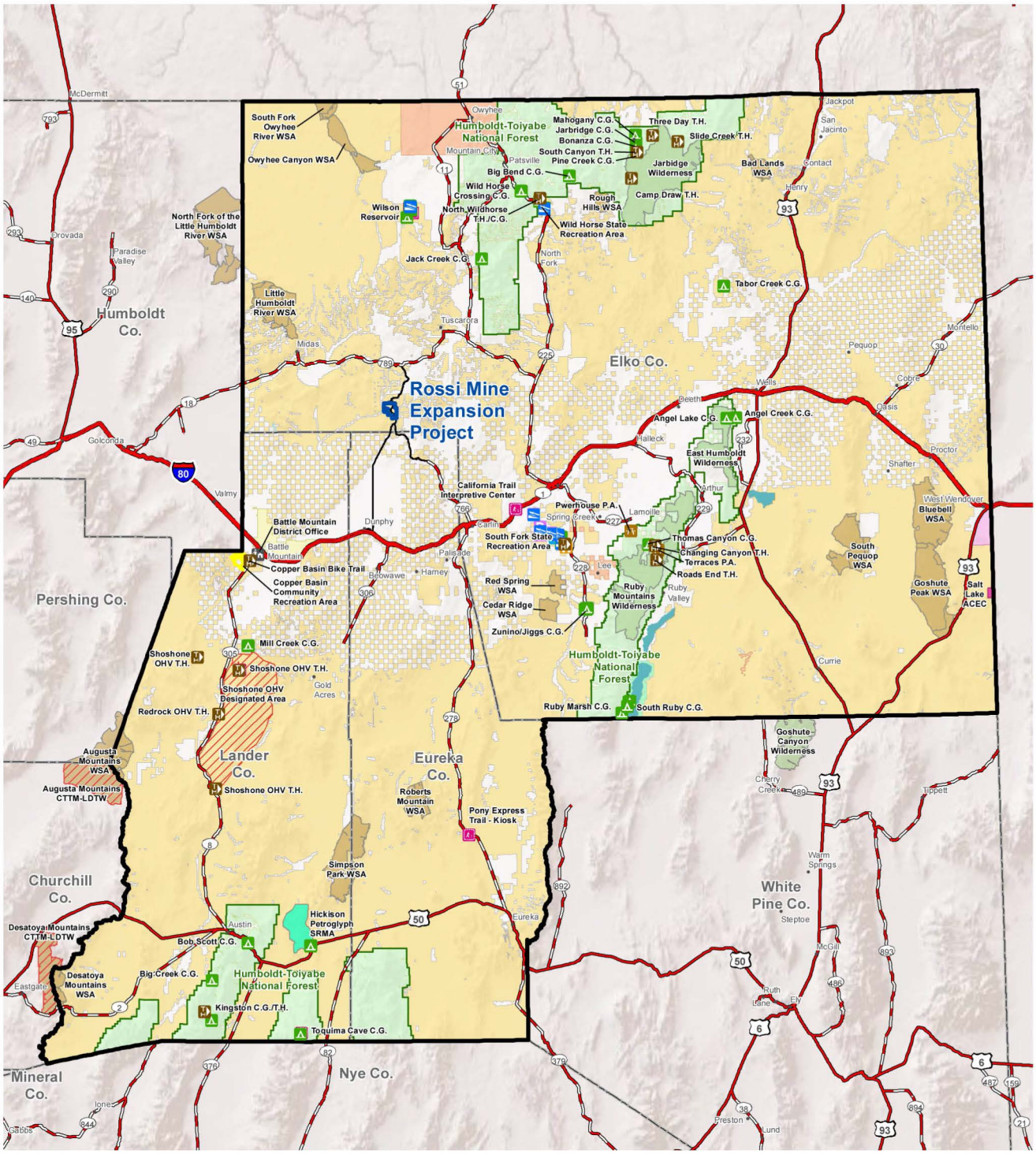
The study area for recreation and wilderness issues is based on the anticipated potential extent of effects from the proposed project. The study area for direct and indirect impacts and CESA for recreation and wilderness comprise Elko, Eureka, and Lander counties as presented in **Figure 3.11-1**. These counties encompass the region in which in the project workforce and their families are likely to live and recreate, as well as the area where the proposed project and past, present, and RFFAs could result in cumulative effects to recreational opportunities or wilderness areas. Due to the large number of recreation and wilderness resources within the study area/CESA, the analysis below focuses on those that are most likely to be impacted by the proposed project.

3.11.1.1 Recreation

Most BLM-administered public lands in the project vicinity are open for dispersed recreational uses, such as hunting, off-highway vehicle (OHV) use, sightseeing, photography, rock hounding, and geocaching. The project vicinity is defined as those areas within 20 miles of the project area. Antelope Creek Road and Boulder Valley Road serve as the primary public access routes for recreational users as well as provide access for ongoing mining activities. BLM-administered lands that are unavailable for dispersed recreational use, which comprise a small percentage of all BLM-administered lands in the area, include isolated parcels with no public access and areas fenced off for protection of the public and to prevent interference with mining activities. Public lands managed by the BLM, federal lands managed by the USFS, USFWS, and Bureau of Indian Affairs, state lands managed by the Nevada State Parks and Nevada Division of Forestry, and privately-owned lands provide additional opportunities for dispersed recreation activities throughout the study area.

No data have been collected to assess past or current levels of recreational use in the project vicinity, but based on the observations of BLM resource specialists, hunting and OHV use are thought to be the most common activities (Setlock 2016). As described in Section 3.17, Wildlife and Aquatic Biological Resources, an important migration route used by the Area 6 mule deer herd connects seasonal ranges found in the vicinity of the existing Rossi Mine. This migration route provides mule deer hunting opportunities in the project vicinity and connected mule deer seasonal ranges. The Rossi PoO area is completely within NDOW hunt management unit 068 while hunt management units 64, 66, and 67 are in the vicinity of the Rossi Mine.

Figure 3.11-1 depicts the location of most developed recreation sites in the study area. There are no developed recreation sites in the immediate project vicinity; however, the study area contains numerous developed recreation sites that provide opportunities for activities such as camping, boating, fishing, mountain biking, white-water rafting, cross-country skiing, and heritage tourism. Willow Creek Reservoir, located approximately 10 air miles northwest of the proposed project, is the nearest developed recreation site. This agricultural impoundment is owned by BGMI and managed by the NDOW, and provides public access for fishing, hunting, boating, and camping. The BLM's California Trail Interpretive Center is located approximately 31 air miles southeast of the proposed project and 8 air miles west of Elko along I-80. The Interpretive Center features dioramas and interactive exhibits, costumed demonstrations of Native American and pioneer life, and a reconstructed Shoshone village and wagon encampment. The South Fork State Recreation Area (SRA), located approximately 40 air miles southeast of the proposed project and 10 air miles south of Elko, provides opportunities for hunting, camping, boating, picnicking, winter sports, and wildlife viewing. The South Fork SRA is managed by Nevada State Parks, features trophy-class trout and bass fisheries. The South Fork canyon area, which lies just west of the South Fork SRA, is managed by the BLM as a Special Recreation Management Area (SRMA). The BLM-operated Copper Basin Mountain Bike Trail system, located approximately 40 air miles southwest of the proposed project and 3 air miles southwest of the community of Battle Mountain, offers a combination of signed single and double track mountain bike trails with varying degrees of difficulty. Wilson Reservoir, located approximately 40 air miles north of the proposed project, is a remote SRMA managed by the BLM to provide opportunities for camping, fishing, boating, picnicking, and hunting.



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Other developed recreation sites located farther from the proposed project include Wild Horse SRA and adjacent Wildhorse SRMA, South Fork Owyhee River SRMA, and Zunino/Jiggs Reservoir SRMA in Elko County; Shoshone OHV Recreation Area and Hickison Petroglyph SRMA in Lander County; and Pony Express National Historic Trail in Eureka County. Various campgrounds, picnic areas, fishing areas, scenic overlooks, and extensive trail systems that provide opportunities for dispersed recreation are located on USFS-managed lands throughout study area, including the Mountain City, Jarbidge, Ruby Mountain, and Austin and Tonopah ranger districts of the Humboldt-Toiyabe National Forest. Most developed USFS recreation facilities in the area are limited to campgrounds with non-flush type toilet facilities.

The towns of Carlin, Elko, Spring Creek, and Battle Mountain have community and commercial recreation facilities. Carlin has a park with ball fields, basketball courts, playground equipment, picnic tables, and a barbeque; an equestrian park; and a motocross park. Elko has rodeo and fairgrounds in addition to seven public parks, ranging from the 0.25-acre Greenbelt Park with a few picnic tables, to the 30-acre Mountain View Park with soccer and ball fields, picnic shelter, and playground. The various parks have an extensive inventory of facilities from barbeque pits and playgrounds to tennis courts and ball fields. Elko also has an 18-hole golf course (Ruby View) and a municipal swimming pool, with both indoor and outdoor pools. The city also provides numerous recreation programs, including ski and snowboard youth programs at the Elko Snowbowl Ski Area approximately six miles north of town. Spring Creek has an 18-hole golf course, a marina, a trap and skeet shooting range, a rifle range, a campground, a sports complex, and a horse palace. Battle Mountain has a nine-hole golf course, mountain bike trails, an outdoor swimming pool, rodeo grounds, camping and fishing areas, gun range, motocross track, a sports complex, and multiple urban parks.

3.11.1.2 Wilderness

Wilderness Areas

There are three designated wilderness areas in the study area/CESA, which are managed by the USFS (University of Montana et al. 2015). **Figure 3.11-1** depicts the location of these wilderness areas in relation to the proposed project.

The 93,000-acre Ruby Mountains Wilderness is located approximately 55 air miles east of the proposed project and was designated by Congress in 1989. The area features glacier-carved valleys and 10 peaks over 11,000 feet, numerous alpine lakes, a large mule deer herd, elk, mountain goats, bighorn sheep, and trout streams. The Ruby Crest National Recreation Trail traverses through the Ruby Mountains Wilderness along the crest of the Ruby Mountains for over 30 air miles.

The Jarbidge Wilderness is located approximately 80 air miles northeast of the proposed project. It was designated by Congress in 1964 and at 110,000 acres, is the second largest wilderness area in Nevada and one of the most remote places in the country. The Jarbidge Wilderness has eight peaks higher than 10,000 feet, numerous creeks and small lakes that provide excellent fishing opportunities, and large elk and deer herds that offer opportunities for hunting and wildlife viewing.

The East Humboldt Wilderness is located approximately 62 air miles east of the proposed project. It was designated by Congress in 1989 and now contains more than 32,000 acres. The area supports a diverse range of vegetation communities, including sagebrush and grasslands that rise to high alpine meadows on the flanks of the 11,127-foot Hole in the Mountain Peak.

Wilderness Study Area

In October 1991, the BLM Nevada State Office released the Nevada BLM Statewide Wilderness Report (BLM 1991c) documenting the rationale and recommendations for 103 Wilderness Study Areas (WSA) throughout the state. All or portions of 16 of these WSAs are located within the study area/CESA **(Figure 3.11-1). Table 3.11-1** identifies the distance of each WSA in the study area to the proposed project and the acreage recommended for wilderness or non-wilderness. Overall, 211,570 acres or 39 percent of WSAs within the study area are recommended for wilderness designation.

Table 3.11-1. Wilderness Study Areas in the Study Area/CESA

Wilderness Study Area	ID	Distance to Project Area (air miles)	Acres Recommended for Wilderness	Acres Recommended for Non-Wilderness
Augusta Mountains	NV-030-108	83.3	0	89,372
Bad Lands	NV-010-184	88.5	8,415	1,011
Bluebell	NV-010-027	108.4	0	55,665
Cedar Ridge	NV-010-088	48.0	0	10,009
Desatoya Mountains	NV-030-110	128.1	43,180	8,222
Goshute Canyon	NV-040-015	105.3	362	0
Goshute Peak	NV-010-033	111.5	61,004	8,766
Little Humboldt River	NV-010-132	22.6	29,775	12,438
North Fork Of The Little Humboldt River	NV-020-827	40.3	8,900	60,783
Owyhee Canyon	NV-010-106	48.0	13,525	8,350
Red Spring	NV-010-091	45.4	0	7,847
Roberts Mountain	NV-060-541	75.7	0	15,090
Rough Hills	NV-010-151	57.9	6,685	0
Simpson Park	NV-060-428	82.7	0	49,670
South Fork Owyhee River	NV-010-103A	60.3	5,180	2,662
South Pequop	NV-010-035	93.8	34,544	6,546
Total	**-**	**-**	**211,570**	**336,431**

Source: BLM 2014b.

Lands with Wilderness Characteristics

In 1979, the lands encompassing the project area were evaluated for wilderness characteristics. The Inventory Unit polygons identified and inventoried in 1979 are: Bootstrap (NV-010-123); Checkerboard (NV-010-210); and Wilson (NV-010-211). At that time it was determined that the project area and adjacent areas did not meet the criteria for wilderness characteristics or designation for wilderness because:

- **Bootstrap:** The unit does not meet the basic requirements necessary to be carried over to the intensive inventory stage. Due to lack of topographic and vegetative screening, and the relatively small size, it lacks outstanding opportunities for solitude or a primitive and unconfined type of recreation in comparison to others of its kind.
- **Checkerboard:** None of the public lands, other than a few acres described elsewhere, occur in blocks of more than 5,000 acres each. In fact, most are the size of a single section (640 acres). None of these lands are in areas of sufficient size as to make practicable its preservation and use in an unimpaired condition.
- **Wilson:** None of the public land in the blocks of less than 5,000 acres are of sufficient size as to make practicable its preservation and use in an unimpaired condition (BLM 1979).

BLM Manual 6310 requires the BLM to update or conduct a wilderness characteristics inventory when a project that may impact wilderness characteristics is undergoing NEPA analysis (BLM 2012d). In accordance with this policy, the BLM Tuscarora Field Office delineated two new inventory units that meet the minimum 5,000-acre size threshold for evaluation of wilderness characteristics and overlap the project area: (1) NV-010-123 (21,240 acres) and (2) NV-010-211 (8,388 acres) (Setlock 2016). The BLM completed a wilderness character inventory in August of 2016 and documented the following:

- NV-010-123 Bootstrap

  This unit met the size requirement of 5,000 acres of continuous BLM land but a utility line ROW was present which intersected the entire unit from the south to the north. Due to the presence of this ROW a sub unit, NV-010-123A (Rossi Mine Area 3) was parceled off to the east and inventoried separately per BLM Manual 6310. The sub unit is approximately 5,780 acres in size but did not meet the criteria for naturalness, solitude, and opportunities for unconfined and primitive recreation. The remainder of the unit NV-010-123 Bootstrap is 15,460 acres and is not located in the proposed disturbance boundary. This unit may or may not contain wilderness characteristics and should be inventoried at a later date. See Form 1 and 2 and associated map in Appendix G.

- NV-010-210 Checkerboard

  These small tracts of checker-bordered BLM land intermixed with private parcels failed to meet the size requirements of 5,000 acres or more of continuous BLM land and therefore were dropped from any further inventory.

- NV-010-211 Wilson

  This unit met the size requirement of 5,000 acres of continuous BLM land but the unit has a maintained BLM Road 1059 Squaw Creek which intersects the unit in the center from the south to the north. This road divided the unit NV-010-211 into two separate sub units, NV-010-211A (Rossi Mine Area 1) to the east and NV-010-211B (Rossi Mine Area 2) to the west. Both subunits were inventoried separately per BLM manual 6310 even though both subunits do not meet the size requirement of 5,000 acres of continuous BLM land. Sub-unit NV-010-211A has 360 acres of private inholdings present and subunit NV-010-211B has 232 acres of private inholdings within that unit. In addition both subunits have utility line ROWs that travel across each unit which only serve to diminish the wilderness character not enhance those opportunities. See Form 1 and 2 and associated map in Appendix G.

3.11.2 Environmental Consequences

Primary issues related to recreation resources include increased traffic along Antelope Creek and Boulder Valley roads, which serve as the primary public access routes for recreational uses in the project vicinity, and the potential displacement of mule deer or alternation of mule deer migration patterns, which could impact hunting opportunities in the project vicinity and associated mule deer seasonal ranges.

3.11.2.1 Proposed Action

Recreation

Expansion of existing operations at the Rossi Mine would result in 1,167 acres of new surface disturbance. The Proposed Action would reduce lands available for dispersed recreational activities in the project vicinity until they are reclaimed following the cessation of active mining activities. Hunting and OHV use are the most common dispersed recreational uses in the vicinity of the project area, and are thus the primary activities likely to be adversely affected by these impacts. Because the additional surface disturbance would occur in areas directly adjacent to active mining facilities, where the value of the recreational setting has already been impacted by the presence of existing mining infrastructure and ongoing operational activities, some recreational users may already be avoiding these areas. Therefore, each additional acre of disturbance is likely to have a lower marginal impact on recreation, so long as similar opportunities for dispersed recreational activities are available in nearby areas.

Construction and operational activities that generate noise and dust could degrade recreational settings and experiences in areas beyond the project footprint. The potential for adverse impacts from fugitive dust would be limited by Applicant Committed Environmental Protection Measures, such as the use of wet drilling methods and implementation of road treatments (e.g. water, chemical, gravel, etc.) to control fugitive dust.

The Proposed Action would result in increased traffic along Antelope Creek and Boulder Valley roads, which serve as the primary public access routes for recreational uses in the project vicinity. Recreationists that use these roads to access recreation areas or recreate in areas adjacent to these roads could be adversely impacted by increased traffic, noise, and dust from project-related vehicle trips. Traffic counts conducted by HES on portions of these roads within the mine area determined that traffic from public vehicles accounts for a relatively small proportion of the overall traffic volume in the mine area, although some increases in traffic volume were observed during periods of open big game hunting seasons (SRK 2014a). In addition, HES has committed to reducing vehicle speeds and applying gravel, water, and chemical treatments to roads to minimize fugitive dust emissions. Based on the generally low volume of public vehicles on these roads and implementation of Applicant Committed Environmental Protection Measures presented in **Table 2-16** for fugitive dust control, minimal impacts to public access for recreation are anticipated, with the greatest potential for impacts coinciding with higher volume of public vehicles that utilize Antelope Creek and Boulder Valley roads during open big game hunting seasons in the fall.

As described in Section 3.17, Wildlife and Aquatic Biological Resources, the Proposed Action would constrain or effectively block an important mule deer migration route. Altered mule deer migration patterns and avoidance of the project area due to noise and human presence by mule deer and other big game species could decrease opportunities for hunting in the project vicinity and connected seasonal ranges.

As described in Section 3.10, Social and Economic Values, the Proposed Action would result in a very modest increase in the regional population. The potential for increased demand for recreation resources and opportunities associated with this minor project-related population change is not anticipated to have a notable effect on existing recreation resources and opportunities due to the capacity of most public lands, developed recreation sites, and community parks and recreation facilities in the region to accommodate additional use.

Based on the ample supply of alternative land for dispersed recreation activities in the study area and CESA, the limited potential for project-related population change to affect demand for recreation resources in the region, and because no unique recreation resources would be impacted, overall effects on recreation resources from the Proposed Action would be minor. However, if the Proposed Action results in decreased use or abandonment of the adjacent mule deer migration corridor, there would be adverse effects to big game hunting opportunities in the project vicinity and connected seasonal ranges.

Wilderness

As described in Section 3.8, Air Quality, project-related emissions are not anticipated to result in measurable effects to air quality in wilderness areas or WSAs, the nearest of which is located approximately 23 air miles from the proposed project. Therefore, the effects of the Proposed Action on wilderness resources in the study area would be negligible and in compliance with the Wilderness Act of 1964 and guidance in BLM Manual 6310.

Results of a BLM project-specific wilderness inventory conducted for two new units that partially overlap the project area determined that these areas do not qualify as lands with wilderness characteristics, and no direct or measurable indirect effects would occur to lands with wilderness characteristics.

3.11.2.2 Reconfiguration Alternative

Recreation

Direct and indirect impacts to recreation would be the same as described for the Proposed Action, except for the following:

- There would be approximately 151 less acres of disturbance under the Reconfiguration Alternative. More public lands would be available for dispersed recreational opportunities in comparison to the Proposed Action; however, due to the minor difference in the amount of new surface disturbance, no notable difference in the level of impacts is anticipated.
- The sequencing of construction and final footprint of the modified Dawn WRDF would be configured to ensure the conservation of a minimum 2,000-foot-wide corridor for use by migrating mule deer throughout the life of the project. Maintaining the viability of this migration corridor would reduce the potential for adverse impacts to mule deer hunting opportunities compared to the Proposed Action.

Wilderness

Direct and indirect impacts to wilderness would be the same as described for the Proposed Action.

3.11.2.3 Livestock Fencing Alternative

Direct and indirect impacts to recreation and wilderness would be the same as described for the Proposed Action and the Reconfiguration Alternative. However, the fence would provide a visual boundary defining the mining area. Recreation activities would not be allowed within the fenced area, except to pass through the mine site, until such time as the mine is closed, reclamation is complete, and the BLM and NDEP have determined the closure and reclamation to be successful. The fence would be removed once the mine is reclaimed and revegetation is determined successful by the BLM and NDEP.

3.11.2.4 No Action Alternative

Recreation

Effects of past and ongoing activities at Rossi Mine were addressed in prior environmental analyses listed in **Table 2-1**. Ongoing mining activities at Rossi Mine would continue to exclude lands from dispersed recreational use, including 896 acres of existing authorized surface-disturbance, until they are reclaimed following the cessation of active mining activities. However, the proposed project would not be developed and no additional displacement of dispersed recreational uses; increases in project-related vehicle traffic, noise, and dust; or increased demand for recreation resources would occur. Therefore, impacts from ongoing development at Rossi Mine would be similar to baseline conditions described in Section 3.11.1, Affected Environment, and would gradually diminish with concurrent reclamation, final closure, and final reclamation of the Rossi Mine.

Wilderness

Under the No Action Alternative, there would be no measurable effects to wilderness areas, WSAs, or lands with wilderness characteristics within the study area due to ongoing operation of the Rossi Mine under the terms of current permits and approvals, which are in compliance with the Wilderness Act of 1964 and guidance in BLM Manual 6310.

3.11.3 Cumulative Impacts

The CESA for recreation and wilderness is defined in Section 3.11.1, Affected Environment, and is shown in **Figure 3.11-1**. Past, present, and RFFAs are discussed in Section 3.2, Past, Present and Reasonably Foreseeable Future Actions. RFFAs for mining and exploration activities are identified in **Table 3.2-1**; their locations are shown in **Figure 3.2-1 and Figure 3.2-2**. **Figure 3.2-2** also illustrates some ROW actions.

3.11.3.1 Proposed Action

Recreation

Past and present actions within the CESA have resulted, or would result, in approximately 39,806 acres of surface disturbance from mining exploration and development projects, including sand and gravel operations, as presented in **Table 3.2-1**. RFFAs within the CESA are anticipated to result in an additional 5,567 acres of surface disturbance for a total cumulative disturbance acreage of 45,373 for mining and surface exploration projects. The total proposed and existing/authorized disturbance of 2,063 acres represents 4 percent of the total estimated disturbance from past, present, and RFFAs. This small incremental increase in surface disturbance from the Proposed Action relative to the total land area available for dispersed recreation would result in a minimal effect on existing or potential recreational activities in the CESA.

As described in Section 3.17, Wildlife and Aquatic Biological Resources, past, present, and RFFAs along the Carlin Trend have altered historic mule deer migration patterns. Incremental impacts from the Proposed Action could adversely impact one of the few remaining migration routes still used by mule deer in this area, which could increase the potential for cumulative and synergistic adverse impacts on the regional mule deer population and associated hunting opportunities. However, mule deer would continue to travel around or through the project area.

Wilderness

The Proposed Action would not result in direct or measurable indirect effects on wilderness areas, WSAs, or other lands with wilderness characteristics. Therefore, there would be no cumulative impacts to wilderness resources.

3.11.3.2 Reconfiguration Alternative

Recreation

Cumulative impacts to recreation would be the same as described for the Proposed Action, except there would be fewer incremental impacts from the Reconfiguration Alternative due to 151 less acres of disturbance and the maintenance of a 2,000-foot-wide corridor for use by migrating mule deer, which may reduce the potential for displacement of dispersed recreational uses and adverse impacts to mule deer hunting opportunities compared to the Proposed Action.

Wilderness

Cumulative impacts to wilderness would be the same as described for the Proposed Action.

3.11.3.3 Livestock Fencing Alternative

Cumulative impacts to recreation and wilderness would be the same as described for the Proposed Action and Reconfiguration Alternative.

3.11.3.4 No Action Alternative

Recreation

Under the No Action Alternative, mining and exploration activities would continue as approved under prior authorizations. Effects of the No Action Alternative on recreation resources and opportunities have been addressed in prior environmental analyses of past and present actions and the effects of RFFAs would be addressed through future analyses. A decision not to approve the proposed project would not alter those effects, so there would be no cumulative effects on recreation from the No Action Alternative.

Wilderness

Under the No Action Alternative, there would be no direct or measurable indirect effects on wilderness areas, WSAs, or other lands with wilderness characteristics. Therefore, there would be no cumulative impacts to wilderness resources that could be distinguished from those addressed in prior environmental analyses for past and present actions or to be addressed in future analyses of RFFAs.

3.11.4 Potential Monitoring and Mitigation Measures

No additional monitoring or mitigation measures are recommended for recreation or wilderness.

3.11.5 Residual Impacts

Residual impacts from the proposed project would include minor, localized reductions in the amount of lands available for dispersed recreation activities and a potential loss or displacement of hunting opportunities due to encroachment upon an important mule deer migration corridor. Of the action alternatives, the maintenance of a 2,000-foot-wide migration corridor under Reconfiguration Alternative may result in the least potential for these impacts to occur. Upon successful reclamation of the mine disturbance, approximately 520 acres of proposed and existing/authorized open pits that would not be reclaimed would remain unavailable for recreational use.

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3.12 Visual Resources

3.12.1 Affected Environment

The study area for visual resources encompasses the proposed PoO boundary. Five KOPs have been identified for the project. The CESA encompasses the viewshed of the proposed project and, due to the location of the project on exposed landforms and related potential for extensive visibility, the CESA is defined as the project viewshed out to 10 miles from the study area. The study area, KOPs, and CESA for visual resources are mapped on **Figure 3.12-1** and the KOPs and associated simulations are shown in **Figures B-1** through **B-10** in **Appendix B**. BLM visual contrast rating forms for KOPs 1 through 5 under the Proposed Action and Reconfiguration Alternative are also located in Appendix B.

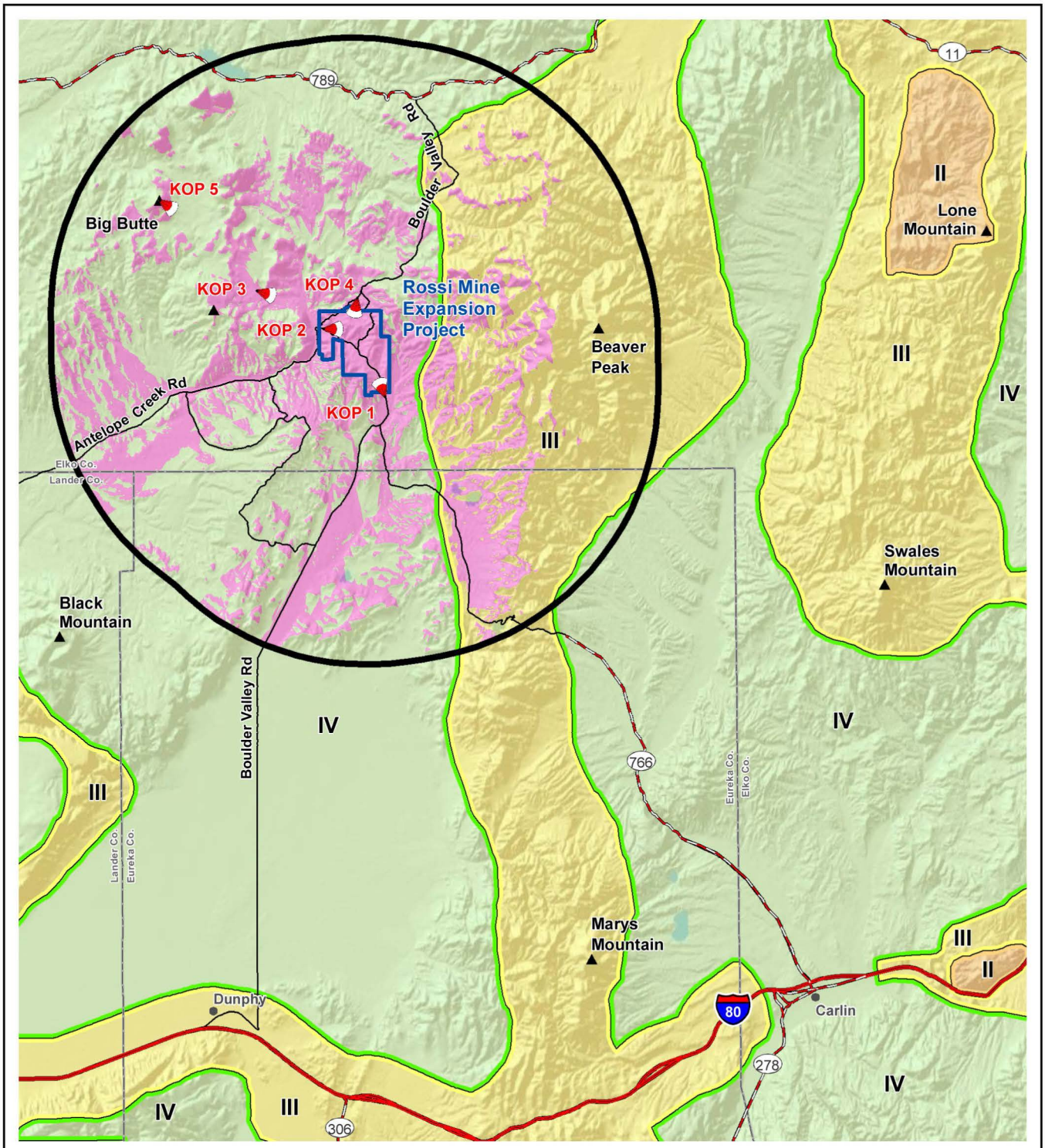
The BLM is required to protect the scenic value of the public lands under its management. BLM uses its Visual Resource Management (VRM) system to inventory, analyze, and manage those resources. **Table 3.12-1** identifies the BLM VRM classes and their associated objectives.

Table 3.12-1. BLM Visual Resource Management Class Objectives

VRM Class	Objective
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	The objective to this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV	The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Source: BLM 1986a.

The Rossi Mine is located in VRM Class IV lands (refer to **Figure 3.12-1**), which generally allow for major modification and high level of change but visual impacts should also be minimized. In addition, the proposed project is visible in the middle-ground (0.5 mile to up to 3 and 5 miles away) from VRM Class III lands associated with Beaver Peak, within the Tuscarora Mountain range, which is located to the east of the project site. Therefore, while mining operations are a part of the existing visual environment, measures should be taken to lessen visual impacts associated with the mine expansion, which are likely to affect nearby recreational viewers and roadway users. Although there are two state scenic routes located east of the city of Elko, there are no officially designated state or local scenic routes in the project area (DOT 2016).



Project Study Area
Visual Resources Cumulative Effects Study Area
Rossi Mine Visibility within 10 Miles
Key Observation Point
Key Summit

Visual Resource Management Classes
Class II
Class III
Class IV

Source: BLM 1987a, BLM 2012d, SRK 2014a.

Rossi Mine Expansion Project EIS

Figure 3.12-1

Visual Resources Cumulative Effects Study Area and Key Observation Points

0 1 2 3 4 5 Miles
0 1 2 3 4 5 Kilometers
1:350,000

2/20/2018

The landscape of the study area is typical of the Basin and Range Physiographic Province. Key visual features of the native, natural landscape include the gently sloping Beaver Peak to the east, the Sheep Creek Range to the south that converges into the Tuscarora Mountain range, and Santa Renia Mountains to the west. The smooth, rounded terrain of the moderate to steep mountain and hill slopes provide visual interest during different times of the day by creating simple to complex light and shade patterns. This provides visual contrast to the flatter to gently sloping terrain associated with the numerous small valleys that do not cast visually dynamic shadows. Light and shade also affects the perceived color of the terrain by saturating or dulling the color hues present in the landscape (see Existing Conditions in **Figures B-3** and **B-5** in **Appendix B**). In addition, irregular rock outcroppings are scattered throughout the study area and CESA that provide visual contrast and interest from the smoother slopes of the mountains and hillsides.

The study area and CESA is primarily rangeland and is vegetated mostly with grasses, mountain big sagebrush, and low sagebrush (refer to Section 3.14, Vegetation, Including Riparian Zones and Wetland Areas). While this vegetation looks rougher in the foreground, it appears smoother as it recedes into the distance (see Existing Conditions in **Figures B-1, B-2, and B-4** in **Appendix B**). The native landscape coloring is comprised of tans, greyish greens, yellow greens, and greyish browns associated with vegetation and beiges, golds, and dark greys associated with the underlying soils. Rock outcroppings tend to be deep greys and browns, sometimes with a rust colored cast.

The terrain and coloring associated with the mine contrasts to varying degrees with the surrounding native landscape. Interior views of the pits are highly disturbed, with terraced slopes and roadways traveling through the bottom and also angling up the sides of the pit. Interior views are mostly contained by the pit walls and surrounding terrain, which are at a higher elevation than the jig plant and maintenance shop area. Views from the outside, looking toward the WRDF sites, appear less disturbed because the surrounding terrain and WRDF sites obscures interior views of the pits. Waste rock material placed at the WRDF sites falls at the angle of repose and creates steep and straight, angular slopes with flat, horizontal ridgelines that can be seen from the exterior of the pit. The steep, angular slopes and horizontal ridgelines of the WRDF sites contrast against the surrounding native terrain that has gentler slopes and is more rounded and irregular. WRDF sites are unvegetated and the exposed slopes tend to be more reddish brown in color, sometimes intermixed with tans, pinks, golden, and greenish hues (see Existing Conditions in **Figures B-2 and B-4** in **Appendix B**). The regularity of WRDF sites are more apparent in foreground and middle-ground views (see Existing Conditions in **Figures B-2, B-3, and B-4** in **Appendix B**) than in background views (see Existing Conditions in **Figures B-2 and B-4** in **Appendix B**), where they blend in more with the surrounding terrain due to distance.

Numerous drainages flow in little valleys through this hilly terrain including Little Coyote Creek that drains north, Boulder Creek that drains east, and Antelope Creek that drains west of the project site. These valleys also often accommodate local roadways such as Boulder Valley Road and Antelope Creek Road that allow for public access to and through the study area. However, Boulder Valley Road by-passes the east side of the jig plant processing area, and public access to the interior of the pit is restricted. Development in the study area is limited to structures associated with the mine and include two maintenance buildings, the jig plant security office, multiple connex storage boxes, and multiple equipment trailers. These structures tend to be tan, grey, white or lightly colored. While developed areas are small in scale, the use of light colors in building materials make these areas more visually apparent in some locations by contrasting against the darker natural landscape. However, the public cannot see these structures because they are located at a lower elevation within the pit. Post and wire fencing, livestock pens, cattleguards, and lattice steel and wooden poled transmission lines are also located within and near the study area.

Most mining areas are fenced off for protection of the public and to prevent interference with mining activities. However, the Rossi Mine is not. Therefore, most of the study area is visible to the public from Boulder Valley Road and Antelope Creek Road. In addition, views of the study area, the mine, and exploration activities are available from mountain and hills within the study area and CESA that may be used for recreation on BLM-administered public lands. These lands are mostly open for dispersed recreational uses, such as hunting, hiking, trail running, mountain biking, sightseeing, photography, rockhounding, geocaching, and off-highway vehicle use (refer to Section 3.11, Recreation and Wilderness). Big Butte, Black Mountain, Lone Mountain, Mary’s Mountain, Beaver Peak, Craig Peak, and

Swales Mountain are of cultural and spiritual significance to Native American Indians in the area, making available views from these peaks sensitive vantage points (refer to Section 3.6, Native American Traditional Values). However, most views are limited to exterior views of the WRDFs and most public visual access to the interior of the mine is limited by terrain.

3.12.2 Environmental Consequences

Impacts to visual resources occur when a proposed project introduces or alters land forms, vegetation, or structures within the characteristic landscape in a manner that would be visually discordant. The level of impact may vary based on the Proposed Action and the proposed changes may or may not be consistent with VRM class objectives (**Table 3.12-1**). In order to analyze visual impacts associated with the proposed project, methods and protocols included in the BLM Visual Contrast Rating Handbook H-8431-1 (BLM 1986a) were used. Visual impacts were determined by evaluating photorealistic simulations prepared for five KOPs to determine visual contrast ratings for existing conditions, proposed post-mining conditions, and proposed reclaimed conditions. The rating process assesses the degree of visual contrast between the existing landscape character under current conditions and the proposed landscape character under post-mining and reclaimed conditions to aid in determining if the Proposed Action would meet VRM Class IV management objectives. The five KOPs used for conducting the impact analysis are mapped on **Figure 3.12-1** and include:

- KOP 1 (**Figure B-1** in **Appendix B**): Located on Boulder Valley Road, just south of the PoO boundary, looking north toward the proposed project. This view is representative of the view for travelers approaching from the south along Boulder Valley Road. Simulations show conditions for the Proposed Action.
- KOP 2 (**Figure B-2** in **Appendix B**): Located just south of Antelope Creek Road looking east toward the proposed project. This view is representative of the view for travelers approaching from the west along Antelope Creek Road.
- KOP 3 (**Figure B-3** in **Appendix B**): Located adjacent to the Mud Springs Road in the Santa Renia Mountains, 2.5 miles from the PoO boundary, looking southeast toward the proposed project. This view is representative of views from the Mud Springs Road and nearby areas that may be used for recreation.
- KOP 4 (**Figure B-4** in **Appendix B**): Located on the transmission line access road, 0.3 miles north of the PoO boundary, looking southwest toward the proposed project. This view is representative of views from nearby hillsides that may be used for recreation.
- KOP 5 (**Figure B-5** in **Appendix B**): Located on Big Butte, 9.3 air miles from the PoO boundary, looking southeast toward the proposed project. This view is representative of culturally sensitive views from nearby peaks. This view was chosen because it is the closest peak with culturally and spiritually sensitive views to Native Americans that would have views of the proposed project, as identified through viewshed modeling (refer to Section 3.6, Native American Traditional Values).
- KOP 1 (**Figure B-6** in **Appendix B**): Same location as shown in **Figure B-1** in **Appendix B**. Simulations show conditions for the Reconfiguration Alternative.
- KOP 2 (**Figure B-7** in **Appendix B**): Same location as shown in **Figure B-2** in **Appendix B**. Simulations show conditions for the Reconfiguration Alternative.
- KOP 3 (**Figure B-8** in **Appendix B**): Same location as shown in **Figure B-3** in **Appendix B**. Simulations show conditions for the Reconfiguration Alternative.
- KOP 4 (**Figure B-9** in **Appendix B**): Same location as shown in **Figure B-4** in **Appendix B**. Simulations show conditions for the Reconfiguration Alternative.
- KOP 5 (**Figure B-10** in **Appendix B**): Same location as shown in **Figure B-5** in **Appendix B**. Simulations show conditions for the Reconfiguration Alternative.

3.12.2.1 Proposed Action

The Proposed Action would result in visible changes to the existing landscape by expanding the existing King Pit, including the associated King North WRDF, and the Queen Lode and QLEE Pits into the QLC Pit; expanding, developing, or modifying existing roads, ancillary support facilities, and ponds for water storage and supply; developing the Dawn Pit and three new WRDFs (QLC North, QLC East, Dawn); installing buried power distribution lines and a short wave/FM radio communications tower; and continued mineral exploration in the project area. New surface disturbance under the Proposed Action would total 1,167 acres. The total surface disturbance would be 2,063 acres for the project when the Proposed Action is added to the existing and authorized disturbance. However, under the Proposed Action, operational lighting, site security, signage, and fencing would be the same as for the existing authorized facilities except that there would be minor additional lighting installed for the new buildings and structures.

Expanding, developing, or modifying existing roads, ancillary support facilities, and ponds for water storage and supply would have little effect on existing visual resources. These elements are an existing visual feature associated with current mining activities and, in an area that is already highly disturbed, slight changes associated with these features would not stand out or substantially increase the visual contrast compared to existing conditions. Similarly, installing 1.5 miles of new, 24.9 kV power distribution lines would also not increase the visual contrast, compared to existing conditions, as all new power distribution lines would be buried in conduit according to industry standards. Site security, signage, and fencing would be the same as for the existing authorized facilities so the visual contrast would not change significantly.

Operational lighting would be installed for the new buildings and structures (permanent and portable office buildings, two vehicle wash facilities, fuel farms, truck scale and scale house, portable storage units, and lined maintenance pad). The lighting that would be used on mobile light plants and equipment, and installed on fixed buildings and structures would be shielded and would face downward, and be directed on to the pertinent site only, and away from adjacent areas as described in the Light Management Plan (HES 2016j) to minimize impacts to the characteristic night sky. Thus, the additional lighting would result in very minimal changes in lighting that would not result in an appreciable increase in nighttime lighting levels nor additional sky glow impacts that would increase visual contrast. Areas of night-time activity, such as star gazing, camping, hiking, dispersed recreation, and driving would not receive higher noticeable changes to the characteristic night sky as a result of the proposed project.

A single short-wave communications tower would be installed upon an unnamed hilltop within the PoO boundary in the southwestern quarter of Section 14, Township 37 North, Range 49 East (**Figure 2-4**). The communication tower would consist of a self-supporting lattice structure approximately 30 feet in height and approximately 18 inches wide (HES 2016k). No guy wires or lights would be installed on the tower and the tower itself would be light gray in color. The communications tower site is located immediately to the north of the existing Coyote Creek communications reflector operated by the Sierra Pacific Power Company (NVN-090441). The addition of the proposed communication tower would result in an incremental increase in visual contrast to observers traveling along the Boulder Valley Road through the northern end of the Rossi Mine PoO boundary. Due to the light color of the proposed tower, the lattice design, and relatively short proposed height, the tower would likely not be visible to observers located more than a few miles from the site. No visual impacts to the existing night sky conditions are anticipated as no lighting is proposed to be installed on the communications tower or at the communications site.

Visible dust seen from blasting and hauling operations are an existing condition that would continue to be visible under the Proposed Action, even with the continued implementation of Applicant Committed Environmental Protection Measures (**Table 2-16**), and would not change the visual contrast. Therefore, the primary visual changes resulting from the Proposed Action would occur through expansion and creation of the open pits and WRDFs and exploration activities throughout the project area. Some of these changes would be partially visible to travelers on the Boulder Valley Road, Antelope Creek Road, Mud Springs Road, and the two-track road along the NV Energy 120 kV transmission line north of the King North WRDF, depending on position and vantage point, as they travel along the outskirts of the mine, and by viewers recreating on nearby hillsides that are at a higher elevation than the mine. Views from other vantages are generally blocked by intervening terrain.

The Proposed Action would increase the size of existing pits and would create the new Dawn Pit. This would result in a larger area of unmined, hilly terrain being excavated and converted to sunken pits compared to existing and near-future conditions due to fulfillment of the approved permit authorization. Like the existing pits, the expanded and new pits would have terraced slopes. This would maintain strong visual contrasts in the forms and lines associated with the pits compared to the native terrain that is irregular and rolling. The color of the exposed pit walls would continue to range in color from being lighter to slightly darker than the surrounding native terrain, for a moderate color contrast. Similarly, there would be a weak texture contrast between the exposed pit walls and native terrain, which are both medium to smooth in texture.

Backfilling the Dawn Pit may reduce the amount of visual disturbance, but the King and QLC Pits would remain and leave prominent landscape scars if not backfilled and reclaimed. Interior views of pits would be partially visible by travelers on the Boulder Valley and Antelope-Boulder Connector Roads as they drive through and along the immediate outskirts of the mine or by viewers recreating on nearby hillsides at a higher elevation than the mine. However, most views toward the interior of the mine would be blocked by the surrounding natural hilly terrain and WRDF landforms.

As a result of increasing the amount of excavation, waste rock placement would result in an expansion of existing WRDFs and the creation of the proposed QLC North, QLC East, and Dawn WRDFs to accommodate excess materials from blasting and mining. Changes associated pit and WRDF expansion and creation would increase the amount of visual contrast between the natural character of the landscape and lands affected by mining activities through the expansion and creation of artificial landforms associated with mining activities. While these changes would increase the visual dominance of pits and WRDFs, their appearance would be visually similar to existing pits and WRDFs in the study area. The expanded and new WRDFs, like the existing WRDFs, would result in weak to moderate visual contrasts due to the steep, angular slopes and horizontal ridgelines that contrast against the rolling terrain of unmined areas.

The color of the exposed WRDF walls would continue to range in color from being lighter to slightly darker than the surrounding native terrain, for a moderate color contrast. Similarly, there would be a weak texture contrast between the exposed pit walls and native terrain, which are both medium to smooth in texture. Color and texture contrasts would improve, post-mining, once the WRDFs are recontoured, reclaimed and revegetated. Slopes would be regraded to blend with surrounding topography, interrupt straight-lined features, and facilitate revegetation.

WRDFs would be recontoured to rounded crests and variable slope angles to resemble natural landforms, to the extent possible. As a result, the visual contrasts from the WRDFs would be reduced after reclamation. WRDF landforms, along with unmined terrain, would aid in blocking many views toward the interior of the mine because they border and hide views of the pits. WRDFs would be more visible than pits and often rise above the surrounding unmined terrain. Visible changes resulting from the Proposed Action would be most visible in the foreground, where distance makes the WRDF landforms more prominent and readily visible (KOPs 1, 2, and 4).

The apparent scale of WRDFs decreases in the middle-ground, because a wider viewshed allows for more of the surrounding terrain to become visible and the WRDFs appear to be comparable in scale to the surrounding terrain (KOP 3). In addition, colors become muted and textures become less discernable in the middle-ground. Background views of the study area make it harder to distinguish the WRDFs from the surrounding natural terrain, resulting in a weak to moderate visual contrast due to distance (KOP 5). Therefore, within the CESA, visual contrast becomes weaker the greater the distance the viewer is away from the study area. These visual contrasts are illustrated in the simulated KOPs.

The Dawn WRDF and a very small portion of the QLC East WRDF would be visible just outside of the PoO boundary, as shown in the simulation for KOP 1 (**Figure B-1** in **Appendix B**). The roadway, signage, and fencing would not be altered and the expanded and new pits and other facilities and features associated with the mine would not be visible because views would be limited by intervening terrain. Therefore, the most prominent feature would be the Dawn WRDF. From this vantage, the WRDF is mounding and introduces a new, large-scale landform where none currently exists, resulting in a moderate form and line contrast during post-mining and reclaimed conditions. There would be weak color and texture contrasts, post-mining, because the exposed material would be fairly consistent with the existing colors and textures in the landscape.

Recontoured and vegetated WRDF slopes would blend well with the surrounding landscape, under reclaimed conditions, resulting in a weak color and texture contrast. The moderate to weak visual contrasts represented in the post-mining and reclaimed condition simulations for KOP 1 would be consistent with short- and long-term VRM Class IV management objectives. However, while the mounded landform of the post-mining and reclaimed conditions blends well with the surrounding unmined terrain, during mining there would be a stronger contrast created by the more angular forms and lines that would be present during active mining under the Proposed Action (refer to the King North WRDF in KOP 4, Existing Conditions, as an example). Even during active mining, the more angular forms would be consistent with VRM Class IV management objectives that allow for a high level of change to the characteristic landscape.

The King North WRDF expansion and the new QLC East WRDF would be visible from KOP 2 (**Figure B-2** in **Appendix B**). The Antelope Creek Connector Road would be realigned, making the alignment of the roadway slightly visible for a weak form, line, color, and texture contrast. The existing utility lines would not be altered and the expanded and new pits and other facilities and features associated with the mine would not be visible because views would be limited by intervening terrain. From this vantage, as seen in the left side of the three visual simulations presented in **Figure B-2** in **Appendix B**, the existing King North WRDF rises above the surrounding terrain. In addition, new landforms associated with the QLC East WRDF would be introduced and visible, as seen in the right side of the three visual simulations presented in **Figure B-2** in **Appendix B**, rising above the unmined terrain.

The form and line of the post-mining and reclaimed WRDF are not as prominent and angular as the existing conditions due to recontouring of slopes post-mining to mimic natural topography to the extent practical. As a result, the visual contrasts from the WRDFs would be reduced after reclamation. There would be weak color and texture contrasts, post-mining, because the exposed material would be fairly consistent with the existing colors and textures in the landscape.

Vegetated WRDF slopes would blend well with the surrounding landscape, under reclaimed conditions, resulting in a weak color and texture contrast. The moderate to weak visual contrasts represented in the post-mining and reclaimed condition simulations for KOP 2 would be consistent with short- and long-term VRM Class IV management objectives. However, while the landform of the post-mining and reclaimed conditions blends well with the surrounding unmined terrain, during mining there would be a stronger contrast created by the more angular forms and lines that would be present during active mining under the Proposed Action (refer to Existing Conditions). Even during active mining, the more angular forms would be consistent with VRM Class IV management objectives that allow for a high level of change to the characteristic landscape.

The King North WRDF expansions and the new QLC East WRDF would be the most prominent features visible in the middle-ground from the Mud Springs Road area in the Santa Renia Mountains, as shown in the simulation for KOP 3 (**Figure B-3** in **Appendix B**). The expanded and new pits and other facilities and features associated with the mine would not be visible because views would be limited by intervening terrain. From this vantage, the WRDFs in the middle-ground are more regular and angular with longer, horizontal ridgelines than the surrounding irregular terrain. The smaller, stepdown landform in front of the larger landform that are both associated with the King North WRDF helps this WRDF to blend better with the surrounding terrain compared to the existing, single WRDF landform. In addition, small portions of King South and QLC East WRDFs would be visible that would blend well with the characteristic landscape.

The form and line of the post-mining and reclaimed WRDFs are not as prominent as the existing WRDF landform due to recontouring of slopes to mimic surrounding natural landform patterns to reduce visual contrasts. There would be moderate color contrast, post-mining, because the exposed material would be more saturated, uniform, and slightly darker than the existing colors in the landscape that are more variable due to slope microclimates and vegetation patterning.

Vegetated WRDF slopes would blend well with the surrounding landscape, under reclaimed conditions, resulting in a weak color contrast. There would be weak texture contrast, post-mining and after reclamation, because the texture of exposed materials and vegetation would be indiscernible at this distance. The moderate to weak visual contrasts represented in the post-mining and reclaimed condition simulations for KOP 3 would be consistent with short- and long-term VRM Class IV

management objectives. At this distance, there would be a similar visual contrast created by the more angular forms and lines that would be present during active mining under the Proposed Action (refer to Existing Conditions), which would be consistent with VRM Class IV management objectives that allow for a high level of change to the characteristic landscape.

The King North WRDF would be visible just outside of the northern PoO boundary, as shown in the simulation for KOP 4 (**Figure B-4** in **Appendix B**). The power line road and transmission lines would not be altered and the expanded and new pits and other facilities and features associated with the mine would not be visible because views would be limited by intervening terrain. Therefore, the most prominent feature would be the King North WRDF. From this vantage, the post-mining and after reclamation WRDF visual simulation shows reduced form and line visual contrasts due to recontouring of slopes to blend in with the surrounding topography compared to existing conditions. There would be weak color and texture contrasts, post-mining, because the exposed material would be fairly consistent with the existing colors and textures in the landscape.

Vegetated WRDF slopes would blend well with the surrounding landscape, under reclaimed conditions, resulting in a weak color and texture contrast. The moderate to weak visual contrasts represented in the post-mining and reclaimed condition simulations for KOP 4 would be consistent with short- and long-term VRM Class IV management objectives. However, while the landform of the post-mining and reclaimed conditions blends fairly well with the surrounding unmined terrain, during mining there would be a stronger contrast created by the more angular forms and lines that would be present during active mining under the Proposed Action (refer to the WRDF in KOP 4, Existing Conditions). Even during active mining, the more angular forms would be consistent with VRM Class IV management objectives that allow for a high level of change to the characteristic landscape.

The King North WRDF expansion and the new QLC East and QLC North WRDFs would be the most prominent features visible in the background from Big Butte, as shown in the simulation for KOP 5 (**Figure B-5** in **Appendix B**). The expanded and new pits and other facilities and features associated with the mine would not be visible because views would be limited by intervening terrain. While harder to see from this vantage, the WRDFs in the background are still more regular and angular with longer, horizontal ridgelines than the surrounding irregular terrain. While the form and line of the post-mining and reclamation WRDF are not as prominent as the existing, there would still be a moderate form and line contrast because the WRDF slopes would be more horizontal and vertical than the unmined, undulating terrain. There would be moderate color contrast, post-mining, because the exposed material would be more saturated, uniform, and slightly darker than the existing colors in the landscape that are more variable due to slope microclimates and vegetation patterning.

Vegetated WRDF slopes would blend well with the surrounding landscape, under reclaimed conditions, resulting in a weak color contrast. There would be weak texture contrast, post-mining and after reclamation, because the texture of exposed materials and vegetation would be indiscernible at this distance. The moderate to weak visual contrasts represented in the post-mining and reclaimed condition simulations for KOP 5 would be consistent with short- and long-term VRM Class IV management objectives. At this distance, there would be a similar visual contrast created by the more angular forms and lines that would be present during active mining under the Proposed Action (refer to Existing Conditions), which would be consistent with VRM Class IV management objectives that allow for a high level of change to the characteristic landscape.

Under the Proposed Action, exploration would continue throughout the project area as described in Section 2.3.10, Exploration. Direct impacts to visual resources from exploration would include short-term loss of approximately 67 acres. Locations of future exploration activity depend upon the results of drilling activity; therefore, specific locations that would be impacted cannot be identified. Indirect impacts resulting from exploration activities would include increased fugitive dust, vibration, and localized soil compaction during road and pad construction and active drilling operations. Exploration would also result in an increase of fragmentation of the existing vegetation communities within the project area. Increased fragmentation of existing vegetation communities would result in minor impacts to visual resources through the minor increase of visual contrasts experienced by an observer.

Overall, existing, post-mining, and reclaimed conditions would meet VRM Class IV management objectives. In addition, recontouring of slopes to provide rounded edges and undulating topography where practical to blend in to the surrounding natural landforms, and vegetating exposed slopes with natural vegetation during reclamation would aid in reducing visual contrasts.

The Proposed Action would also be visible from VRM Class III lands, which is located approximately 0.75 mile from the PoO Boundary at its closest point. This is farther away than KOP 4 that is 0.3 miles away and closer than KOP 3 that is 2.5 miles from the PoO boundary. Both of these views have moderate to weak visual contrasts in the post-mining and reclaimed conditions that would be consistent with short- and long-term VRM Class IV management objectives. VRM Class III management objectives allow for a moderate level of change and, therefore, the Proposed Action would also be consistent with these objectives.

3.12.2.2 Reconfiguration Alternative

The Reconfiguration Alternative is the same as described for the Proposed Action with the following exceptions: the Dawn and QLC North WRDFs would have modified and smaller footprints, and QLC East WRDF would have a modified, slightly larger footprint, and the eastern portion of the QLC Pit would be completely backfilled (**Figure 2-7**). Overall, this alternative would generally result in reducing the amount of visual disturbance and contrasts in those areas. Under this alternative, the King North WRDF and King Pit would have the same visual contrast compared to the Proposed Action, as shown in the simulations for the Reconfiguration Alternative. While the QLC East WRDF would be slightly larger under this alternative, it would be visually similar and result in a very similar visual contrast compared to the Proposed Action.

As shown in **Figure B-6** in **Appendix B**, the Dawn WRDF would still be visible from KOP 1 but would appear slightly smaller (due to further distance from the KOP) and slightly more geometric, with more angular slopes and rounded corners, compared to the Proposed Action that has a more rounded form. In addition, a very small portion of the QLC East WRDF would also be visible under this alternative, similar to the Proposed Action. The reclaimed conditions are comparable to the Proposed Action. As shown in **Figure B-7** in **Appendix B**, in the left of the simulations, views of the King North WRDF would look the same under this alternative as under the Proposed Action. The existing King South WRDF and the new QLC North WRDF would combine together under the Reconfiguration Alternative, and would still be visible from KOP 2. In addition, the QLC East WRDF would also be visible and appear almost the same as under the Proposed Action. The main difference is that the King South and QLC North WRDFs would appear as a very slight jog in the peak line that would not alter the visual contrast compared to the Proposed Action. As shown in **Figures B-8 through B-10** in **Appendix B**, KOPs 3 through 5 would have no noticeable changes from these vantages when compared to the Proposed Action. From a distance, changes associated with the Reconfiguration Alternative would not be evident in KOPs 3 and 5 and this alternative would look the same as under the Proposed Action. From KOP 4, differences associated with the Reconfiguration Alternative would not be visible behind the King North WRDF from this location. Overall, KOPs 1 through 5 would have the same visual contrast under the Reconfiguration Alternative as under the Proposed Action.

Overall, this alternative would result in slightly smaller areas of disturbance west of the QLC East WRDF and south of the Dawn WRDF but, like the Proposed Action, would also result in weak to moderate visual contrasts in form, line, color, and texture. As with the Proposed Action, post-mining and reclaimed conditions of the WRDF terrain would blend better with the characteristic landscape than existing and proposed active mining conditions and the Reconfiguration Alternative would comply with VRM Class IV management objectives and the nearby VRM Class III management objectives. WRDFs would be graded to mimic the nearby existing landform pattern to the extent possible, and exposed slopes would be reclaimed with natural vegetation to reducing visual contrasts.

3.12.2.3 Livestock Fencing Alternative

Under the Livestock Fencing Alternative, all aspects of the Proposed Action and Reconfiguration Alternative would remain the same except that three or four strand, wildlife friendly livestock exclusion fence would be installed around the perimeter of the mine facilities as shown in **Figure 2-15**. Therefore,

the visual conditions shown in the visual simulations would not be greatly altered because the proposed WRDF sites and access roads would not change under the Livestock Fencing Alternative. As shown on **Figure 2-12**, there is already existing fencing along the mine boundary on either side of the cattleguard at Boulder Valley Road that would be utilized under this alternative so that there would be no change in the visual contrast of the proposed project as seen from KOP 1 (**Figure B-1** in **Appendix B**) compared to the Proposed Action. In addition, there would be no change in the visual contrast of the proposed project seen from KOPs 3 and 5 (**Figures B-3 and B-5** in **Appendix B**) because the fence would not be visible at these distances. There would be very little change in the visual contrast of the proposed project seen from KOPs 2 and 4 (**Figures B-2 and B-4** in **Appendix B**) with the inclusion of the fence. Livestock exclusion fencing is an existing visual element in the study area and new fencing would not be prominent enough in form, line, color, or texture as to introduce a visually discordant feature in the landscape (refer to KOP 1). As such, the fencing would not detract from views or substantially affect the visual character. Fencing would also be consistent with VRM Class IV management objectives. As a result, visual impacts would be the same than those identified for the Proposed Action and the Reconfiguration Alternative. The fence would be removed once the mine is reclaimed and revegetation is determined successful by the BLM and NDEP.

3.12.2.4 No Action Alternative

Under the No Action Alternative, mining activities would continue under the existing permit authorization but the proposed project would not be developed. Upon closure of the mine, reclamation activities associated with existing mine disturbance and surface exploration areas would occur under the existing permit authorization. However, additional impacts to visuals resources associated with the Proposed Action, Reconfiguration Alternative, and the Livestock Fencing Alternative would not occur. Because mining is an existing approved action in the study area, the visual effects of the No Action Alternative are considered to be minimal and consistent with VRM Class IV management objectives.

3.12.3 Cumulative Impacts

The CESA for visual resources is defined in Section 3.12.1, Affected Environment, and mapped on **Figure 3.12-1**. The past, present, and RFFAs are identified and discussed in Section 3.2, Past, Present, and Reasonably Foreseeable Future Actions. RFFAs from mining and exploration activities are included in **Table 3.2-1**; their locations are shown in **Figures 3.2-1 and 3.2-2**. **Figure 3.2-2** also illustrates some ROW actions.

3.12.3.1 Proposed Action

Visual effects of past and present actions are included in the description of the Affected Environment, Section 3.12.1. RFFAs that would result in visual effects within the CESA are projects that result in built structures such as the TS Power Plant and Bell Creek Substation, pipeline and utility corridor projects, and exploration and development projects associated with mining. Temporary and permanent built structures are common in the CESA due to past and present mining activities. Ancillary facilities associated with the Proposed Action are minimal and would not compound visual effects. Similarly, as described in Section 3.12.2.1, the new distribution lines associated with the Proposed Action within the PoO boundary would be minimal and would not compound visual effects when factored with other pipeline and utility projects that are occurring and are likely to occur within the CESA. Mining projects would be the most likely to compound visual effects and increase visual contrast within the CESA by increasing surface disturbances and creating new landforms. In addition, the visual presence of dirt roads would likely increase within the CESA to provide access to past, present, and RFFA projects. However, the CESA is comprised of VRM Class III and VRM Class IV lands that provide for moderate and high levels of change in the landscape. Therefore, it is anticipated that the visual disturbances within the CESA would meet VRM Class III and Class IV management objectives, assuming that past, present, and RFFA projects would be required to implement reclamation plans or additional measures to minimize visual effects as a part of their current or future permit authorizations.

Existing, post-mining, and reclaimed conditions associate with the Proposed Action would meet VRM Class III and Class IV management objectives even though the post-mining and reclaimed conditions of

the WRDF terrain blend better with the characteristic landscape than the existing active mining conditions blend. In addition, recontouring of slopes to blend with the natural topography, and vegetating exposed slopes with natural vegetation during reclamation would aid in reducing visual contrasts and cumulative effects. The VRM Class III management objective establishes that “changes should repeat the basic elements found in the predominant natural features of the characteristic landscape” and the VRM Class IV management objective establishes that “every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.”

3.12.3.2 Reconfiguration Alternative

While there would be a slight decrease in visual contrasts in the CESA under the Reconfiguration Alternative, cumulative effects would be similar to those associated with the Proposed Action. Therefore, this alternative would meet the standards associated with VRM Class III and Class IV management objectives. The same mitigation measure would aid in further reducing cumulative visual effects associated with this alternative.

3.12.3.3 Livestock Fencing Alternative

Cumulative effects under the Livestock Fencing Alternative would be the same as described for the Proposed Action and Reconfiguration Alternative because livestock exclusion fencing is an existing visual element in the CESA and new fencing would not be prominent enough in form, line, color, or texture as to introduce a visually discordant feature in the landscape. As such, the fencing would not detract from views or substantially affect the visual character or result in increased visual contrasts in the CESA.

3.12.3.4 No Action Alternative

Under the No Action Alternative, the proposed project would not be developed and additional impacts to visual resources would not occur.

3.12.4 Potential Monitoring and Mitigation Measures

Implementation of concurrent reclamation, as described in Section 2.3.12, during operations benefits the closure and reclamation process, begins to establish vegetation on reclaimed areas that are no longer active, and lessens the visual impacts of the mine site. Regrading and reshaping earthwork activities of reclamation change the lines and forms of the facilities to blend with the natural topography by rounding and softening the sharp or angular edges. Seeding the regraded and reshaped facilities begins to re-establish vegetation which also blends the colors and textures into the natural terrain. No monitoring or additional mitigation would be necessary.

3.12.5 Residual Impacts

The proposed project would not cause residual impacts since the proposed project would comply with the Class IV objective during active mining and after reclamation.

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3.13 Soils and Reclamation

3.13.1 Affected Environment

The study area for soils and reclamation encompasses the proposed project area or area within the proposed PoO boundary. The CESA for soils and reclamation is defined as the Rock Creek Valley and Boulder Flat hydrographic basins **(Figure 3.13-1**). The CESA was selected based on the location of the proposed project within these hydrographic basins.

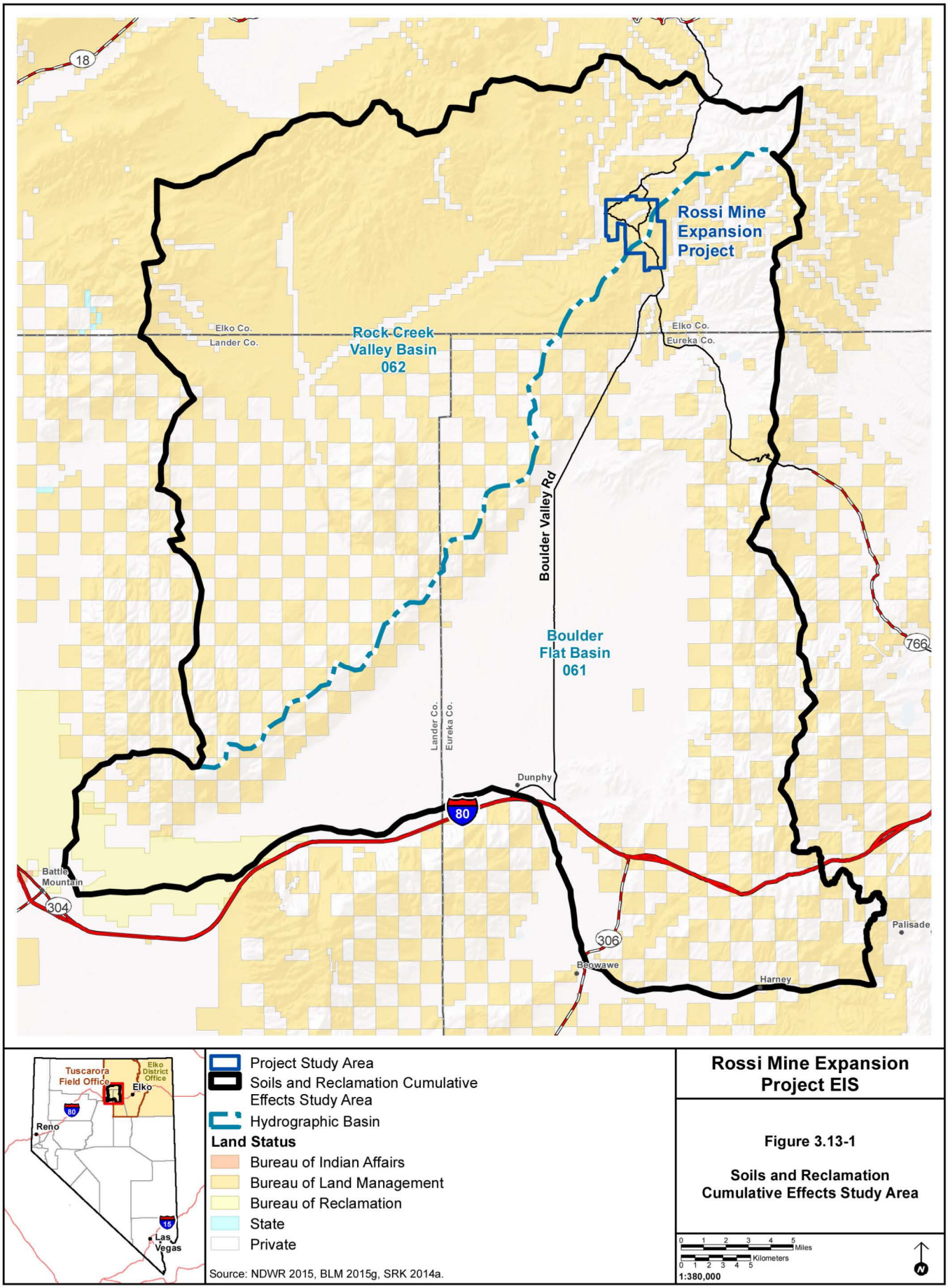
Structurally, the proposed project lies within the Great Basin Section of the Basin and Range Province of the Intermountain Plateaus. It also lies within the Owyhee High Plateau Major Land Resource Region (NRCS 2006). Soils within the study area are primarily derived from volcanic rock and to a lesser extent from sedimentary rock. They developed on lower mountain slopes and hills.

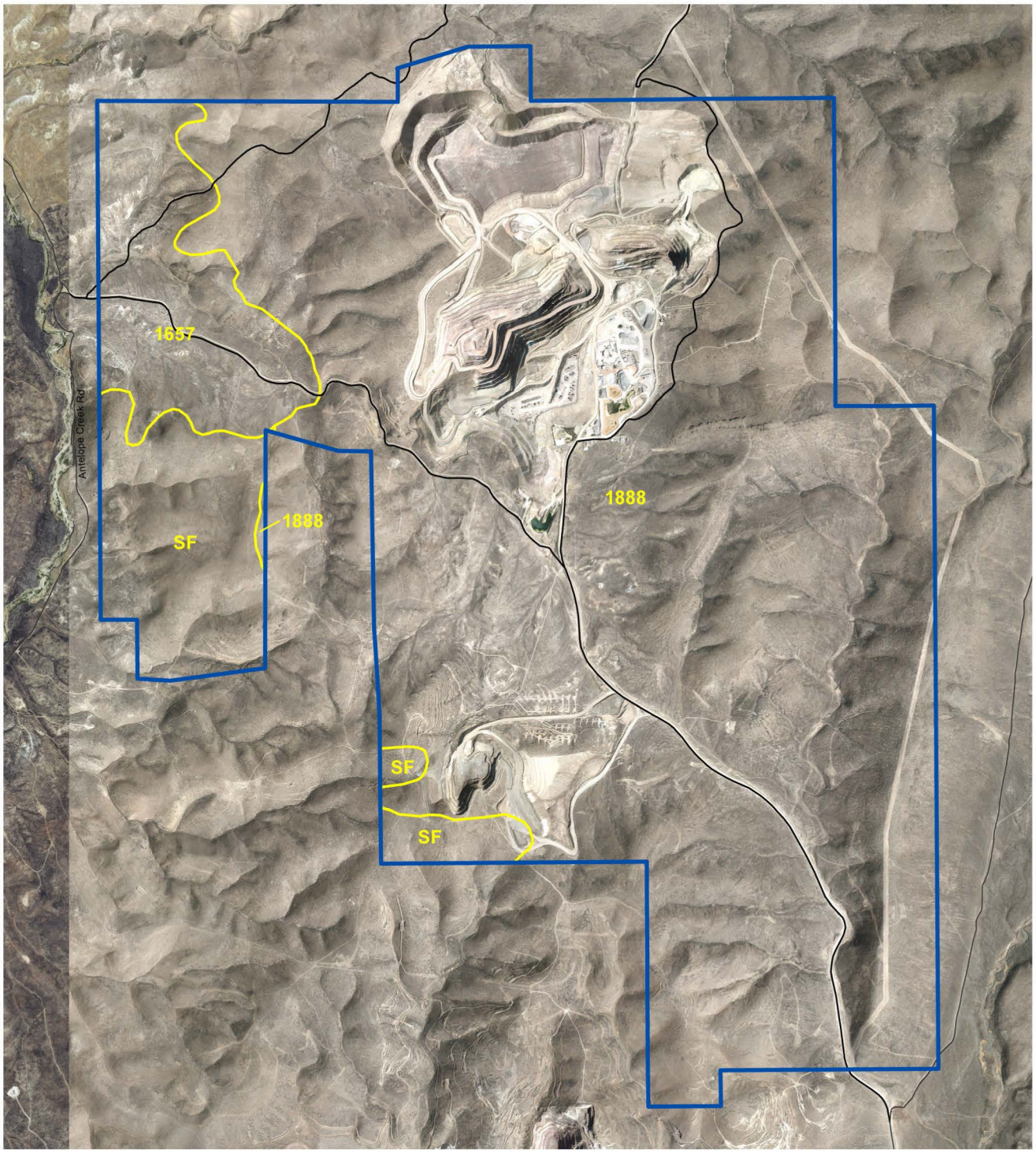
The soil information for the study area is based on Soil Survey Geographic database review and analyses (NRCS 2015a), the Soil Survey of Northwest Elko County Area, Nevada, (NRCS 1986), the Soil Survey Tuscarora Mountain Area, Nevada (NRCS 1968), the Rossi Mine Expansion Project Soils, Vegetation, and Wildlife Baseline Report (SRK 2013b), and the Rossi Mine Expansion Plan of Operations (NVN-070547) and Reclamation Permit Application (No. 0257) (SRK 2014a). The distribution of soils within the proposed study area is illustrated in **Figure 3.13-2**.

Soils in the study area are characteristically moderately deep (i.e., 25 to 36 inches) to deep (i.e., 36 to 60 inches). Soils along ridge tops and slopes tend to be shallow and are intermixed with gravel, cobble, and stone rock fragments. Most of the soils in the study area have clay subsoils that are moderately prone to shrink-swell. Water erosion hazard ranges from slight to moderate. The soils in the study area range from slightly acidic to slightly alkaline.

3.13.1.1 Project Area

The physical and chemical characteristics and reclamation suitability of soil map units that have been mapped within the project area are summarized in **Table 3.13-1**. A portion of the project area has been previously disturbed by historic mining activities. Where previous mining disturbance has occurred, soils that have been reclaimed are considered anthropogenically altered (i.e., altered by man) and may not match the current soil survey descriptions.





Project Study Area

Soil Map Units

1657 - Ninemile-Alyan association

1888 - Chen-Pie Creek-Alyan association

SF - Slaven-Ramires association

Source: SRK 2014a, NRCS 2015a.

Rossi Mine Expansion Project EIS

Figure 3.13-2

Soil Types Within the Project Study Area

0 0.1 0.2 0.3 0.4 0.5 Miles

0 0.25 0.5 0.75 1 Kilometers

1:30,000

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The study area is dominated by three soil associations. The Slaven-Ramires association (Map Unit SF) covers approximately 8 percent of the study area. The Slaven soils are moderately deep soils that occur on hills and mountain side slopes. The soil profile is very to extremely gravelly to lithic bedrock. The Slaven-Ramires soils are poorly suited for rangeland seeding because of the gravelly surface layer and steepness of slope. Water percolates slowly into this soil, affecting irrigation.

The Chen-Pie Creek-Alyan association (Map Unit 1888) covers approximately 84 percent of the study area. The Chen-Pie Creek-Alyan soils are moderately shallow soils that occur on hills and in drainages. The top 5 to 9 inches of this association range from gravelly loam to very cobbly loam. This upper sequence is underlain by 7 to 9 inches of clay, very gravelly clay, or very cobbly clay. The depth to lithic (hard) bedrock is between 12 and 40 inches below ground surface. The Chen-Pie Creek-Alyan soils are poorly suited for rangeland seeding because of droughty soils (subject to excessive drainage). The primary constraint on Chen-Pie Creek-Alyan soils for rangeland seeding is rooting depth, which is not relevant for soils that are stockpiled as growth media. Drainages, rock outcrops, and some of the hills have shallow soils; water percolates slowly into these soils, affecting irrigation.

The Ninemile-Alyan association (map unit 1657) covers approximately 8 percent of the study area. The Ninemile-Alyan soils are moderately shallow soils occur on hills and in drainages. The top 9 inches of this association are gravelly loam. This upper sequence is underlain by 5 inches of clay and a subsequent five inch layer of gravelly clay. Depth to lithic (hard) bedrock is between 10 and 40 inches below ground surface. The primary constraint on Ninemile-Alyan soils for rangeland seeding is rooting depth, which is not relevant for soils that are stockpiled as growth media. Water percolates slowly into this soil, affecting irrigation. Refer to **Table 3.13-1** for a description of these soils.

Table 3.13-1. Soil Map Units within the Study Area

Map Unit Symbol	Map Unit Name	Acres	Water Erosion Hazard	Wind Erosion Hazard	Low Reclamation Potential[1]	Hydric	Compaction Prone[2]	Shallow Bedrock[3]	Stony-Rocky[4]	Droughty[5]
1657	Ninemile-Alyan Association	286	Slight	Low	no	no	no	no	no	no
1888	Chen-Pie Creek-Alyan Association	3,157	Moderate	Low	no	no	no	no	no	yes
SF	Slaven-Ramires Association	299	Moderate	Low	no	no	no	no	yes	no

Sources: NRCS 1968; NRCS 1986; NRCS 2015a.

Water erosion hazard class determined from Soil Erodibility Factor (Kw) for surface horizons and slope.

[1] Low Reclamation Potential = Soils with high strong acidity, strong alkalinity, salinity, or sodic properties.
[2] Compaction Prone = Surface is sandy clay loam or finer.
[3] Shallow Bedrock = Soils with lithic (hard) bedrock at 60 inches or less.
[4] Stony-Rocky = Soil profile has large stones or rocks that may pose reclamation or excavation challenges.
[5] Droughty = Soils with a surface texture of sandy loam or coarser that are moderately well to excessively drained.

3.13.2 Environmental Consequences

3.13.2.1 Proposed Action

Primary issues related to soils and reclamation are the following:

- soil erosion resulting from wind and water
- soil sedimentation as a result of water erosion
- soil compaction, rutting, and pulverization
- changes in soil texture and structure
- soil contamination
- availability of suitable soils and growth media for revegetation
- potential for restoring land uses after mine closure
- mine site stabilization
- protection of public and environmental safety after mine reclamation and closure

A total of 2,063 acres would be disturbed under the Proposed Action: 1,167 acres of new disturbance and 896 acres under existing authorizations. Under the Proposed Action, exploration would continue throughout the project area as described in Section 2.3.10, Exploration. Direct impacts to soil resources from exploration would include short-term loss of approximately 67 acres. Locations of future exploration activity depend upon the results of drilling activity, therefore specific locations and soil types that would be impacted cannot be identified. Indirect impacts resulting from exploration activities would include increased fugitive dust, vibration, and localized soil compaction during road and pad construction and active drilling operations. Exploration would also result in an increase of fragmentation of the existing soil units within the project area.

Reclamation Requirements

Under BLM 3089 regulations (43 CFR Subpart 3809.420), reclamation practices for mining projects on public lands are required to include several factors including:

- At the earliest feasible time, the operator shall reclaim the area disturbed, except to the extent necessary to preserve evidence of mineralization, by taking reasonable measures to prevent or control onsite and offsite damage of the Federal lands;
- Saving of topsoil for final application after reshaping of disturbed areas have been completed;
- Measures to control erosion, landslides, and water runoff;
- Measures to isolate, remove, or control toxic materials;
- Reshaping the area disturbed, application of the topsoil, and revegetation of disturbed areas, where reasonably practicable; and
- Rehabilitation of fisheries and wildlife habitat.

As discussed in Section 2.3.11, Growth Media Stockpiles, as mining progresses, soil would be salvaged, consistent with current operations, placed in stockpiles within the authorized disturbance area, and retained for subsequent use in reclamation. Jig tail fines also would be used as growth media to supplement salvaged topsoil for reclamation as described in Section 2.3.12.4, Cover Material. To minimize wind and water erosion, the stockpiles would be contoured up to slopes of 2.5H:1V (2.5 units horizontal per 1 unit vertical) and to meet an overall 3:1 slope. Growth media stockpiles would be seeded with an interim seed mix to compete with cheatgrass and keep the soil viable for plant growth.

Reclamation would occur after mining operations are complete in areas where surface disturbance has occurred within the project area including haul roads, drill pads, ancillary facilities, WRDFs, and the jig plant processing area. HES would retain the currently authorized option to partially backfill the King,

Queen Lode, and QLEE pits. Open pits may or may not be reclaimed, with the exception of the proposed Dawn Pit, which would be completely backfilled and recontoured once the mining activity has been completed.

Soil Impacts

Erosion could lead to an overall loss of soil at the reclamation site. Erosion is a concern on stockpiles as well as on any area where soil becomes exposed to erosive forces such as water and wind, e.g., on dirt roads and exposed cuts. Soils subject to water erosion and associated soil sedimentation include those with a silty or fine sandy texture; high inorganic content; poor soil structure; low soil permeability; exposed surfaces including low vegetative cover; and steep topography. Soils subject to wind erosion include those with a silty or fine sandy texture; with irregular and dry surfaces; and with exposed surfaces (lack of shelter from the wind source), including those with low vegetative cover. The erosion potential for soils in the study area is shown in **Table 3.13-1.**

At the Rossi Mine, erosion could occur during mining activities when soils and subsoils are exposed. Steep cuts would expose subsoils to both wind and water erosion. As part of mining activities, soil would be removed and placed in stockpiles, where soil would be vulnerable to both wind and water erosion until vegetative cover is established with the interim seed mix. The creation of roads and tracks clears vegetation, making dirt surfaces, such as road shoulders or dirt tracks, vulnerable to both water and wind erosion. Erosion could also occur in the early stages of reclamation, after the growing media are distributed but before vegetative cover is established. Applicant Committed Environmental Protection Measures for soil resources presented in **Table 2-16** of this EIS and the Rossi Mine Reclamation Plan include BMPs to control water erosion, runoff, and sediment transport including the installation and maintenance of water bars, diversion ditches, sumps, interim seeding of growth media stockpiles and select berms, certified weed-free straw bales, silt fences, and rock and gravel cover. Stormwater diversions and basins would be designed to the 100-year, 24-hour storm.

Soil compaction results when soil particles are compressed by an applied load; as a result of the applied load, the pore spaces between the particles decreases and the bulk density increases. Compaction reduces water infiltration and aeration, and results in excessive water runoff and erosion, as well as less availability of water and air to plant roots. The result of reduced infiltration and aeration is lower growth rates. Soil rutting is a specific kind of soil compaction. It results from the passage of a vehicle or equipment over vulnerable soil. In addition to soil compaction impacts, rutting also affects surface hydrology of the site and the rooting environment. Rutting physically severs roots as well as affecting infiltration and aeration.

At the Rossi Mine, placement and movement of heavy equipment could cause soil compaction and rutting, making these areas more susceptible to erosion and decreasing their suitability for revegetation. During reclamation, roads would be ripped, reshaped, regraded, and re-contoured. After re-contouring, growth media would be placed and the area would be seeded. Drainage features may be retained as needed. After reclamation, roads would blend with the surrounding topography.

Growth media excavation, transport, storage, and redistribution alter the existing soil structure and biome, causing adverse impacts to aeration and permeability. Texture is disrupted during excavation. Some mixing of textural zones occurs; zones with different chemical properties are mixed, creating adverse chemical impacts on soil quality for seedbeds. The biological crust may be buried during stockpiling, causing existing microbial populations to decrease during growth media stockpiling and storage. Due to these effects, the soil quality of growth media is less than that of the native soil resources.

At the Rossi Mine, the stockpiled growth media would be used for ongoing reclamation as mining activities come to completion, rather than all reclamation activities being performed at once. This allows an opportunity for testing revegetation success and adapting approaches as needed. Further, after growth media is placed and vegetation is re-established, the soil quality would improve over time. The post-reclamation monitoring and maintenance program (described in Section 3.13.4, Potential Monitoring and Mitigation) would ensure that vegetation is established before reclamation is considered complete.

Surface mining alters topography, creating deep pits where material is removed, hills where waste material is placed, and ponds where jig tailing fines are deposited and produced from ore processing activities. Deep open pits can capture precipitation, forming temporary shallow ponds; pose a hazard to wildlife and people; and interfere with migration patterns. Stockpile mounds can become a source of erosion and, depending on placement, can interfere with wildlife migration patterns. Jig ponds are typically constructed in areas that do not naturally collect surface water runoff.

As discussed under the Reclamation Requirements section, HES would retain the currently authorized option to partially backfill the King, Queen Lode, and QLEE pits. Open pits would not be reclaimed, with the exception of the proposed Dawn Pit. Upon completion of mining activities, the Dawn Pit would be backfilled and contoured to be congruent with surrounding topography. Six inches of growth media would be placed in areas needing growth media, and the area would be seeded. Jig ponds would be drained and re-contoured so as not to retain rainwater and snowmelt. The Dawn Pit, WRDFs, and jig ponds would be designed to be consistent with the surrounding topography after reclamation.

Soil contamination could result from material spills during mining activities. If large spills occur, contamination could result in the removal and disposal of large amounts of soil. The risk of unanticipated chemical releases is discussed in Section 3.7, Hazardous Materials and Solid Waste. HES has a plan to supplement native soils with jig fines and other sources, discussed below under Reclamation and Safety Impacts, which would make up for any potential loss of soil needed as growth media.

At the Rossi Mine, all contaminated soils are removed from the spill site, placed in dedicated dumpsters, and transported off-site. Multiple solid waste dumpsters are located within the processing area during operations, and wastes are disposed of in accordance with the RCRA regulations for hazardous waste management.

Surface disturbance of existing soils under the Proposed Action would increase the potential for the establishment of noxious weeds and non-native invasive plant species as presented in Section 3.15, Noxious Weeds and Non-native Invasive Plant Species.

Reclamation and Safety Impacts

Reclamation involves restoring the post-closure mining area to pre-mining land uses. Pre-mining land uses at the project site are mineral exploration, livestock grazing, wildlife habitat, utility corridors, and dispersed recreation.

A primary factor in restoring the site to previous uses is revegetation success, which in turn largely depends on the quality of the growth media. As discussed above and in Section 2.3.11, Growth Media Stockpiles, topsoil would be salvaged during mining operations, stockpiled within the authorized disturbance area, and retained for use in reclamation. In operating years prior to 1981, growth media were salvaged on a limited basis; therefore, a deficit in growth media may exist with respect to the acreage to be covered during reclamation activities. The total amount of growth media available for reclamation is estimated to be approximately 24,000,000 cf of which an estimated 29,000,000 cf of growth media would be required for mine reclamation assuming a six inch cover depth (HES 2016d), as described in Section 2.3.12.4, Cover Material. HES would import growth media from offsite as needed to meet reclamation requirements. In conjunction with salvaged soils, HES proposes to use jig fines, weakly lithified conglomerate and mudstone of the Carlin Formation, and Carlin Tuff to supplement salvaged growth media. HES would first test these supplemental growth media materials with the proposed seed mixture to judge their success for use in reclamation to stabilize soils as discussed in Section 2.3.12.4, Cover Material. Revegetation success would be evaluated through an annual monitoring program until revegetation standards stipulated in the Nevada Guidelines for Successful Revegetation (NDEP 2015a) have been met.

Other factors requiring consideration are topography and potential presence of mining support facilities and contaminants at the site. Two open pits, if not backfilled or partially backfilled, and several WRDFs would remain. Open pits pose hazards to both humans and wildlife. Pit slopes in the open King Pit and

the Queen Lode Complex are expected to be approximately 40° to 45° (2.5H:1V to 2.2H:1V). The typical bench height is expected to be 60 feet. WRDFs are expected to be graded up to 2.5H:1V to 3:1 overall slope during reclamation.

As discussed in Section 2.3.12.6, Reclamation of Proposed Project Facilities, all mining support structures (buildings, power lines, water pipelines, processing facilities, mine roads, fences, gates, communication tower, etc.) would be removed from public lands and disturbance reclaimed. Buildings at the Rossi Mine include both temporary structures and buildings on concrete foundations. Mine closure would involve removal of temporary structures, permanent structures, and debris. However, concrete foundations would be buried in place under a minimum of five feet of material and six inches of growth media. Above-ground utilities (e.g., electrical infrastructure, pipes) would be removed, and underground utilities would be removed or capped as appropriate and abandoned. All contaminated soil would be removed from the site. Drill holes would be plugged and abandoned, and monitoring and production wells would be plugged and abandoned according to state regulations. Most roads would be ripped, as discussed above, although a few would remain as public roads to provide public access to areas north and west of the site. Open pits remaining at the end of mining would have a berm placed approximately 15 feet from the edge of the pit with either a signed warning of a hazard or fenced or both. Accordingly, the mine would be closed in such a way as to eliminate access to the open pits.

3.13.2.2 Reconfiguration Alternative

Under the Reconfiguration Alternative, facility designs, operations schedules, anticipated workforce and employment, and Applicant Committed Environmental Protection Measures would remain the same as the Proposed Action. Therefore impacts to soil resources would be the same with the following exception. Under the Reconfiguration Alternative, the footprint of the QLC WRDFs and the Dawn WRDF would be reduced in comparison to the Proposed Action, and the eastern portion of the QLC would be backfilled and reclaimed. Under the Reconfiguration Alternative, 151 fewer acres would be disturbed than under the Proposed Action. Qualitatively, soil, reclamation, and safety impacts would generally be the same as those under the Proposed Action.

3.13.2.3 Livestock Fencing Alternative

Under the Livestock Fencing Alternative, operations, facility designs, operations schedules, anticipated workforce and employment, and Applicant Committed Environmental Protection Measures would remain the same as the Proposed Action with the following exception. Under the Livestock Fencing Alternative an additional 7 acres of surface disturbance would result from fencing installation. These acres would be in addition to disturbance acreages reported for the Proposed Action and Reconfiguration Alternative. The fence would be removed once the mine is reclaimed and revegetation is determined successful by the BLM and NDEP.

3.13.2.4 No Action Alternative

Under the No Action Alternative, the proposed project would not be developed, and impacts associated with soil resources and reclamation would not occur. The King Pit expansion and QLC Pit expansion would not take place, the Dawn Pit would not be constructed, the Dawn WRDF would not be created, and associated facilities would not be constructed. Continuation of mining activities associated with the Rossi Mine, completion of closure and reclamation activities associated with the existing disturbance, and ongoing exploration activities would be conducted under existing authorizations.

Under the No Action Alternative, although there would be no new authorized disturbance, development of the previously authorized facilities would continue. Under the No Action Alternative, the types of impacts to soil resources, reclamation procedures, and safety impacts would generally be the same, yet reduced in scope in comparison to the Proposed Action.

3.13.3 Cumulative Impacts

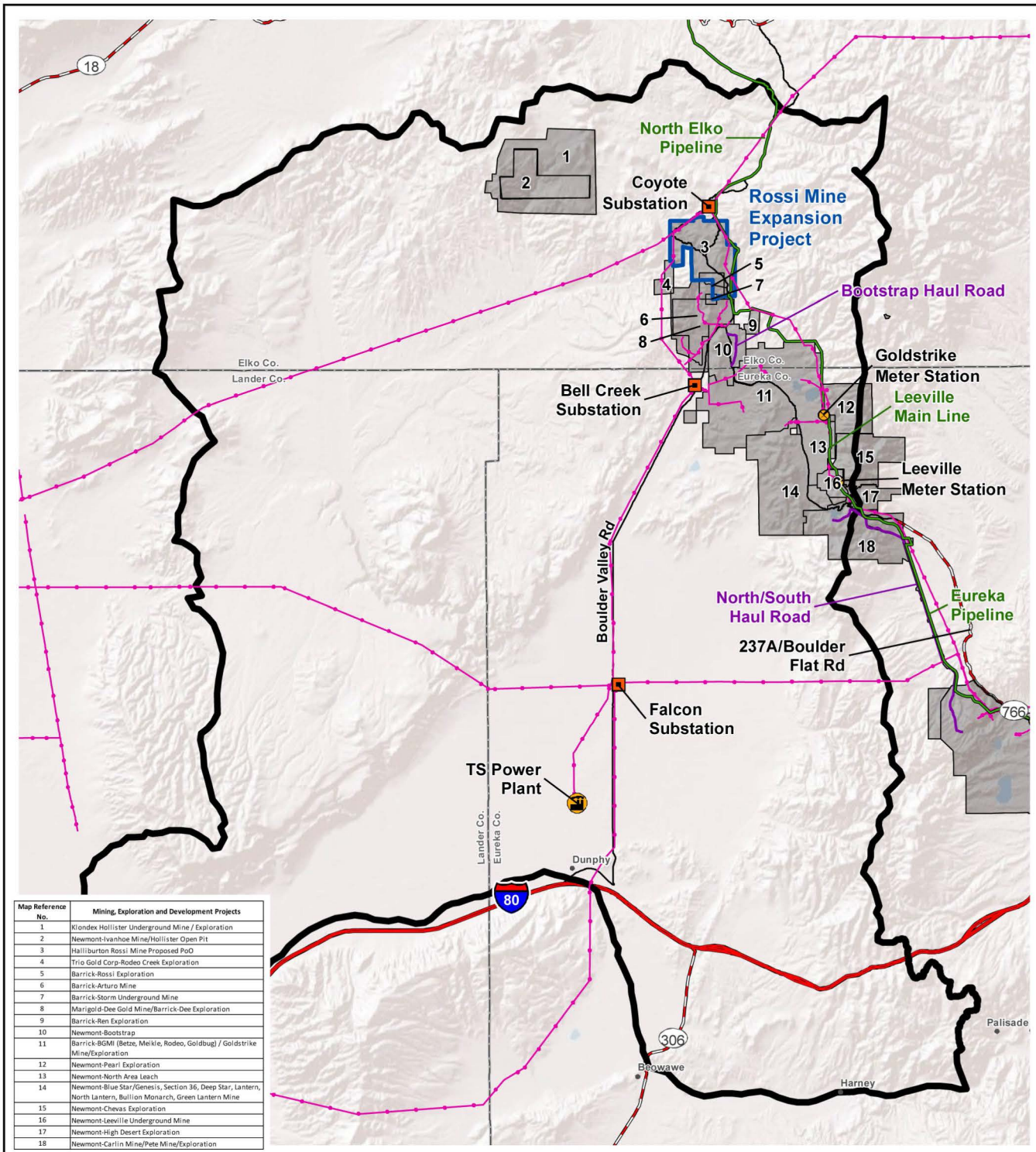
As stated in Section 3.13.1, the CESA for soil resources and reclamation is the Rock Creek Valley and Boulder Flat hydrographic basins, which encompasses 632,757 acres, as shown in **Figure 3.13-1**. Cumulative impacts to soils and reclamation result from surface disturbance related to mining and exploration, energy development, wildfire, grazing, dispersed recreation, roads, and other natural and human-caused activities within the CESA.

The impacts from past, present, and RFFAs are discussed in Section 3.2, Past, Present, and Reasonably Foreseeable Future Actions. RFFAs for mining and exploration activities are identified in **Table 3.2-1**; their locations are shown in **Figure 3.2-1** and **Figure 3.2-2**. **Figure 3.2-2** also illustrates some ROW actions. These projects include primarily mining and mineral exploration projects, but also include pipeline and electric utility projects, and other RFFAs as shown in **Figure 3.2-2**. Those projects that are within the Soils and Reclamation CESA are shown in **Figure 3.13-1** and would result in approximately 29,454 acres of disturbance within the CESA, or 4.6% of the CESA.

In addition to the mining and exploration activities identified in this section, numerous major wildfires have occurred in the soils and reclamation CESA, creating additional impacts on soils. Cumulative impacts on soils as a result of wildfire include physical, biological, and chemical changes, such as breakdown in soil structure, reduced moisture retention, loss of organic soil matter through combustion, changes in microbial and invertebrate species and population dynamics, and partial loss of root systems (USFS 2005).

Figure 3.13-4 shows the locations of past wildfires within the CESA. Wildfires have burned a total of 439,909 acres in the CESA, or 69.5% of the CESA, including within the study area, since 1980.

Further, the CESA holds several grazing allotments on public lands, totaling 294,763 acres on BLM lands and 127 acres on Bureau of Reclamation lands, for a total of 294,890 acres, or 46.6% of the CESA. An additional 189,578 acres of grazing land are held in private ownership. **Figure 3.13-5** shows the grazing allotments in the CESA. Grazing can result in increased soil compaction, removal of ground cover, and reduced infiltration. These can lead to increased runoff and erosion as well reduced soil quality.



Map Reference No.	Mining, Exploration and Development Projects
1	Klondex Hollister Underground Mine / Exploration
2	Newmont-Ivanhoe Mine/Hollister Open Pit
3	Halliburton Rossi Mine Proposed PoO
4	Trio Gold Corp-Rodeo Creek Exploration
5	Barrick-Rossi Exploration
6	Barrick-Arturo Mine
7	Barrick-Storm Underground Mine
8	Marigold-Dee Gold Mine/Barrick-Dee Exploration
9	Barrick-Ren Exploration
10	Newmont-Bootstrap
11	Barrick-BGMI (Betze, Meikle, Rodeo, Goldbug) / Goldstrike Mine/Exploration
12	Newmont-Pearl Exploration
13	Newmont-North Area Leach
14	Newmont-Blue Star/Genesis, Section 36, Deep Star, Lantern, North Lantern, Bullion Monarch, Green Lantern Mine
15	Newmont-Chevas Exploration
16	Newmont-Leeville Underground Mine
17	Newmont-High Desert Exploration
18	Newmont-Carlin Mine/Pete Mine/Exploration

Project Study Area
Soils and Reclamation Cumulative Effects Study Area

Existing and Reasonably Foreseeable Projects
- Metering Station
- Power Plant
- Substation
- Pipeline
- Road
- Transmission Line
- Mine Plan Boundaries

Source: NDWR 2015, BLM 2015g, SRK 2014a, BLM 2010b.

Rossi Mine Expansion Project EIS

Figure 3.13-3

Past, Present, and RFFAs within the Soils and Reclamation Cumulative Effects Study Area

0 1 2 3 4 5 Miles
0 1 2 3 4 5 Kilometers
1:380,000

N

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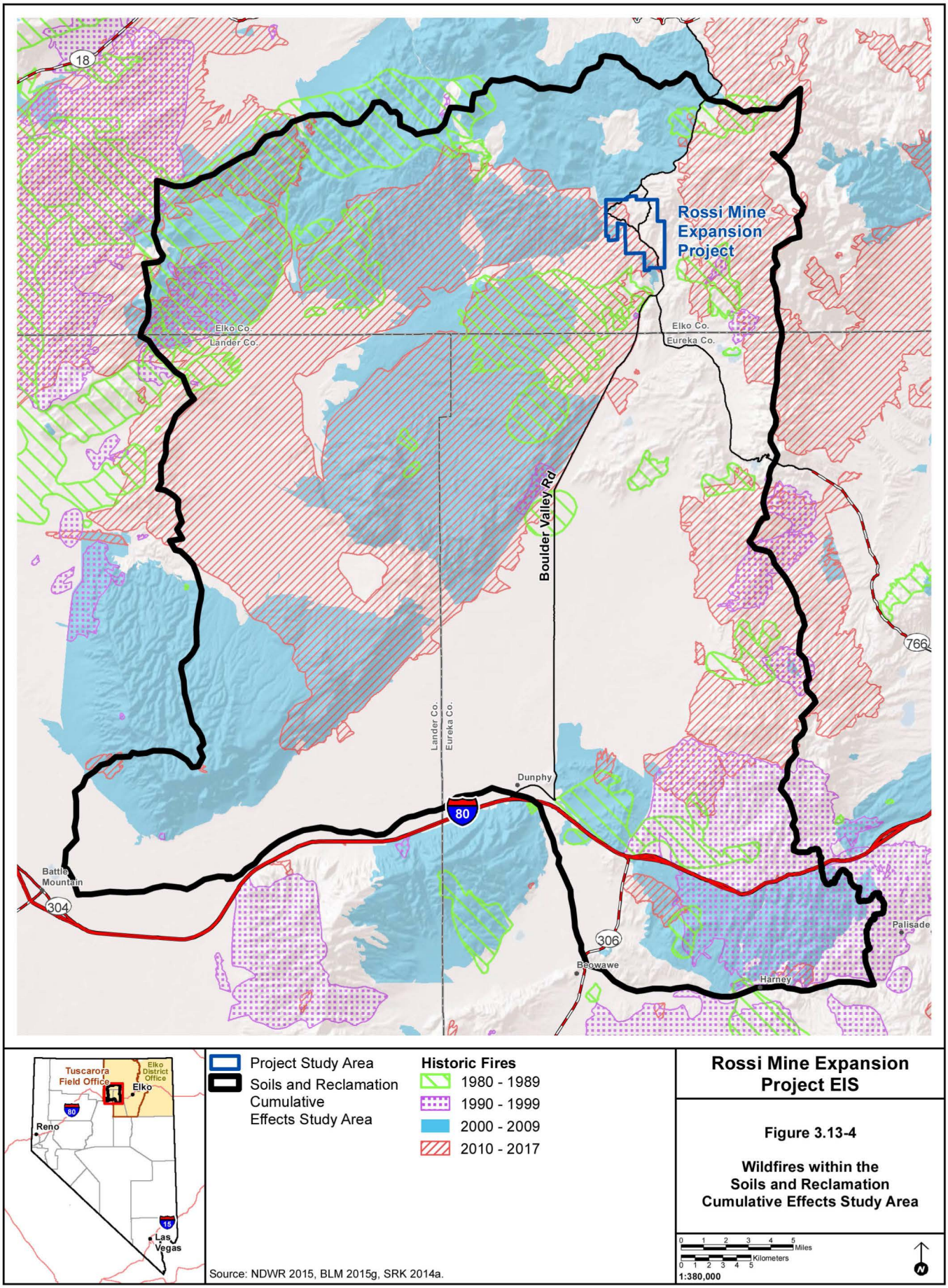

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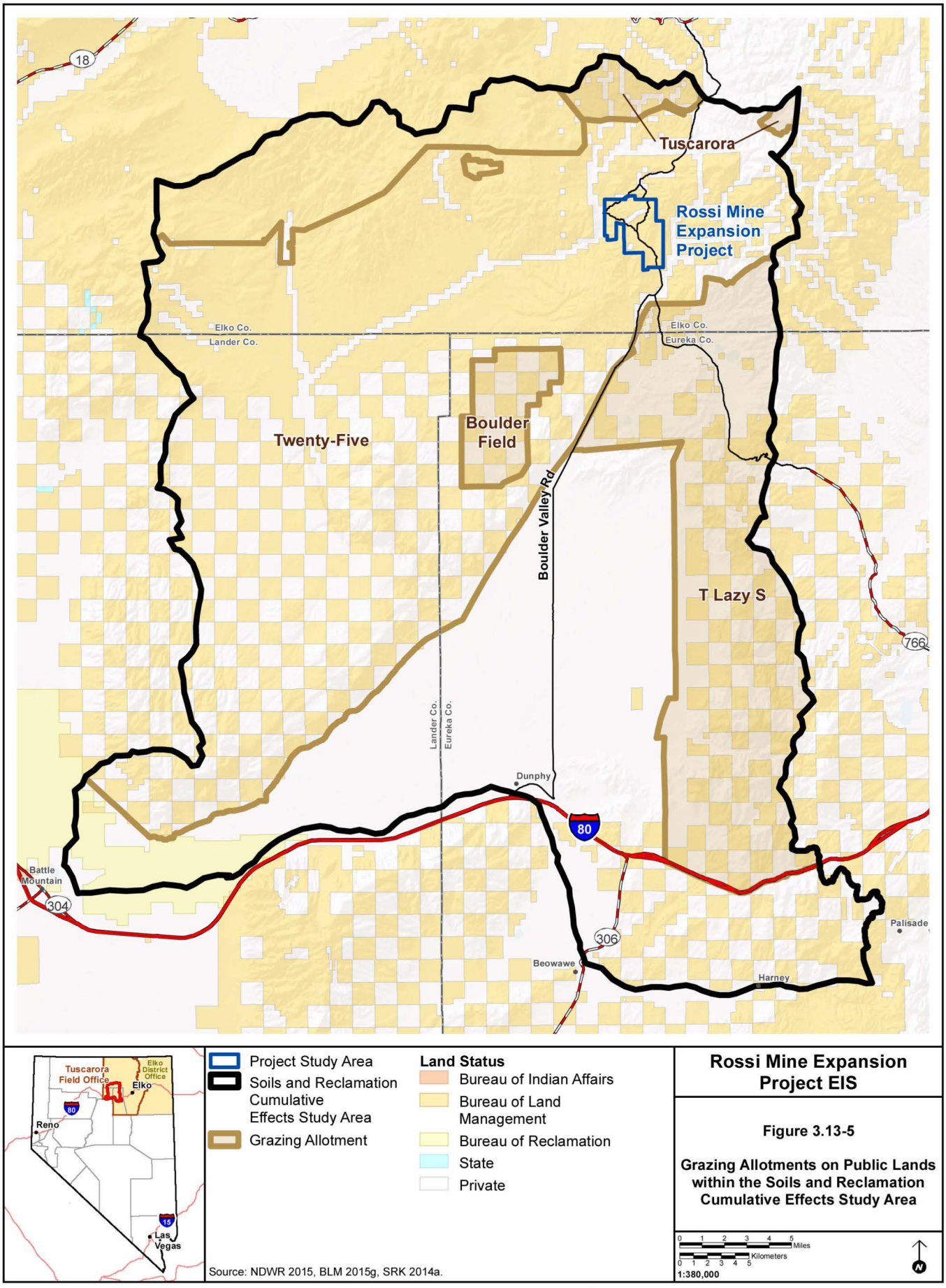

Rossi Mine Expansion Project EIS

Figure 3.13-5

Grazing Allotments on Public Lands within the Soils and Reclamation Cumulative Effects Study Area

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2/20/2018

3.13.3.1 Proposed Action

Cumulative impacts on soil resources resulting from the Proposed Action include the following:

- Changes to the soil structure and biology and associated loss of soil quality, fertility, and potential as successful growing media
- Erosion and associated loss of growing media for reclamation purposes
- Sedimentation and associated loss of habitat and increased potential for flooding

The Proposed Action would involve excavation, storage, and reuse of soil as growth media. Reclaimed jig fines as well as inorganic topsoil created from weakly lithified conglomerate and mudstone of the Carlin Formation and Carlin Tuff harvested from the project site would supplement the excavated soil, as specified in the Reclamation Plan. Analysis of reclaimed jig fine samples, as presented in **Table 3.4-10**, indicated that average concentrations of arsenic and manganese slightly exceeded NDEP reference values as presented in Section 3.4.1.5, Rock Geochemistry. Further, Humidity Cell Tests of reclaimed jig fines as presented in Section 3.4.1.5, Rock Geochemistry, produced circum-neutral to mildly alkaline leachate and exhibited low associated metal release (SRK 2014e). Cumulative impacts on drainage would be mitigated by implementation of the Reclamation Plan. Surface configurations and drainage controls would manage and minimize runoff during project operation and after mine closure.

Cumulative impacts relating to reclamation as a result of the Proposed Action include the following:

- Revegetation success
- Changed topography
- Presence of mining artifacts, including contaminants

The Proposed Action includes a monitoring program to ensure revegetation success under the Reclamation Plan. Vegetation monitoring would be conducted annually for a minimum of three years in accordance with the Nevada Guidelines for Successful Revegetation (NDEP 2015a). Monitoring would continue until revegetation standards have been met as stipulated in the Reclamation Plan. The use of fertilizer and soil amendments is not included under the Proposed Action but may be recommended by the BLM depending upon the results of vegetation monitoring. The Proposed Action would change the topography in the project area, resulting in an unfilled pit and a partially filled pit with benched walls, graded WRDFs, and drainage controls throughout the site. Some mining artifacts or remnants would remain, such as buried utilities (e.g., pipelines, and open pits). All contaminated soil would be removed and managed in accordance with RCRA guidelines.

Past and present actions within the Soils and Reclamation CESA have resulted, or would result, in approximately 27,454 acres of surface disturbance from mining exploration, pipelines, and electric utility projects. RFFAs within the Soils and Reclamation CESA are anticipated to result in an additional 2,000 acres of surface disturbance, resulting from potential future expansion of current mining projects in the Carlin Trend area (Newmont Blue Star/Genesis, Section 36, Deep Star, Lantern, North Lantern, Bullion Monarch, Green Lantern, Carlin Mine), for a total cumulative disturbance acreage of 29,454. The Proposed Action would incrementally increase the disturbance within the CESA by 1,167 acres (4 percent), resulting in a total cumulative disturbance of 30,621 acres. Because monitoring would be implemented to ensure the success of revegetation and drainage stability, the disturbance would be temporary until reclamation is complete and successful. Topography would be permanently changed but would not result in unstable conditions that could lead to mass wasting (downslope movement of earth materials) or other soil instabilities. The cumulative soils impact would be minor, and the cumulative impact related to topographic changes would be moderate.

3.13.3.2 Reconfiguration Alternative

Under the Reconfiguration Alternative, cumulative soils impacts would be similar to, but less than, those under the Proposed Action. The disturbance would be 1,016 acres, 151 acres less than under the Proposed Action.

3.13.3.3 Livestock Fencing Alternative

Under the Livestock Fencing Alternative, cumulative soils impacts would be the same as under the Proposed Action and Reconfiguration Alternative with the addition of 7 acres of surface disturbance resulting from fence installation. Upon successful reclamation and revegetation as determined by BLM and NDEP, the fence would be removed.

3.13.3.4 No Action Alternative

Under the No Action Alternative, there would be no additional disturbance within the CESA. The Proposed Action would not contribute to a cumulative impact.

3.13.4 Potential Monitoring and Mitigation

No additional mitigation beyond that prescribed in the Reclamation Plan is recommended. The Reclamation Plan specifies monitoring for slope stability, stormwater, groundwater resources, reclamation, and noxious weeds. The Reclamation Plan specifies the following:

- Once disturbance is no longer anticipated in an area, reclamation would occur with subsequent monitoring of revegetation success. Vegetation monitoring would be conducted annually for a minimum of three years in accordance with the Nevada Guidelines for Successful Revegetation (NDEP 2015a). Monitoring would continue until revegetation standards have been met as stipulated in the Reclamation Plan.

3.13.5 Residual Impacts

Residual impacts to soils would include a permanent irreversible loss of soil productivity and quality on approximately 194 acres of open pits that may not be reclaimed under the Proposed Action. Under the Reconfiguration Alternative, residual impacts would include permanent irreversible loss of soil productivity and quality on approximately 144 acres of open pits that may not be reclaimed.

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3.14 Vegetation, including Riparian Zones and Wetland Areas

3.14.1 Affected Environment

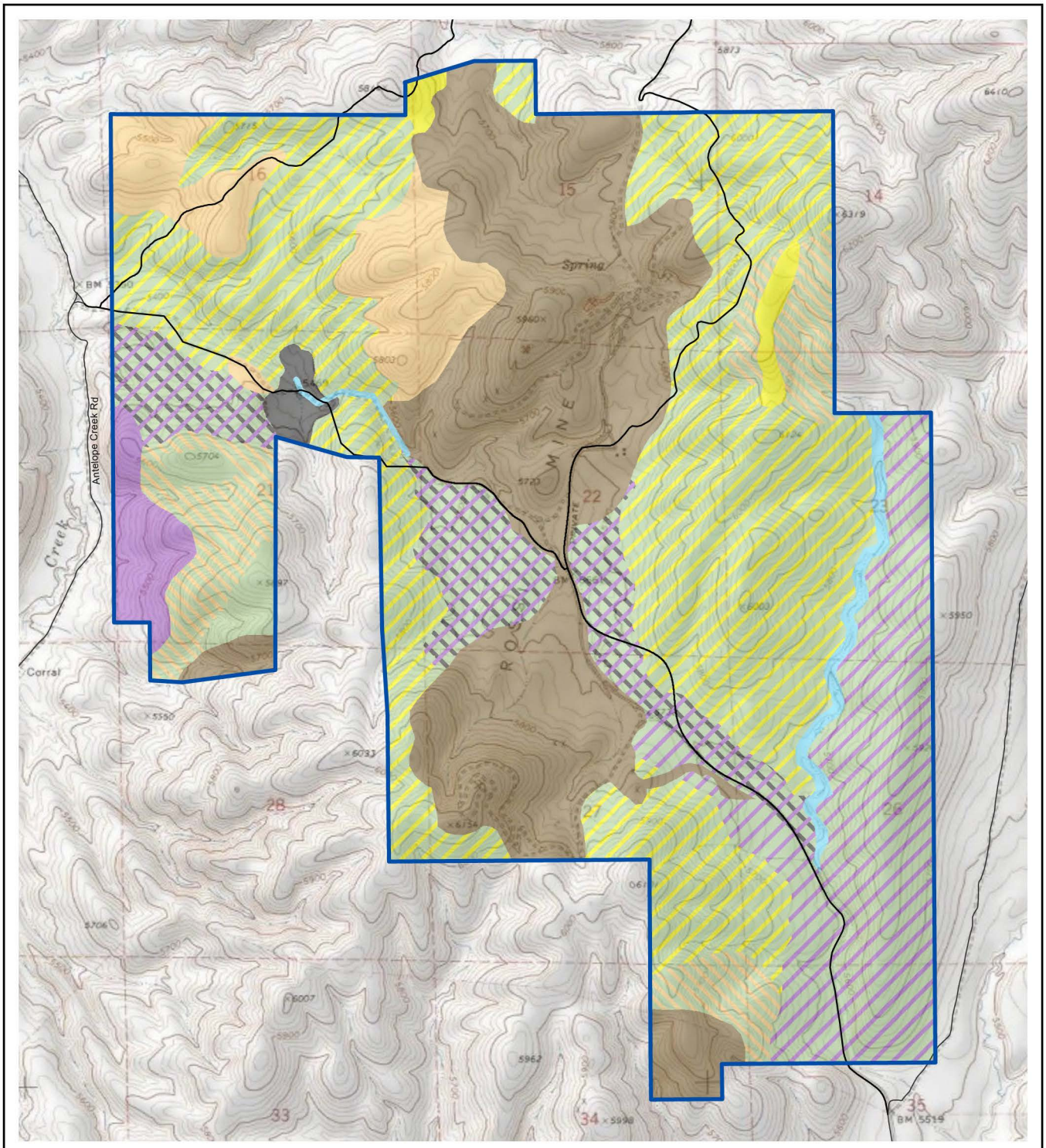
The study area for vegetation resources includes the area within the proposed PoO boundary (**Figure 3.14-1**). The CESA for vegetation resources covers the Twenty-Five Allotment as well as the Boulder Field, T Lazy S, and Mary's Mountain grazing allotments and Boulder Creek Valley area between the T Lazy S and Twenty-Five Allotment (**Figure 3.14-2**). The study area for riparian zones and wetland areas is the same as vegetation resources. The CESA for riparian zones and wetland areas encompasses the Rock Creek, Boulder Valley, and Maggie Creek Area hydrographic basins along the Carlin Trend. These three basins drain southward into the Humboldt River.

3.14.1.1 General Vegetation

The vegetation study area is located in the Upper Humboldt Plains subdivision of the Central Basin and Range ecoregion. The Central Basin and Range ecoregion is the predominant ecoregion in Nevada and is composed of elevated internally drained xeric basins in between scattered mountain ranges (Bryce et al. 2003). Xeric basins are characterized as having low annual precipitation amounts and are generally very dry. The vegetation is a mosaic of sagebrush or saltbush-greasewood shrublands and salt flats. The climate is arid, with annual precipitation typically 10 to 12 inches (NRCS 2015b). The elevation ranges from 5,400 to 6,300 feet above mean sea level (SRK 2013b). The Upper Humboldt Plains subdivision consists of rolling plains with occasional buttes and low mountains (Bryce et al. 2003). Due to its elevation range, this subdivision is cooler and wetter than the Central Basin and Range subdivisions, resulting in increased dominance of cool-season grasses in areas of shallow, stony soil (Bryce et al. 2003). Substrates consist of volcanic ash, rhyolite, and tuffaceous rocks.

Distribution of vegetation types in the study area is strongly influenced by variations in landscape position, soil type, moisture, elevation, and aspect. Plant species composition, abundance and vegetative structure have been affected by previous disturbances within the project area including wildfires, livestock grazing, mine operations, exploration activities, and reclamation. Vegetation cover and land use types, and plant community characterizations were compiled based on NRCS ecological site descriptions, existing NEPA documents and site-specific wetland and vegetation studies conducted within the study area (BLM 2014a, SRK 2013b, NRCS 2015c, NRCS 2015b). Species nomenclature herein is consistent with the USDA-NRCS Plants Database (NRCS 2015b).

An ecological site is a landform with specific physical characteristics, which differs from other landforms in its ability to produce distinctive kinds and amounts of vegetation and in its response to management. General vegetation types comprise multiple ecological sites. Seven ecological sites are located in the study area (**Table 3.14-1**). **Table 3.14-1** summarizes ecological sites in the study area and the characteristic dominant vegetation for each ecological site. Characteristic vegetation may not be present in these ecological sites due to prior disturbance from human activities and wildfires.



- Project Study Area
- Annual Grassland
- Anthropogenic Disturbance
- Black Sagebrush
- Low Sagebrush
- Wyoming Sagebrush
- Mountain Sagebrush
- Mixed Mountain/ Low Sagebrush
- Mixed Wyoming/ Mountain Sagebrush
- Mixed Black/Wyoming/ Mountain Sagebrush
- Mountain Sagebrush/ Annual Grassland
- Meadow

Source: SRK 2013b, SRK 2014a.

Rossi Mine Expansion Project EIS

Figure 3.14-1

Existing Vegetation Communities in the Project Study Area

0 0.1 0.2 0.3 0.4 0.5 Miles
0 0.25 0.5 0.75 1 Kilometers
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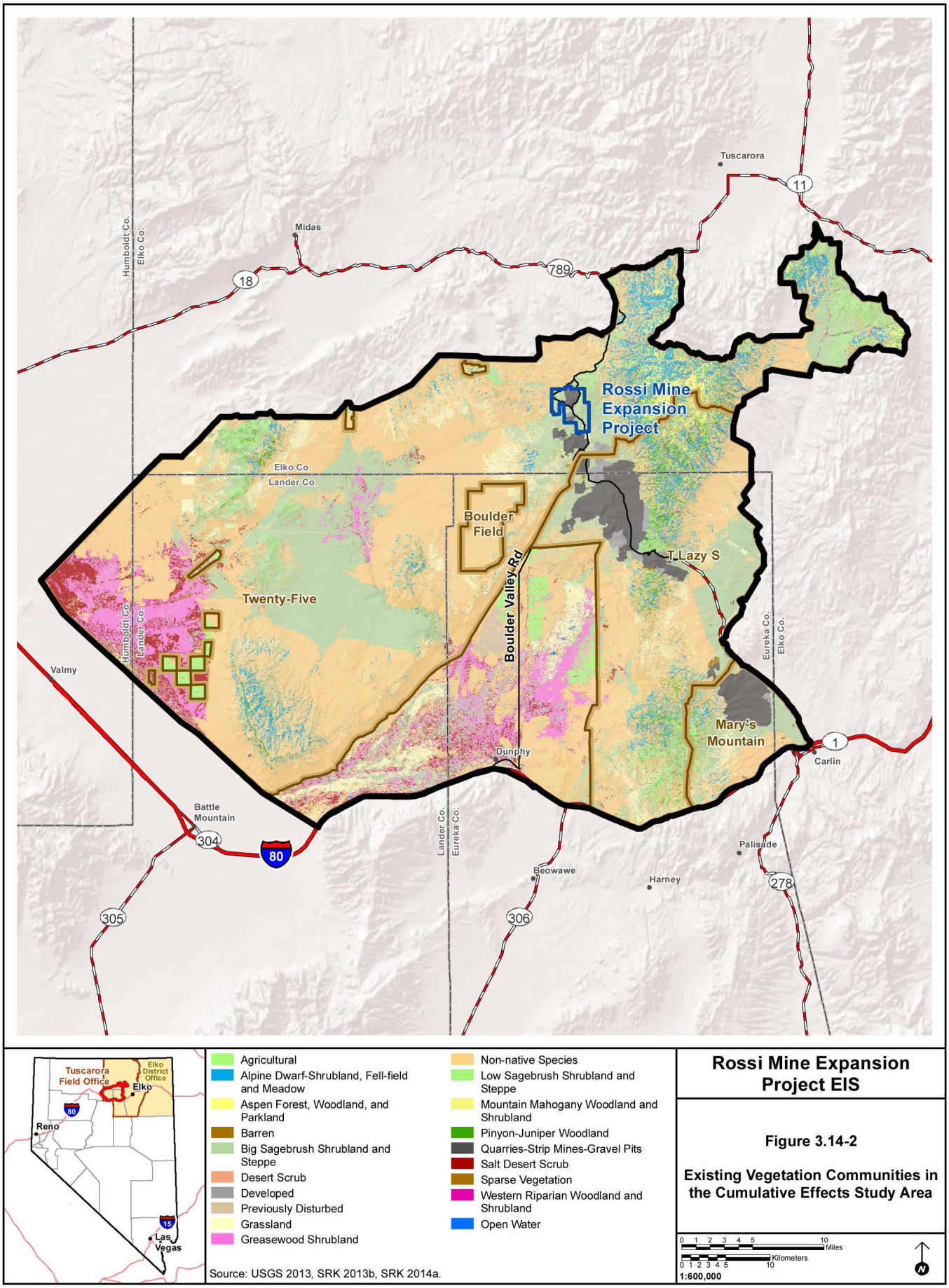

- Agricultural
- Alpine Dwarf-Shrubland, Fell-field and Meadow
- Aspen Forest, Woodland, and Parkland
- Barren
- Big Sagebrush Shrubland and Steppe
- Desert Scrub
- Developed
- Previously Disturbed
- Grassland
- Greasewood Shrubland
- Non-native Species
- Low Sagebrush Shrubland and Steppe
- Mountain Mahogany Woodland and Shrubland
- Pinyon-Juniper Woodland
- Quarries-Strip Mines-Gravel Pits
- Salt Desert Scrub
- Sparse Vegetation
- Western Riparian Woodland and Shrubland
- Open Water

Source: USGS 2013, SRK 2013b, SRK 2014a.

Rossi Mine Expansion Project EIS

Figure 3.14-2

Existing Vegetation Communities in the Cumulative Effects Study Area

0 1 2 3 4 5 10 Miles
0 1 2 3 4 5 10 Kilometers
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Table 3.14-1. Ecological Sites within the Study Area

Dominant Vegetation Type	Ecological Site Code	Ecological Site Name	Acres	Percent of Study Area
Grassland	025XY003NV	LOAMY BOTTOM 8-14 P.Z.	101	3
	025XY005NV	WET MEADOW	63	2
	025XY006NV	DRY MEADOW	3	<1
Low Sagebrush	025XY017NV	CLAYPAN 12-16 P.Z.	1,392	37
	025XY018NV	CLAYPAN 10-12 P.Z.	798	21
Big Sagebrush	025XY014NV	LOAMY 10-12 P.Z.	1,101	29
Wyoming Big Sagebrush	025XY019NV	LOAMY 8-10 P.Z.	161	4
Undefined[1]			112	3

Sources: NRCS 2015b; NRCS 2015c.

[1] Some areas of the study area have not been defined by Ecological Site Descriptions.

The dominant cover type within the study area, sagebrush shrubland, is composed of a dominant overstory of shrubs and a subdominant understory of herbaceous species (**Table 3.14-2**). This vegetation type comprises 61 percent of the study area and consists of three specific vegetation types (low sagebrush, mountain big sagebrush, and Wyoming big sagebrush). Usually found on dry flats and plains, alluvial fans, rolling hills, rocky hill slopes, saddles and ridges, the substrate for this vegetation type is typically deep, well-drained and non-saline soils. Exposure to desiccating winds is common for these areas. This cover type is found on both burned and unburned areas in the study area. The dominant shrub, depending on location, is mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana;* the most prevalent sagebrush in the study area), low sagebrush (*Artemisia arbuscula*), or Wyoming big sagebrush (*Artemisia tridentata* ssp. w*yomingensis*). Occasional associated shrubs include twistleaf rabbitbrush (*Chrysothamnus viscidiflorus var. viscidiflorus*), smooth horsebrush (*Tetradymia glabrata*), prickly phlox (*Leptodactylon pungens*) and serviceberry (*Amelanchier alnifolia*) appearing sporadically in small groups. Understory species consist of grasses and forbs including bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass (*Poa secunda*), cheatgrass (*Bromus tectorum*), and bottlebrush squirreltail (*Elymus elymoides*). Soils associated with this vegetation cover type are typically deep, well-drained, and non-saline. **Figure 3.14-1** illustrates the vegetation cover and existing anthropogenic disturbance within the study area based on baseline vegetation surveys (SRK 2013b). **Figure 3.14-2** illustrates the vegetation communities in the CESA.

Table 3.14-2. Land Cover Types within the Study Area

Land Cover	Area (acres)	Percent of Study Area (%)
Mixed Mountain and Low Sagebrush	1,345	36
Anthropogenic Disturbance	932	25
Mixed Wyoming Big and Mountain Sagebrush	475	13
Mixed Black, Wyoming Big and Mountain Big Sagebrush	290	8
Mountain Sagebrush/Annual Grassland	242	6
Annual Grassland	224	6
Wyoming Sagebrush	70	2
Meadow	46	1
Mountain Sagebrush	41	1
Low Sagebrush	32	<1
Black Sagebrush	25	<1
Open Water, Riparian Zones, and Herbaceous Wetlands	10	<1

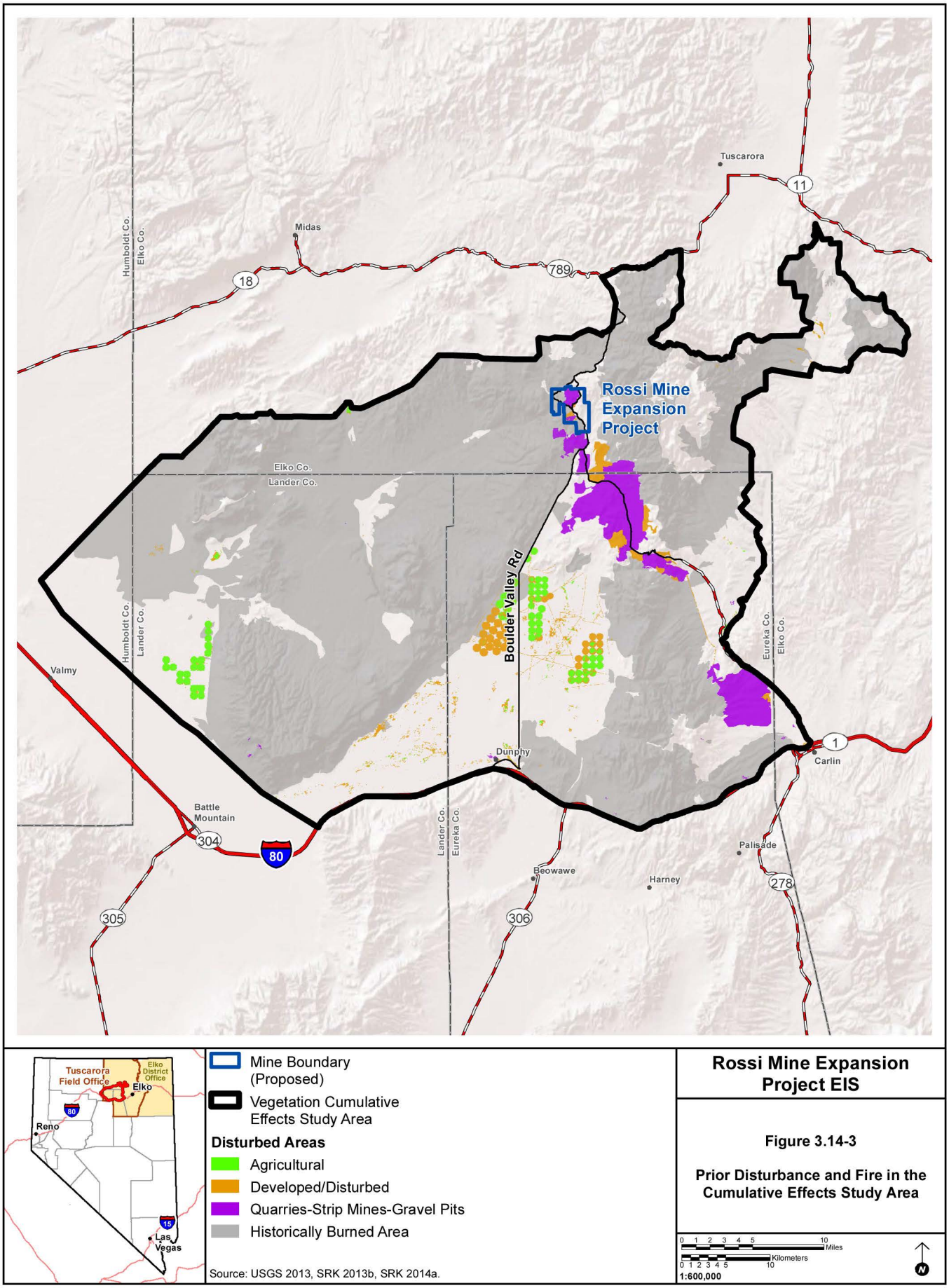
Source: SRK 2013b.

Previously burned areas occur throughout the study area and CESA (**Figure 3.14-3**). Approximately 1,732 acres in the study area have burned since 2000, of which 1,668 acres burned in the 2017 Rooster Comb fire (BLM 2017b). Fire has provided the basis for a predominantly annual grass understory present throughout much of the study area. Also present are seeded grasses including crested wheatgrass (*Agropyron cristatum*), squirreltail grass (*Elymus elymoides*), thickspike wheatgrass (*Elymus lanceolatus* ssp. *lanceolatus*), slender wheatgrass (*Elymus trachycaulus* ssp. *trachycaulus*), and bluebunch wheatgrass (*Pseudoroegneria spicata*). Common weedy annual species include cheatgrass (*Bromus tectorum)*, prickly lettuce (*Lactuca serriola*), fiddlenecks (*Amsinckia menziesii* var. *menziesii* and *a. tessallata*), tumble mustard (*Sisybrium altissimum*), tall annual willowherb (*Epilobium brachycarpum*), and filaree (*Erodium* spp). Burned areas have been reseeded as part of fire rehabilitation seeding projects.

Historically, the BLM has implemented vegetation treatments within the Rossi Mine vicinity in response to wildfires. In 1965, aerial seeding of various native species and drill seeding of crested wheatgrass was conducted by the BLM in areas burned by the 1964 Boulder Fire located within the current PoO boundary and to the immediate south of the Rossi Mine (BLM 1965a, b).

Existing disturbance occupies 25 percent of the study area and is characterized by surface disturbance from previous and existing mine operations.

Riparian zones/herbaceous wetland areas and water features occupy <1 percent of the study area and are composed of stream channels, riparian/wetland vegetation, and open water. Section 3.14.1.2, Riparian Zones and Wetland Areas, provides specific information regarding riparian zones and wetland areas.



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3.14.1.2 Riparian Zones and Wetland Areas

Riparian and wetland features in the study area include riparian zones, a perennial pond, and a seasonal pond. **Figure 3.14-4** illustrates riparian zones and wetland areas that occur in the study area.

The term wetland is defined in 33 CFR 328, 7(b) as it applies to the jurisdictional limits of the USACE under the Clean Water Act as "those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." Note that the frequency and duration of saturation may vary by geographical region and is largely dependent upon local climatic conditions. Wetlands adjacent to other waters of the United States, such as streams, also are considered to be waters of the United States.

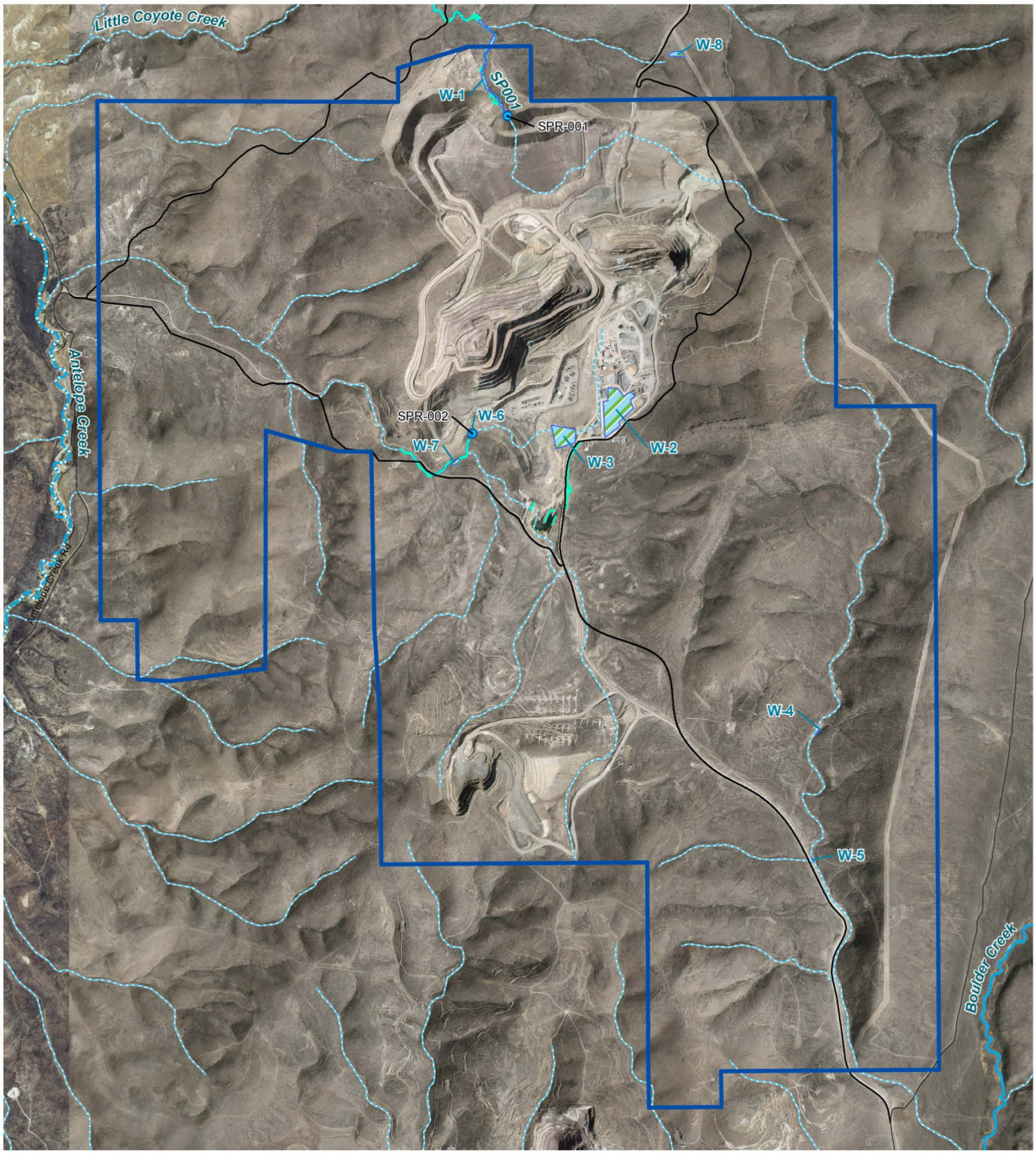
According to the USACE's 1987 Wetland Delineation Manual, a three-parameter approach is required for delineating USACE-defined wetlands (Environmental Laboratory 1987). Based on this approach, areas are identified as wetlands if they exhibit the following characteristics:

1. The prevalence of vegetation consisting of hydrophytic species or plants that have the ability to grow in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content and depleted soil oxygen levels.
2. The presence of soils that are classified as hydric or possessing characteristics that are associated with reducing soil conditions. Hydric soils are poorly drained and have a seasonal high water table within 6 inches of the surface.
3. An area that is inundated either permanently or periodically at mean water depths less than or equal to 6.6 feet or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation.

The USACE (Environmental Laboratory 1987) requires that, under normal circumstances, all three of these conditions be met for an area to be considered a wetland under the USACE's definition.

Additional guidance on wetlands is provided in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008). For the purposes of NEPA, the analysis in this EIS must address all wetlands, even if they are not jurisdictional under the Clean Water Act, because even non jurisdictional wetlands are part of the human environment.

Riparian and wetland areas were identified within the study area based on publically available data and field surveys of all potential wetland and riparian features and surveys to delineate jurisdictional wetlands. In 2012, using ongoing seep and spring monitoring studies by SRK Consulting (U.S.), Inc. (SRK), as a basis, EcoSynthesis Scientific and Regulatory Services, Inc. (EcoSynthesis) visited and investigated for riparian characteristics each cattle pond, spring, pond, or damp area that SRK had previously located within the study area, as well as distinctive patches of hillside vegetation (EcoSynthesis 2013). Only two natural (spring-supported) riparian features (W-1 and W-7) were found (**Figure 3.14-4**). Other areas of riparian vegetation were found adjacent to ponds or along a roadside drainage channel. Ponds (whether perennial or seasonal) were categorized as non-riparian. Field investigations to identify jurisdictional wetlands and waters of the U.S. were also conducted in the study area in 2012 and 2014. These investigations identified eight wetland features (some of which overlap with riparian zones identified in prior surveys) in the project area. The eight wetland areas within the study area are shown in **Table 3.14-3** and illustrated in **Figure 3.14-4**.



Project Study Area
Seep or Spring
Perennial Stream Reach
Discontinuous Stream Reach
Intermittent/Ephemeral Stream Reach
Wetland
Riparian Zone

Source: AECOM 2014; EcoSynthesis 2013; BLM 2000b, SRK 2014a.

Rossi Mine Expansion Project EIS

Figure 3.14-4

Seeps, Riparian Zones and Wetlands within the Project Study Area

0 0.1 0.2 0.3 0.4 0.5 Miles
0 0.25 0.5 0.75 1 Kilometers
1:30,000

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2/20/2018

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Table 3.14-3. Wetland Areas within the Study Area

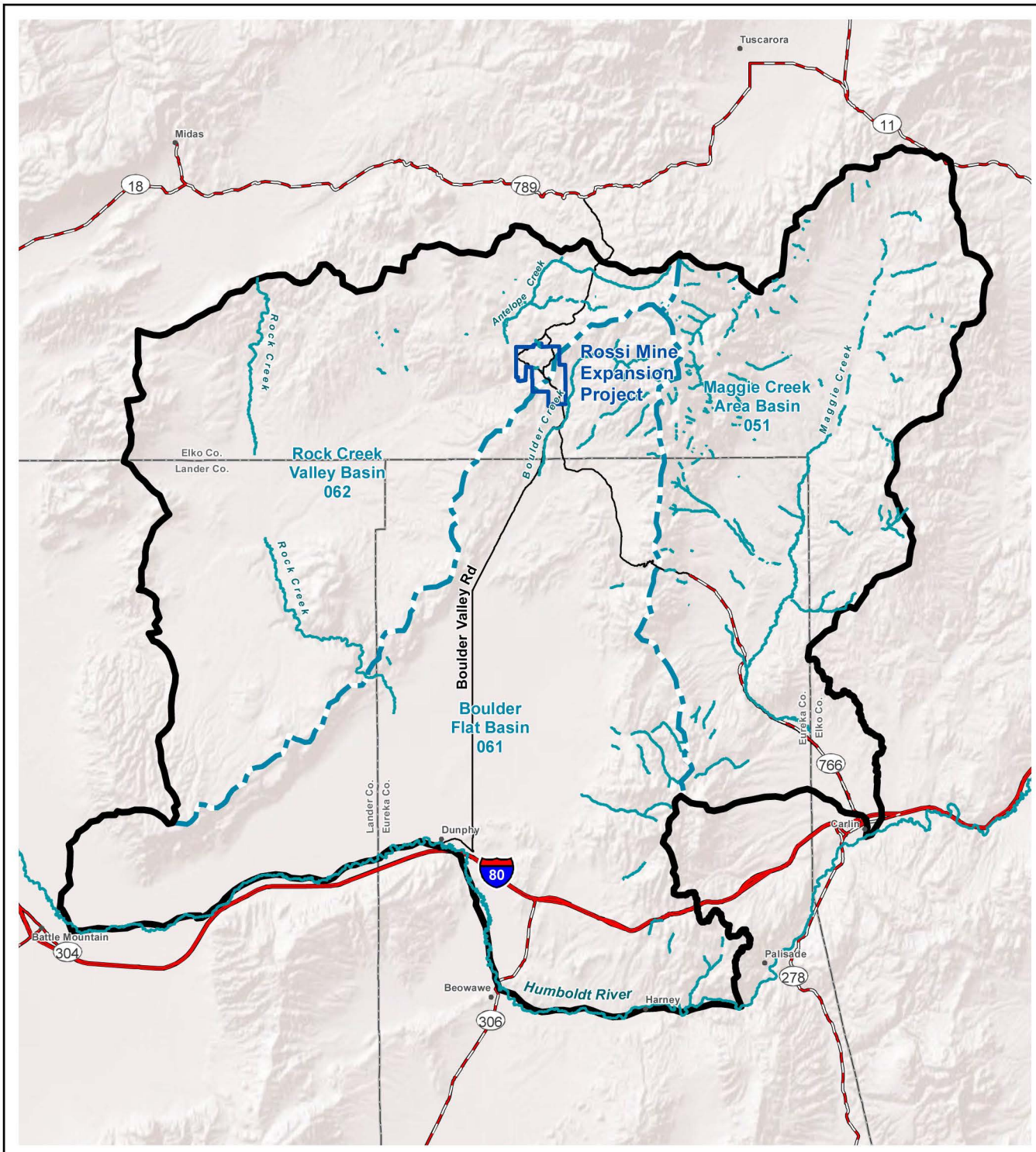
Wetland ID	Wetland Vegetation	Acres	Jurisdictional[1]
W-1	Baltic rush, waterclover, curly dock, salt grass, bulrush.	1.11	No
W-2	Willows, canary reed grass, and cattails (jig pond).	5.65	No
W-3	Willows (overflow pond for jig pond).	2.5	No
W-4	Heavily grazed, bare ground 85 percent of cover. Fowl bluegrass, and cheat grass.	0.03	No
W-5	Heavily grazed. Sedges.	0.02	No
W-6	Heavily grazed. Sedges, Baltic rush, salt grass, willows, and curly dock.	0.05	No
W-7	Heavily grazed. Salt grass, meadow barley, and Baltic rush.	0.17	No
W-8	Signs of grazing. Salt grass, meadow barley, curly dock, and grass sp.	0.42	No
Total Acres		**9.95**	

Source: AECOM 2014.

[1] Identified as a wetland as defined by the USACE and subject to jurisdiction the Clean Water Act.

Typical species found in the wetlands along the ephemeral channels and more heavily vegetated portions of these wetlands include willows (*Salix spp.*) cattails (*Typha* spp.), meadow barley (*Hordeum brachyantherum*), and Baltic rush (*Juncus balticus*) (AECOM 2014). Species that typically occur where vegetation is more heavily grazed include cheatgrass, fowl bluegrass (*Poa palustris*), and curly dock (*Rumex crispus*) (AECOM 2014). Of the eight wetlands identified in the study area, two are located along tributaries to Boulder Creek, one is located along a tributary to Little Coyote Creek, three are associated with human-constructed ponds, and two are associated with seeps (AECOM 2014). Only three wetlands are larger than 1 acre, with the largest mapped wetland being approximately 5.65 acres. Seeps that occur within the study area are associated with either historic sedimentation or runoff control features or occur at the base of waste rock facilities or other drainage features that have developed in relation to mine activities.

No wetland features in the study area are subject to jurisdiction by the USACE because they lack a significant nexus with a traditional navigable water. Flow in Boulder Creek is seasonal on its northern end where the flow rate is dictated by rain events. Further downstream Boulder Creek becomes ephemeral and loses flow from evapotranspiration and agricultural ditch diversions (BLM 2014a). Therefore, Boulder Creek does not have any hydrologic connection with the Humboldt River and any upstream features that flow to Boulder Creek are isolated and lack a significant nexus with a traditional navigable water. Hydrologic features in the CESA are shown on **Figure 3.14-5**.



Project Study Area

Water Resources Cumulative Effects Study Area

Hydrographic Basin

Riparian Zone and Associated Wetland

Source: EcoSynthesis 2013, BLM 2000b, NDWR 2015, SRK 2014a.

Rossi Mine Expansion Project EIS

Figure 3.14-5

Riparian Zones and Associated Wetlands within the Cumulative Effects Study Area

0 1 2 3 4 5 10 Miles

0 1 2 3 4 5 10 Kilometers

1:500,000

N

10/12/2017

3.14.2 Environmental Consequences

Primary issues related to vegetation resources include loss or degradation of upland and riparian/wetland vegetation communities and revegetation measures used for reclamation activities. The potential impacts of the proposed project on vegetation can be classified as short-term (temporary) and long-term duration. Short-term impacts result from surface disturbances related to construction, operation and interim and final reclamation activities that would occur over the 8-year mine life and 5-year reclamation period. Short-term impacts would cease upon mine closure and completion of successful reclamation. Long-term impacts consist of permanent changes to vegetation communities, irrespective of reclamation success. Short-term and long-term impacts are discussed in more detail below.

3.14.2.1 Proposed Action

General Vegetation

Under the proposed project, mine development and operation would disturb a total of approximately 2,063 acres, of which 1,167 acres would result from newly authorized surface disturbance. Approximately 206 acres would occur in areas of existing disturbance, and 961 acres would occur in previously undisturbed areas. The majority of the disturbance would occur in the sagebrush shrubland type, upland areas, and/or areas previously disturbed by historical mining activities.

Table 3.14-4 lists the ecological sites that would be disturbed from project construction and operation. Acres of ecological sites impacted by mining activities were estimated by intersecting the area impacted by mining activities with the ecological sites within the study area boundary.

Table 3.14-4. Proposed Action – Disturbed Acres of Ecological Sites within the Study Area

Dominant Vegetation Type	Ecological Site Code	Ecological Site Name	New Disturbance	Total Disturbance	Total Disturbance Percent of Study Area (%)[2]
Grassland	025X6003NV	LOAMY BOTTOM 8-14 P.Z.	35	61	2
	025XY005NV	WET MEADOW	23	41	1
	025XY006NV	DRY MEADOW	0	0	0
Low Sagebrush	025XY017NV	CLAYPAN 12-16 P.Z.	467	820	21
	025XY018NV	CLAYPAN 10-12 P.Z.	291	511	14
Big Sagebrush	025XY014NV	LOAMY 10-12 P.Z.	314	559	15
Wyoming Big Sagebrush	025XY019NV	LOAMY 8-10 P.Z.	0	6	0
Undefined[1]			37	65	2
Total			1,167	2,063	55

Sources: NRCS 2015b; NRCS 2015c.

[1] Some areas of the study area have not been defined by Ecological Site Descriptions.
[2] Total may vary due to rounding.

In addition, vegetation along existing access roads would be affected (e.g., reduction in growth rate) as a result of additional dust deposition.

Project-related activities would result in the loss of 1,072 acres of ecological sites with existing shrub-dominated vegetation or areas that could support shrub-dominated vegetation. With reclamation,

shrub-dominated vegetation cover type would return as grass/forb dominated vegetation cover type in the short term. Over the long term, shrubs would become re-established and increase in abundance within the majority of disturbed areas as a result of reclamation and natural re-colonization. The loss of shrub-dominated vegetation would represent a long-term impact as it could take up to 25 years following reclamation for mature shrub species to re-establish.

Under the Proposed Action, exploration would continue throughout the project area as described in Section 2.3.10, Exploration. Direct impacts to general vegetation from exploration would include short-term loss of approximately 67 acres. Locations of future exploration activity depend upon the results of drilling activity; therefore, specific vegetation types that would be impacted cannot be identified. Indirect impacts resulting from exploration activities would include short-term increases of fugitive dust, vibration, and localized soil compaction during road and pad construction and active drilling operations. Exploration would also result in an increase of fragmentation of the existing vegetation communities within the project area.

Table 3.14-5 lists the land cover types that would be disturbed from project construction, operation, and exploration. Acres of land cover types impacted by mining activities were estimated by intersecting the area impacted by mining activities with the land cover types within the study area boundary.

Table 3.14-5. Proposed Action – Disturbed Acres of Land Cover and Vegetation Types within the Study Area

Vegetation Type	New Disturbance	Total Disturbance[1]	Total Disturbance Percent of Study Area (%)
Annual Grassland	46	131	4
Anthropogenic Disturbance	206	916	24
Black Sagebrush	1	1	0
Low Sagebrush	2	8	0
Meadow	2	5	0
Mixed Black, Wyoming Big and Mountain Big Sagebrush	204	206	6
Mixed Mountain Big and Low Sagebrush	564	654	17
Mixed Wyoming Big and Mountain Big Sagebrush	98	98	3
Mountain Sagebrush	0	0	0
Mountain Sagebrush/Annual Grassland	44	44	1
Wyoming Sagebrush	0	0	0
Total	**1,167**	**2,063**	**55**

Source: SRK 2013b.

[1] Total disturbance includes previously authorized and proposed new surface disturbance.

Once further disturbance within a certain area is no longer anticipated, disturbed areas would be reclaimed and monitored for revegetation success in accordance with BLM and NDEP-BMRR regulations and as discussed in Section 2.3.12, Closure and Reclamation Plan. The goals of reclamation is for post-mining land uses to be consistent with pre-mining land uses, which include mineral exploration, livestock grazing, wildlife habitat, utility corridors, and dispersed recreation.

Reclamation activities would include, but would not be limited to:

- Implementing concurrent reclamation of facilities as soon as practicable during production;
- Controlling surface water runoff to limit erosion and sediment transport;
- Incorporating operational stormwater management facilities into the closure design;
- Placing growth media on disturbed areas, and seeding with the approved certified weed-free seed mixture; and
- Limiting and/or eliminating long-term maintenance (SRK 2014a).

Interim seed mixes would be used for concurrent reclamation during project operations. The interim seed mix uses three species that stabilize areas quickly, while the reclamation seed mix consists of a variety of native grasses, forbs, and shrubs to revegetate disturbed areas. Discussion of the final reclamation mix to be used for revegetation activities post-operations is provided in Section 2.3.12.5, Soil Preparation, Seeding and Planting, and Revegetation. The final reclamation seed mix would include plant species that best represent vegetation community assemblages found in transitional habitat that currently exists within the project area that have not been disturbed by previous mining or other development activity. Satisfactory revegetation of mine-related disturbance areas (i.e., assuming the primary goal of soil stabilization through presence of adequate plant cover) is anticipated to occur approximately 3 to 15 years following reclamation. After 25 years, the reclaimed plant communities likely would consist of adequate herbaceous plant cover with sufficient diversity to substantially reduce the potential for soil erosion and provide suitable forage for livestock and wildlife.

Interim reclamation would occur during mining operations, with final reclamation occurring thereafter for about 2 years and vegetation monitoring occurring for at least 3 additional years, in accordance with the *Nevada Guidelines for Successful Revegetation for Nevada Department of Environmental Protection, Bureau of Land Management, and the USDA Forest Service* (NDEP 2015a). Quantitative reclamation monitoring to measure compliance would begin after the third growing season and would continue annually until the reclamation success criteria are achieved. HES would submit an annual reclamation report, containing descriptions of the reclamation activities completed during the previous year, on or before April 15th of each year to the BLM and NDEP-BMRR for the preceding calendar year. Reclamation monitoring and maintenance activities would occur until the final reclamation bond is released.

Riparian Zones and Wetland Areas

The potential impacts of the proposed project on riparian zones and wetland areas would predominantly be considered long-term. Long-term impacts consist of permanent changes to wetland areas and riparian zones irrespective of post-closure and reclamation success. Impacts to wetland areas would result from surface disturbances, changes in surface water and groundwater flows, and the removal of water sources related to construction, operation, and reclamation activities. The King North WRDF, based on its mapped extent, would result in less than 0.1 acre of disturbance to one wetland area (W-1) (**Figure 3.14-4)**. The Proposed Action would also disturb an additional 0.8 acres of riparian vegetation in the study area (W-7), which would result in complete disturbance of riparian vegetation in the study area, because the remaining 1.6 acres is located within areas of existing/authorized disturbance.

Exploration would not be conducted in riparian zones and wetland areas; therefore, impacts would be limited to potential increases in fugitive dust from exploration in adjacent upland areas and minor increases in sedimentation resulting from road and pad construction.

Indirect impacts to wetland areas as a result of soil erosion and sedimentation would be minimized with the implementation of erosion control measures as described in Section 2.3.13, Applicant Committed Environmental Protection Measures.

Upgrades to the existing Rossi Mine water system were previously authorized under NDEP Water Pollution Control Permit NEV #2015112 but have yet to be installed, as discussed in Section 2.2.7.9, Water Supply, Demand, and Management. The water conservation upgrades would eliminate the need for the existing lower stock pond identified as wetland area W-3 in **Figure 3.14-4**. Once the water conservation upgrades are installed and operating, water flow to wetland area W-3 would cease. This lack of consistent surface water flow would result in the existing 2.5 acres of W-3 area riparian and

wetland vegetation, consisting mainly of willows (AECOM 2014), to dry up because wetland vegetation requires consistent soil moisture and saturation to exist in an otherwise dry environment. The 2.5 acres comprising W-3 would be reclaimed, as discussed in Section 2.3.12.6, Reclamation of Proposed Facilities.

3.14.2.2 Reconfiguration Alternative

General Vegetation

The effects of the Reconfiguration Alternative to vegetation would be similar to the Proposed Action, except that sequencing of the construction and reclamation of the Dawn Pit would be conducted to reduce the duration of surface disturbance at this location. Additionally, construction of the QLC Pit and associated WRDFs would be modified from the Proposed Action, including complete backfilling of the eastern portion of the QLC Pit. Overall, this alternative would result in approximately 151 fewer acres of disturbance with proportionally less impact to vegetation resources in the study area.

Table 3.14-6 lists the ecological sites that would be disturbed from construction and operation under the Reconfiguration Alternative and **Table 3.14-7** shows the amount of disturbance by land cover type in the study area under this alternative.

Table 3.14-6. Reconfiguration Alternative – Disturbed Acres of Ecological Sites within the Study Area

Dominant Vegetation Type	Ecological Site Code	Ecological Site Name	New Disturbance	Total Disturbance	Percent of Study Area (%)[2]
Grassland	025X6003NV	LOAMY BOTTOM 8-14 P.Z.	30	57	2
	025XY005NV	WET MEADOW	20	38	1
	025XY006NV	DRY MEADOW	0	0	0
Low Sagebrush	025XY017NV	CLAYPAN 12-16 P.Z.	406	759	20
	025XY018NV	CLAYPAN 10-12 P.Z.	253	473	13
Big Sagebrush	025XY014NV	LOAMY 10-12 P.Z.	274	519	14
Wyoming Big Sagebrush	025XY019NV	LOAMY 8-10 P.Z.	0	6	0
Undefined[1]			33	60	2
			1,016	1,912	51

Sources: NRCS 2015b; NRCS 2015c.

[1] Some areas of the study area have not been defined by Ecological Site Descriptions.
[2] Total may vary due to rounding.

Table 3.14-7. Reconfiguration Alternative – Disturbed Acres of Vegetation Types within the Study Area

Vegetation Type	New Disturbance	Total Disturbance	Total Disturbance Percent of Study Area (%)
Annual Grassland	46	131	4
Anthropogenic Disturbance	209	918	24
Black Sagebrush	2	2	0
Low Sagebrush	2	8	0
Meadow	2	5	0
Mixed Black, Wyoming Big and Mountain Big Sagebrush	133	135	4
Mixed Mountain Big and Low Sagebrush	550	640	17
Mixed Wyoming Big and Mountain Big Sagebrush	59	60	2
Mountain Sagebrush	0	0	0
Mountain Sagebrush/Annual Grassland	13	13	0
Wyoming Sagebrush	0	0	0
Total	**1,016**	**1,912**	**51**

Source: SRK 2013b.

Riparian Zones and Wetland Areas

Under the Reconfiguration Alternative, the types of impacts to riparian zones and wetland areas would be the same as the Proposed Action, except that this alternative would result in 0.1 fewer acres of disturbance to riparian zones.

3.14.2.3 Livestock Fencing Alternative

Under the Livestock Fencing Alternative, in addition to the mining activities proposed under the Proposed Action or the Reconfiguration Alternative, a fence would be installed around the perimeter of the mine facilities to exclude livestock from 2,967 acres. Approximately 7 acres of surface disturbance would result from fence construction, with temporary adverse impacts to vegetation in the immediate vicinity of the fence. Over the long-term in upland areas, excluding livestock from the area could potentially alter vegetation species composition and structure through reduced grazing of existing grass and forb species within the fenced area; but these effects, should they occur, would be very minor and dispersed. Impacts from exploration activity under the Livestock Fencing Alternative would be the same as under the Proposed Action. The greatest impact of excluding livestock from the mine facilities would occur to existing wetland vegetation. As shown in **Table 3.14-3**, wetlands W-4, W-5, W-6, and W-7 were documented to be heavily grazed during surveys in 2014. Excluding livestock from these areas would result in an increase in vegetative cover in the short-term. Over the long-term and without other disturbance, vegetation structure may change with taller vegetation (e.g., willows, cattails) replacing grasses and sedges. The fence would be removed once the mine is reclaimed and revegetation is determined successful by the BLM and NDEP.

3.14.2.4 No Action Alternative

Under the No Action Alternative, the proposed project would not be developed and the related potential impacts to vegetation resources would not occur. Continuation of mining activities associated with the Rossi Mine, completion of closure and reclamation activities associated with existing disturbance, ongoing mineral exploration activities, and reclamation within the study area, would be conducted under existing

authorizations. No additional ground-disturbing activities beyond those currently authorized would occur at the mine site.

3.14.3 Cumulative Impacts

The CESA for vegetation resources and riparian zones and wetland areas is defined in Section 3.14.1, Affected Environment, and is shown in **Figure 3.14-2, Figure 3.14-3**, and **Figure 3.14-5** respectively. Past, present, and RFFAs are discussed in Section 3.2, Past, Present, and Reasonably Foreseeable Future Actions. RFFAs for mining and exploration activities are identified in **Table 3.2-1** and their locations are shown in **Figures 3.2-1** and **3.2-2**. **Figure 3.2-2** also illustrates some ROW actions.

3.14.3.1 Proposed Action

General Vegetation

Predominant native vegetation communities that occur in the CESA include big sagebrush shrubland and steppe, grassland, greasewood shrubland, salt desert scrub, low sagebrush shrubland and steppe, and pinyon-juniper woodland. Past, present, and RFFAs in the vegetation CESA have resulted, or would result, in approximately 40,286 acres of mine- and mineral exploration-related disturbance for locatable and salable minerals and includes 395 acres attributed to sand and gravel mining operations. Past, present, and RFFAs from utility and energy development including the North Elko Pipeline and TS Power Plant have resulted, or would result, in up to 379 acres of additional disturbance. The Proposed Action including exploration within the project area would incrementally increase disturbance by an additional 1,167 acres for a total cumulative disturbance of 41,832 acres. This disturbance represents approximately 3 percent of the total past, present, and RFFAs disturbance. It is assumed that portions of past mine-related disturbances in the CESA have been reclaimed, and ongoing reclamation at existing operations would continue. The incremental additional impacts to vegetation as a result of the proposed project would be temporary in nature for the majority of the project disturbance area, with the exception of open pits, which would not be reclaimed.

Other surface disturbing activities in the CESA that contribute to cumulative effects of vegetation resources include the establishment and spread of noxious weeds and non-native invasive plant species, livestock grazing, and wildfires. Cumulative losses for vegetation resources potentially would include the reduction of native ecosystem functions such as soil stability, erosion control, livestock and wildlife forage, and wildlife habitat. The removal of woody species from these areas would result in a long-term change in vegetation structure since it may take up to 15 to 25 years for shrub species of similar stature to become re-established in these areas. Indirect impacts to vegetation resources associated with surface disturbance activities would include fugitive dust accumulation, and introduction and spread of noxious weeds or non-native invasive plant species. Fugitive dust from development activities can adversely impact native vegetation communities and alter vegetative composition. The cumulative effects of noxious weeds and non-native invasive plant species are discussed in Section 3.15, Noxious Weeds and Non-native Invasive Plant Species.

Livestock grazing has and would continue to influence vegetation composition and structure throughout the CESA. Potential for overgrazing may increase as vegetation is lost to mining activities and wildfire. Adjustment of stocking rates would account for the reduction in forage and ensure vegetation communities are not overgrazed. Within the CESA, reductions in permitted grazing use would continue to occur as a result of mine development and wildfires. Successful reclamation of mined areas and restoration of burned sites would allow for stocking rates to return to near pre-mining/pre-burn levels.

Numerous wildfires have occurred in the study area, creating additional regional impacts to vegetation within the CESA. **Figure 3.2-3** illustrates the locations of the wildfires in the region over the past 37 years, amounting to 1,476,738 acres. During the summer of 2017, approximately 202,856 acres of the CESA were burned by the Rooster Comb wildlife, including approximately 1,668 acres within the Rossi Mine PoO boundary. The cumulative effect of fires within the CESA is more pronounced because of the increased size and intensity of recent wildfires. Direct and indirect impacts to vegetation resources from wildfires include the complete loss or partial removal of upland vegetation species, potential removal of below ground biomass, soil hydrophobicity, and potential introduction and/or spread of noxious weeds or invasive plant species. See Section 3.13.3, Cumulative Impacts, for a further discussion of the effects of

wildfires on soil resources. Some burn areas have converted from sagebrush systems to cheatgrass monocultures. Increases in cheatgrass increase the fire return interval, which may permanently alter plant community structure and composition. Impacts to vegetation resources may vary depending on fire intensity, duration, and frequency. Recovery timeframes for herbaceous and woody species would be relatively similar to those previously described for other surface disturbance-related activities. Reseeding could improve vegetation structure and composition in burned areas and would benefit wildlife by providing forage, cover, and nesting habitat. Large areas affected by fire may take years to reestablish native vegetation. Planting in burned areas would provide breeding habitat, cover, and forage for a diversity of wildlife including mule deer, pronghorn, sage grouse, and pygmy rabbit.

Reclamation of mine-related disturbances in the CESA would be incremental as various operations reach the end of active mining and begin closure activities. In the CESA, permanent disturbance associated with mining would largely be associated with open pits. Areas being reclaimed on public lands would be reclaimed to BLM standards and monitored to assess success of reclamation. Grasses with low densities of native forbs and shrubs would likely be the dominant vegetation on reclaimed areas.

Previously disturbed land at the Arturo Mine, adjacent to the Rossi Mine Expansion Project, has been reclaimed with a seed mix consisting of native grasses, forbs and shrubs. These reclaimed areas maintain a diverse plant community that is self-sustaining and resistant to erosion. However, communities of big sagebrush, the most extensive pre-mining plant community, have proven difficult to re-establish on reclaimed lands when the soil characteristics do not contain the specific chemicals required by sagebrush to establish and grow (BLM 2010d).

Past, present, and RFFAs would cumulatively and incrementally reduce vegetation cover types until such time that reclamation is deemed successful and native plants are re-established. The cumulative unreclaimed disturbance area that would remain after completion of the interrelated actions, including the pit areas of the proposed project, would be a small percentage of the total land area in the CESA. Loss of mature shrubs would be minimal relative to the total acreage of woody species communities that occur within the CESA.

Riparian Zones and Wetland Areas

Surface disturbing activities in the CESA that have resulted, or would result, in cumulative effects to riparian zones and wetland areas include wildfires, mining operations, utility and energy development, and agricultural activities. Within the CESA, impacts to riparian zones and wetland areas are discussed in the NEPA documents associated with the past and current projects (BLM 2014a, BLM 2010b, BLM 2008a, BLM 2007b). Cumulative impacts to riparian zones and wetland areas within the Carlin Trend are discussed in the Final Environmental Impact Statement for the Arturo Mine Project (BLM 2014a). Cumulative impacts to riparian zones and wetland areas cannot be quantified but are discussed qualitatively.

It is anticipated that the cumulative impacts to riparian zones and wetland areas in the Carlin Trend from past, present, and RFFAs would include degradation of riparian and wetland vegetation from livestock grazing; mining (surface disturbance and dewatering activity); conversion of native riparian/wetland plant communities to communities dominated by invasive non-native species; other industrial development (e.g., power plants and power transmission corridors); service roads; wildfire; and in some cases agricultural diversions (BLM 2010d). These activities may result in the temporary or permanent loss of riparian and wetland vegetation. Wildfires have had varying impacts on riparian and wetland habitats, depending on the condition and moisture levels of the riparian zone prior to the wildfire. Grazing has affected and would continue to affect riparian zones and wetland areas to varying degrees. Depending on the level of management, livestock grazing may have minimal to extensive impacts on riparian vegetation. Grazing in the annual hot season, combined with the establishment of noxious weeds and non-native invasive plant species has an increased potential for impacts to riparian and wetland resources through loss of habitat and decrease and/or loss of vegetation.

Over the last several decades, riparian zones have generally improved throughout portions of the study area in response to changes in livestock management. As the need and opportunity for further grazing management changes are identified and implemented, riparian zones are expected to continue to improve. Although some impacts due to dewatering have occurred, riparian zones and wetland areas have been

improved and expanded in the CESA, through the Maggie Creek Watershed Restoration Project and Upper Willow Creek Habitat Enhancement Plans (BLM 2010d).

Under the proposed project the loss of the one wetland area from the King North WRDF (less than 0.1 acre) would be a very small but incremental addition to cumulative impacts to wetland areas within the CESA. Similarly, the 0.8 acre of disturbance to riparian zones would be a very small but incremental addition to cumulative impacts to riparian zones in the CESA.

Areas of wetland and riparian zone loss resulting from the Proposed Action would impact wildlife and migrating mule deer (*Odocoileus hemionus*) moving through the project area. Wetland and riparian habitat are often used by migrating mule deer and other migratory wildlife species as important seasonal stopover habitat, which provides available water and higher quality forage in comparison to other areas of migratory corridors within the Carlin Trend. Research has indicated that although stopover sites are important to completion of seasonal migrations, mule deer are not severely constrained by stopover spacing and are able to navigate both shorter and longer distances between stopovers (Sawyer and Kaufmann 2011). Details regarding impacts to mule deer are presented in Section 3.17, Wildlife and Aquatic Biological Resources.

Climate Change

Potential changes to the project area resulting from the effects of climate change forecasted by the Central Basin and Range Rapid EcoRegional Assessment (REA) could include higher than normal growing season temperatures, contraction or expansion of some existing vegetation communities, the expansion of existing noxious weed populations, and the introduction of noxious weed species previously undocumented in the ecoregion and project area (Comer et al. 2013). Regarding temperature increases specifically, the Central Basin and Range REA forecasts an average increase in average summer maximum daytime temperatures of approximately 5°F within the Rossi project area by 2060 (Comer et al. 2013). These increases in average growing season temperatures are anticipated to result in low elevation basins throughout the Central Basin and Range ecoregion potentially transitioning from the existing cool semi-desert vegetation communities into very warm and sparsely vegetated desert landscapes more typical of the Mojave Basin and Range.

A number of studies have documented a decrease in biomass and productivity resulting from climate change in the Southwest. A central New Mexico study found that the amount of above-ground plant biomass decreased as temperature increased and precipitation decreased (Anderson-Teixeira et al. 2011).On the Colorado Plateau, drought was associated with a substantial decrease in photosynthetic production of organic compounds, with summer rains rarely resulting in net increase in biomass (Bowling et al. 2010). The impact of climate change on vegetation communities within the CESA may be magnified compared to other ecosystems due to the aridity and lower resiliency of lands in the Great Basin. These lands are always “on the edge” due to extreme variation in the timing and quantity of precipitation, invasive species, altered fire regimes, and increasing development (Pellant 2007). With increasing atmospheric CO_2 levels, cheatgrass and other introduced annual grasses are expected to proliferate and continue to outcompete native species, which can be expected to increase the frequency and size of wildfires in the area (Smith et al. 2000). Ultimately, biodiversity in the CESA could be significantly reduced, which in turn might alter ecosystem processes such as primary production, nutrient dynamics, and landscape water balance.

3.14.3.2 Reconfiguration Alternative

General Vegetation

Cumulative effects under the Reconfiguration Alternative would be similar to cumulative effects associated with the Proposed Action, except that this alternative would incrementally add approximately 1,016 acres to the disturbance for a total cumulative disturbance of 41,681 acres associated with mineral exploration and mining activities within the CESA. The Reconfiguration Alternative disturbance represents approximately 3 percent of the total. Cumulative impacts to vegetation resources would be similar to those described for the Proposed Action minus 151 acres of vegetation impacts from surface disturbance.

Riparian Zones and Wetland Areas

Cumulative effects to wetland areas under the Reconfiguration Alternative would be the same as discussed under the Proposed Action. Cumulative effects under the Reconfiguration Alternative to riparian zones would result in 0.1 acre less incremental impact than the Proposed Action.

3.14.3.3 Livestock Fencing Alternative

Cumulative effects under the Livestock Fencing Alternative would be the same as discussed under the Proposed Action and Reconfiguration Alternative, except that an additional 7 acres of disturbance would result from the fence posts. Additionally, excluding livestock from the project area, where there has been evidence of frequent livestock use in wetland areas around water features, could result in livestock use increasing in wetland areas outside of the project area. Fencing would benefit the project during reclamation allowing for vegetation to establish without the stress from livestock grazing. Upon successful reclamation and revegetation as determined by BLM and NDEP, the fence would be removed.

3.14.3.1 No Action Alternative

Under the No Action Alternative, the proposed project would not be developed and no additional cumulative effects to vegetation resources or riparian zones and wetland areas would occur.

3.14.4 Potential Monitoring and Mitigation Measures

3.14.4.1 General Vegetation

The following mitigation measures are recommended for vegetation resources.

Issue: Sagebrush is an important habitat in the study area, and the loss of sagebrush communities would have impacts on area wildlife. Sagebrush communities can take several decades to reclaim and often be unsuccessful without additional reclamation measures.

Mitigation Measure V-1: Additional reclamation measures would be implemented to assist in the reclamation of sagebrush shrubland communities in the project area. Additional reclamation measures to be implemented include:

- Application of mulch;
- Inoculation with arbusucular mychorrizea;
- Growth media would be direct-placed, when possible;
- The use of imprinters and/or cultipackers; and
- Planting of sagebrush in small patches.

Effectiveness: The implementation of the additional sagebrush measures would assist in the establishment of successful sagebrush communities by favoring the establishment of big sagebrush in the project area. Big sagebrush would be favored by decreasing competition with noxious weeds through control of non-native invasive plant species, and the amelioration of site conditions through the addition of mulch, inoculation with arbusucular mychorrizea.

3.14.4.2 Riparian Zones and Wetland Areas

No mitigation measures are proposed for this resource.

3.14.5 Residual Impacts

3.14.5.1 General Vegetation

Residual impacts to vegetation would include the permanent loss of 194 acres of vegetation in previously reclaimed or undisturbed areas associated with the expansion of open pits that may not be reclaimed. Under the proposed project, the loss of shrub-dominated communities would represent a long-term

change in vegetation composition (i.e., shrub-dominated communities to grass/forb-dominated communities). In addition, fragmentation and the conversion of vegetation types would occur over the long term, depending on the success of reclamation and associated disturbances during the life of the project.

3.14.5.2 Riparian Zones and Wetland Areas

Under the Proposed Action, mining activity would result in less than 0.1 acre of disturbance to one wetland area (W-1) (**Figure 3.14-4**). The Proposed Action would also disturb 0.8 acres of riparian vegetation in the study area, which would result in complete disturbance of riparian vegetation in the study area, as the remaining 1.6 acres of riparian vegetation in the study area would be removed under existing/authorized disturbance as discussed on page 3.14-13.

3.15 Noxious Weeds and Non-native Invasive Plant Species

3.15.1 Affected Environment

The study area for noxious weeds and non-native invasive plant species includes the lands within the PoO boundary (**Figure 3.15-1**). The CESA for noxious weeds and non-native invasive plant species covers the Twenty-Five Allotment as well as the Boulder Field, T Lazy S, and Mary's Mountain grazing allotments and Boulder Creek Valley area between the T Lazy S and Twenty-Five Allotment (**Figure 3.15-2**).

Under the Federal Plant Protection Act of 2000 (formerly the Noxious Weed Act of 1974 [7 U.S.C. §2801-2814]), a noxious weed is defined as "any plant or plant product that can directly or indirectly injure or cause damage to crops, livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment." Invasive species are also managed under the Invasive Species Executive Order 13112, which directs federal agencies to take actions to prevent the introduction of invasive, non-native species and control their impact if introduced. The BLM Elko District developed an Integrated Weed Management Program, which incorporates manual, mechanical, herbicide treatments, prescribed fire, and biological control methods to control weeds (BLM 1998d, BLM 2011). Additionally, the Noxious Weed Act of 1974, as amended by Section 15 of the Management of Undesirable Plants on Federal Lands (1990), authorizes the Secretary of the Interior to "cooperate with other federal and state agencies and others in carrying out operations or measures to eradicate, suppress, control, prevent, or retard the spread of any noxious weed." The provisions of the act direct the agencies to consider noxious weeds when considering impacts of surface disturbing activities.

The State of Nevada also regulates noxious weeds. Under the NRS, a noxious weed is defined as "any species of plant which is, or is likely to be, detrimental or destructive and difficult to control or eradicate" (NRS 555.005 – Control of insects, pests, and noxious weeds). Noxious weeds have become a growing concern in Nevada, based on their ability to increase in cover relative to surrounding vegetation and exclude native plants from an area. Noxious weeds are classified into three categories based on the statewide importance, distribution, and the ability of eradication or control measures to be successful (see **Table 3.15-1** at footnote 1). A list of the noxious weed species designated by the State of Nevada is provided in **Table 3.15-1**.

Table 3.15-1. State of Nevada Noxious Weeds

Common Name	Scientific Name	Category[1]
African rue	*Peganum harmala*	A
Austrian fieldcress	*Rorippa austriaca*	A
Black henbane	*Hyoscyamus niger*	A
Camelthorn	*Alhagi camelorum*	A
Common crupina	*Crupina vulgaris*	A
Common St. Johnswort	*Hypericum perforatum*	A
Crimson fountain grass	*Pennisetum setaceum*	A
Dalmation toadflax	*Linaria dalmatica*	A
Dyer's woad	*Isatis tinctoria*	A
Eurasian water-milfoil	*Myriophyllum spicatum*	A
Giant reed	*Arundo donax*	A
Giant salvinia	*Salvinia molesta*	A

Table 3.15-1. State of Nevada Noxious Weeds

Common Name	Scientific Name	Category[1]
Goatsrue	*Galega officinalis*	A
Houndstongue	*Cynoglossum officinale*	A
Hydrilla	*Hydrilla verticillata*	A
Iberian starthistle	*Centaurea iberica*	A
Malta star thistle	*Centaurea melitensis*	A
Mayweed chamomile	*Anthemis cotula*	A
Mediterranean sage	*Salvia aethiopis*	A
Purple loosestrife	*Lythrum salicaria, L. virgatum* and their cultivars	A
Purple starthistle	*Centaurea calcitrapa*	A
Rush skeletonweed	*Chondrilla juncea*	A
Sow thistle	*Sonchus arvensis*	A
Spotted knapweed	*Centaurea masculosa*	A
Squarrose knapweed	*Centaurea virgata*	A
Sulfur cinquefoil	*Potentilla recta*	A
Swainsonpea	*Sphaerophysa salsula*	A
Syrian bean caper	*Zygophyllum fabago*	A
Yellow star thistle	*Centaurea solstiltialis*	A
Yellow toadflax	*Linaria vulgaris*	A
African mustard	*Brassica tournefortii*	B
Diffuse knapweed	*Centaurea diffusa*	B
Leafy spurge	*Euphorbia esula*	B
Medusahead	*Taeniatherum caput-medusae*	B
Musk thistle	*Carduus nutans*	B
Russian knapweed	*Acroptilon repens*	B
Sahara mustard	*Brassica tournefortii*	B
Scotch thistle	*Onopordum acanthium*	B
Silverleaf nightshade	*Solanum elaeagnifolium*	B
Canada thistle	*Cirsium arvense*	C
Hoary cress	*Cardaria draba*	C
Johnsongrass	*Sorghum halepense*	C
Perennial pepperweed	*Lepidium latifolium*	C
Poison-hemlock	*Conium maculatum*	C
Puncture vine	*Tribulus terrestris*	C

Table 3.15-1. State of Nevada Noxious Weeds

Common Name	Scientific Name	Category[1]
Salt cedar (tamarisk)	*Tamarix* spp.	C
Spotted water hemlock	*Cicuta maculata*	C

Source: Nevada Department of Agriculture 2012.

[1] **Category A** includes weeds that are generally not found or that are limited in distribution throughout the state subject to a) active exclusion from the state and active eradication wherever found and b) active eradication from the premises of a dealer of nursery stock.
Category B includes weeds that are generally established in scattered populations in some counties of the state subject to a) active exclusion where possible and b) active eradication from the premises of a dealer of nursery stock.
Category C includes weeds that are generally established and generally widespread in many counties of the state subject to active eradication from the premises of a dealer of nursery stock.

Recognizing these regulations, the BLM requires that NEPA documents consider and analyze the potential for the spread of noxious weed species and provide preventative rehabilitation measures for each management action involving surface disturbance. The BLM considers plants invasive if they have been introduced into an environment where they did not evolve. As a result, they usually have no natural enemies to limit their reproduction and spread (Westbrooks 1998).

A total of three State of Nevada listed noxious weeds were recorded within the study area during field surveys (SRK 2013b, BLM 2015h). In addition, two species considered invasive and related to State of Nevada noxious weeds were observed during the survey. These observations include one location of hairy whitetop (*Cardaria pubescens*), adjacent to a gravel county road and an ephemeral drainage, and one location of bull thistle (*Cirsium vulgare*) at an impoundment (SRK 2013b), and two locations of spotted knapweed (*Centaurea masculosa) (*BLM 2015h*)* (**Figure 3.15-1**). Previous surveys have also observed two locations of scotch thistle (*Onopordum acanthium*) and three locations of hoary cress (*Cardaria draba*) immediately to the south of the Rossi Mine PoO boundary along the Boulder Valley Road (BLM 2015h) (**Figure 3.15-1**). The study area also includes introduced annual grassland (predominantly cheatgrass), mostly occurring in areas that have been previously disturbed and reclaimed.

Surveys of the Arturo Mine site, which is located adjacent to the study area, documented noxious weeds in areas where existing disturbance existed, including scotch thistle, salt cedar, and bull thistle (BLM 2014a). At the time of those surveys (2009), Scotch thistle populations were most prominent and occurred throughout the existing disturbance area, including exploration roads, with control measures for this species being implemented in order to control or eradicate the species. Control measures for salt cedar were also being implemented to success. Bull thistle populations generally occurred along the periphery of the constructed wetlands areas (BLM 2014a). **Figure 3.15-2** illustrates documented existing noxious weeds and non-native plant species in the CESA.

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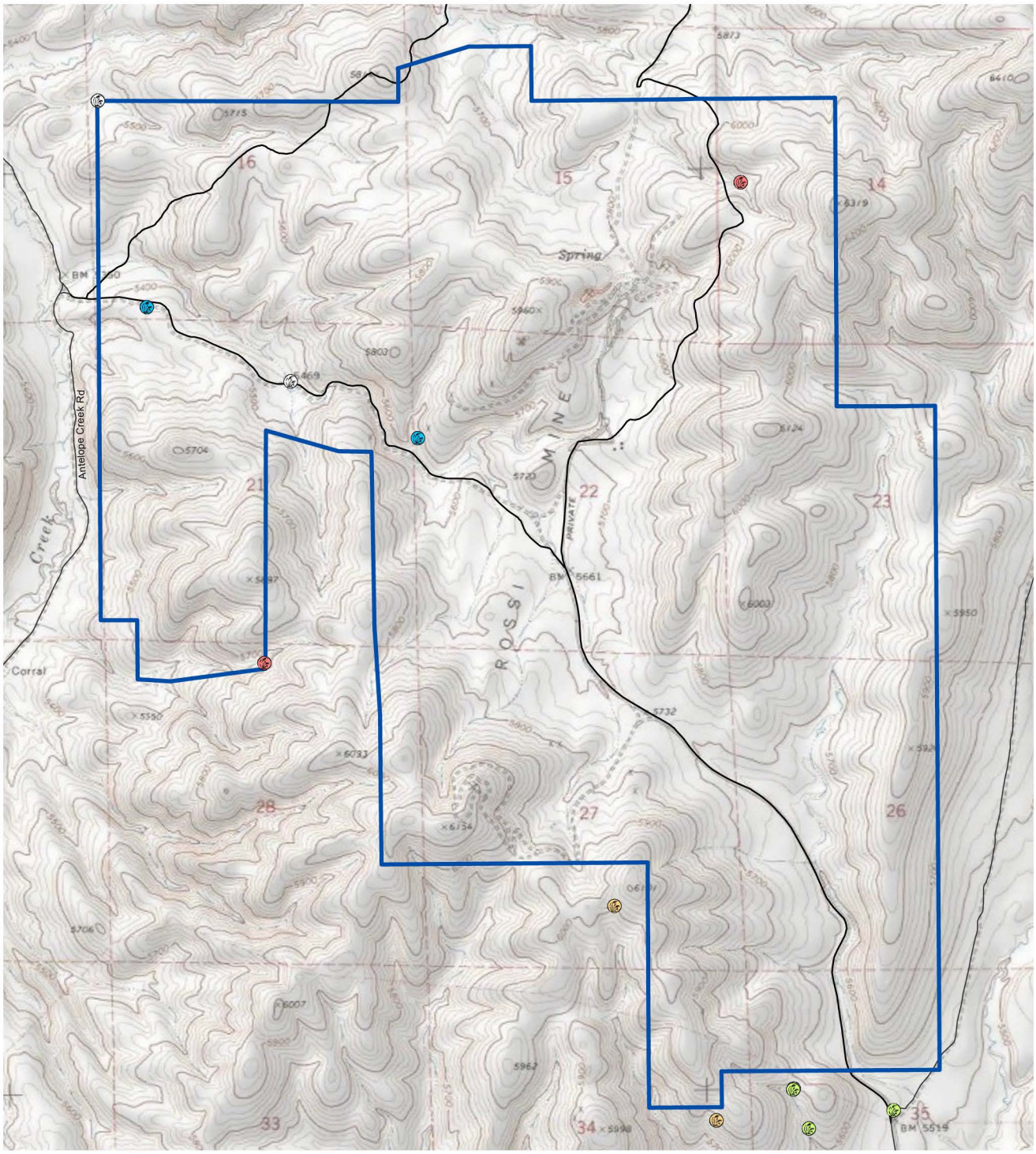
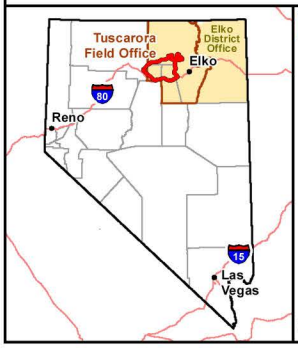




- Project Study Area
- Bull Thistle
- Hairy Whitetop
- Hoary Cress
- Scotch Thistle
- Spotted Knapweed

Source: BLM 2015h, SRK 2013b, SRK 2014a.

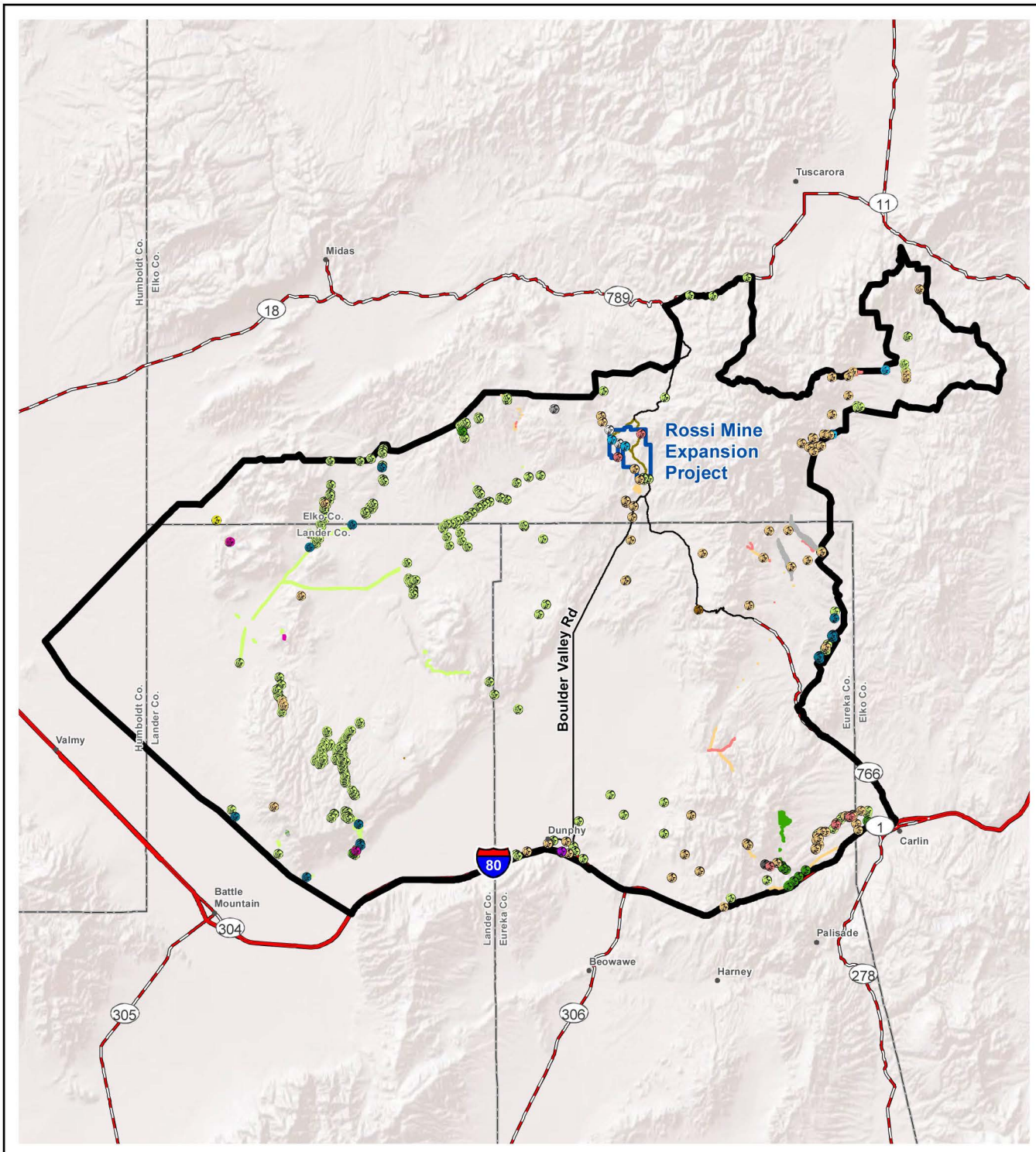
Rossi Mine Expansion Project EIS

Figure 3.15-1

Existing Noxious Weeds and Invasive Non-Native Plant Species within the Project Study Area

0 0.1 0.2 0.3 0.4 0.5 Miles
0 0.25 0.5 0.75 1 Kilometers
1:30,000

10/11/2017



- Bull Thistle
- Canada Thistle
- Hairy Whitetop
- Hoary Cress
- Knapweed spp.
- Musk Thistle
- Perennial Pepperweed
- Rush Skeletonweed
- Russian Knapweed
- Saltcedar
- Scotch Thistle
- Spotted Knapweed
- Thistle spp.
- Bull Thistle
- Canada Thistle
- Common Mullein
- Curly Dock
- Hoary Cress
- Iberian knapweed
- Knapweed spp.
- Lesser Burdock
- Musk Thistle
- Perennial Pepperweed
- Prickly Lettuce
- Rush Skeletonweed
- Russian Knapweed
- Saltcedar
- Scotch Thistle
- Spotted Knapweed
- Thistle spp.

Source: BLM 2015h, SKR 2013b, SRK 2014a.

Rossi Mine Expansion Project EIS

Figure 3.15-2

Existing Noxious Weeds and Invasive Non-Native Plant Species in the Cumulative Effects Study Area

0 1 2 3 4 5 10 Miles
0 1 2 3 4 5 10 Kilometers
1:600,000

N

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3.15.2 Environmental Consequences

3.15.2.1 Proposed Action

Under the proposed project, mine development and operation would disturb approximately 1,167 acres from surface disturbance activities. Approximately 206 acres would occur in areas of existing disturbance and 961 acres would occur in previously undisturbed areas. The majority of the disturbance would occur in the sagebrush shrubland land cover type.

Following surface disturbance activities, noxious weeds and non-native invasive plant species may readily colonize areas that typically lack or have minimal vegetation cover. Noxious weed seed and plant material can be transferred into the project area via livestock, wildlife, vehicles, equipment, and the wind. Noxious weed and invasive plant species that occur in the project vicinity and along the Boulder Valley, Antelope Creek, and Boulder-Antelope Connector Roads are the species most likely to become established within areas of surface disturbance. It is anticipated that minor populations of weedy annual species (e.g., halogeton, cheatgrass) may become established in localized areas for extended periods of time. Surface disturbance and increased vehicle travel along new routes may readily spread noxious weeds and non-native invasive plant species and colonize areas that have minimal vegetative cover or that have been recently disturbed. Noxious weed species can degrade and modify native communities, reduce resources for native species, monopolize limited sources of moisture, and adversely affect native pollinators. In addition, noxious weeds and non-native invasive plant species can reduce wildlife habitat, alter fire regimes, and degrade wetland and riparian areas.

Implementation of the Rossi Mine Noxious and Invasive Weed Management Plan (HES 2016i), Applicant Committed Environmental Protection Measures, and HES' reclamation measures would reduce the potential for noxious weeds and non-native invasive plant species establishment in the study area. All surface disturbance would be reclaimed either concurrently during operations as areas become available or once mining is complete. HES' PoO and Noxious and Invasive Weed Management Plan includes management strategies and control techniques to prevent or minimize the establishment or spread of weed populations. The HES is available as an appendix to the Rossi Mine PoO on file with the BLM Elko District Office. Noxious weed management would continue during the post-mining reclamation period and the post-closure monitoring period.

As summarized in Section 2.3.12.3, Reclamation of Proposed Project Facilities, HES would implement BMPs outlined in the Rossi Mine Noxious and Invasive Weed Management Plan to prevent the spread of noxious weeds, which would include seeding growth media stockpiles as soon as practical with an interim seed mix and using certified weed-free seed mixture, and washing all vehicles that have been off-road and possibly exposed to noxious weed seeds at designated wash areas (HES 2016i). Seeding the growth media stockpiles with the interim seed mix would stabilize the growth media and reduce soil erosion in addition to minimizing the potential for the establishment of noxious weeds and non-native invasive plant species. Successful reclamation of mine-related disturbance areas (except for open pits) would result in the establishment of a permanent vegetative cover, which would minimize the potential establishment of noxious weeds and non-native invasive plant species in the long term. Open pits would not be reclaimed; however, due to the absence of soils, the potential for establishment of noxious weeds and non-native invasive plant species would be less likely.

3.15.2.2 Reconfiguration Alternative

The Reconfiguration Alternative would be similar to the Proposed Action, except sequencing of the construction and reclamation of the Dawn Pit would be conducted to reduce the duration of surface disturbance at this location. Additionally, construction of the QLC Pit and WRDFs would be modified from the Proposed Action to maintain a minimum 2000-foot-wide undisturbed corridor for mule deer migration between the proposed Dawn WRDF and the Arturo Mine facilities to the south as shown in **Figure 2-8**. Overall, this alternative would result in approximately 151 fewer acres of disturbance in the study area. As a result, the potential for the introduction or spread of noxious weeds and non-native invasive plant species would be less than the Proposed Action since 151 fewer acres would be disturbed.

3.15.2.3 Livestock Fencing Alternative

The environmental consequences for the Livestock Fencing Alternative would be similar to the Proposed Action and Reconfiguration Alternative, except that constructing a fence around the PoO area could increase the risk of spreading invasive non-native species to these areas, especially if vehicles are driven off road to install the fence. In the long-term, excluding livestock from the PoO area could help prevent the spread of non-native invasive plant species in the study area, since the seeds of non-native invasive plant species could not be carried into the PoO area by cattle. The fence would be removed once the mine is reclaimed and revegetation is determined successful by the BLM and NDEP.

3.15.2.4 No Action Alternative

Under the No Action Alternative, the proposed project would not be developed and subsequent impacts associated with the introduction or spread of noxious weeds and non-native invasive plant species would not occur. Continuation of mining activities associated with the Rossi Mine, completion of closure and reclamation activities associated with existing disturbance, and ongoing mineral exploration activities within the study area, would be conducted under existing authorizations and the spread of noxious weeds and non-native invasive plant species may occur. Existing weed control measures would continue to be implemented to prevent the establishment of new populations and to control existing populations in mine-related disturbance areas.

3.15.3 Cumulative Impacts

The CESA for noxious weeds and non-native invasive plant species is described in Section 3.15.1, Affected Environment, and is shown in **Figure 3.15-2**. The past, present, and RFFAs are discussed in Section 3.2, Past, Present and Reasonably Foreseeable Future Actions. RFFAs for mining and exploration activities are identified in **Table 3.2-1**; their locations are shown in **Figure 3.2-1** and **Figure 3.2-2**. **Figure 3.2-2** also illustrates some ROW actions.

3.15.3.1 Proposed Action

Past, present, and RFFAs in the CESA have resulted, or would result, in approximately 40,587 acres of mine and exploration related surface disturbance, including 395 acres of sand and gravel mining operations. Past, present, and RFFAs from utility and energy development including the North Elko Pipeline and TS Power Plant have resulted, or would result, in up to 379 acres of additional disturbance. The Proposed Action including exploration within the project area would incrementally increase disturbance by an additional 1,167 acres for a total cumulative disturbance of 41,754 acres. This disturbance represents approximately 3 percent of the total past, present, and RFFAs disturbance. Noxious weeds and non-native invasive plant species currently exist in the CESA (**Figure 3.15-2**). Surface disturbance activities from implementation of the proposed project as well as other future projects could further spread noxious weeds and non-native invasive plant species into previously undisturbed areas, and may increase the acreage and population numbers of already established noxious weeds and non-native invasive plant species populations. Other surface disturbing activities in the CESA that contribute to the cumulative spread of noxious weeds and non-native invasive plant species include livestock grazing, wildfire, all-terrain vehicles, wildlife and recreation use.

It is anticipated that the cumulative impacts to noxious weeds and non-native invasive plant species in the CESA from past, present, and RFFAs would result in the potential for the introduction of new noxious weed and non-native invasive plant species in addition to the increased spread of these species into disturbed areas created from surface disturbances associated with grazing, wildfires, recreational use and the development of mining projects and utility corridors. Linear surface disturbances such as utility corridors, roads, and trails provide corridors for further introduction and spread of noxious weeds and non-native invasive plant species (Gelbard and Belnap 2003, Watkins et al. 2003). These networks of corridors can then serve as a source of propagules (D'Antonio et al. 2001) for noxious weeds and non-native invasive plant species to spread into adjacent undisturbed areas.

It is assumed that the majority of the surface disturbance-related impacts within the CESA would be reclaimed, minimizing the introduction and/or spread of noxious weeds and non-native invasive plant species. HES would implement measures to minimize the introduction and/or spread of noxious weeds and non-native invasive plant species within the proposed project disturbance areas, thereby minimizing the project's contribution to cumulative effects.

Climate Change

Potential changes to the project area resulting from the effects of climate change forecasted by the Central Basin and Range REA could include higher than normal growing season temperatures, contraction or expansion of some existing vegetation communities, the expansion of existing noxious weed populations, and the introduction of noxious weed species previously undocumented in the ecoregion and project area (Comer et al. 2013). Regarding temperature increases specifically, the Central Basin and Range REA forecasts an average increase in average summer maximum daytime temperatures of approximately 5°F within the project area by 2060 (Comer et al. 2013). These increases in average growing season temperatures are anticipated to result in low elevation basins throughout the Central Basin and Range ecoregion potentially transitioning from the existing cool semi-desert vegetation communities into very warm and sparsely-vegetated desert landscapes more typical of the Mojave Basin and Range.

Increasing temperature and longer growing season could further result in expansion of invasive annual grass and forb species into elevations where they are currently limited or the replacement of one existing exotic annual grass with another. These shifts in species compositions have potential to introduce novel effects on local fire regimes in vegetation communities such as montane sagebrush steppe and higher elevation woodland and forest (Abatzoglou and Kolden 2011; Rivera et al. 2011).

3.15.3.2 Reconfiguration Alternative

Cumulative effects under the Reconfiguration Alternative would be similar to cumulative effects associated with the Proposed Action, except that this alternative would add approximately 1,016 acres of new disturbance, which is 151 acres less than the Proposed Action, resulting in a total cumulative disturbance of 41,603 acres. This smaller amount of surface disturbance represents a smaller incremental impact to the cumulative effects of non-native invasive species.

3.15.3.3 Livestock Fencing Alternative

Cumulative effects acreages under the Livestock Fencing Alternative would be the same as the cumulative effects associated with the Proposed Action and the Reconfiguration Alternative with the addition of 7 acres of surface disturbance resulting from fence installation. Upon successful reclamation and revegetation as determined by BLM and NDEP, the fence would be removed.

3.15.3.4 No Action Alternative

Under the No Action Alternative, the proposed project would not be developed and no additional cumulative effects from noxious weeds and non-native invasive plant species would occur.

3.15.4 Potential Monitoring and Mitigation Measures

HES would monitor revegetation success and for the presence of noxious and non-native invasive plant species. HES would treat noxious and non-native invasive plant species found within the PoO boundary that are associated with the mine and mineral surface disturbance as described in their weed management plan. No additional mitigation measures are recommended for noxious weeds and non-native invasive plant species.

3.15.5 Residual Impacts

Noxious weeds and non-native invasive plant species may persist over the long term regardless of the implementation of weed control programs.

3.16 Range Resources

3.16.1 Affected Environment

The study area for range resources comprises the area within the proposed PoO boundary and the area potentially encompassed under the Livestock Fencing Alternative. These are the areas in which direct and indirect project-related impacts to range resources are most likely to occur. The CESA for range resources includes the Twenty-Five Allotment as well as the Boulder Field, Tuscarora, T Lazy S, and Mary's Mountain grazing allotments—the allotments in which cumulative impacts to range resources from past, present, and reasonably foreseeable mining and exploration activities along the Carlin Trend are most likely to occur. **Figure 3.16-1** depicts the study area and CESA boundaries for range resources. **Table 3.16-1** summarizes key characteristics of grazing allotments within the CESA.

The study area is located within and encompasses approximately 1 percent of the total land area of the Twenty-Five Allotment, which is the only grazing allotment within the study area. The Twenty-Five Allotment includes approximately 309,390 acres of public land and 214,693 acres of private land totaling 524,083 acres (BLM 2015c). One operator, 26 Ranch, LLC, is currently permitted by the BLM to graze cattle and horses in approximately 30 different pastures within the allotment during different seasons of use (BLM 2015c). The BLM coordinates with the operator to determine grazing management for the Twenty-Five Allotment, including individual pastures, on an annual basis. Grazing by horses is restricted under the permit to the periods between March 1 and April 30, May 1 and May 3, and December 1 to February 28. One AUM represents the amount of forage necessary for the sustenance of one cow or its equivalent (e.g., one cow and her calf, one horse) for a period of one month (43 CFR 4100.0-5). Grazing preference is the total number of AUMs, including AUMs in active use and suspension, apportioned to livestock grazing use. The grazing preference takes into account areas determined by the BLM as unsuitable for livestock grazing because of low production, lack of water, or other uses (e.g., trailing) as well as competition with wildlife and wild horses. Suspended AUMs on public lands are not authorized for use, usually because of poor rangeland conditions, and may only be removed from suspension under the provisions of the grazing regulations at 43 CFR 4110.3-1(b) or made temporarily available through a non-renewable use permit under 43 CFR 4110.3-1(a). The grazing preference for the Twenty-Five Allotment is 55,215 AUMs; 34,130 AUMs are in active use and 13,878 AUMs are suspended from use (BLM 2015c). Refer to Section 3.14, Vegetation, including Riparian Zones and Wetland Areas, for information on vegetation communities within the vicinity of the proposed project.

The study area contains a stock water trough, which is located approximately 0.3 mile south of a stock pond. This trough provides fresh water to livestock and wildlife. The BLM's range improvement inventory database for the Elko District Office does not identify any other range improvements within the study area (BLM 2015c); however, there are two fences near the eastern and southeastern boundaries of the study area and numerous range improvements, such as water wells, guzzlers, water troughs, and livestock ponds present throughout the CESA, as shown in **Figure 3.16-1**.

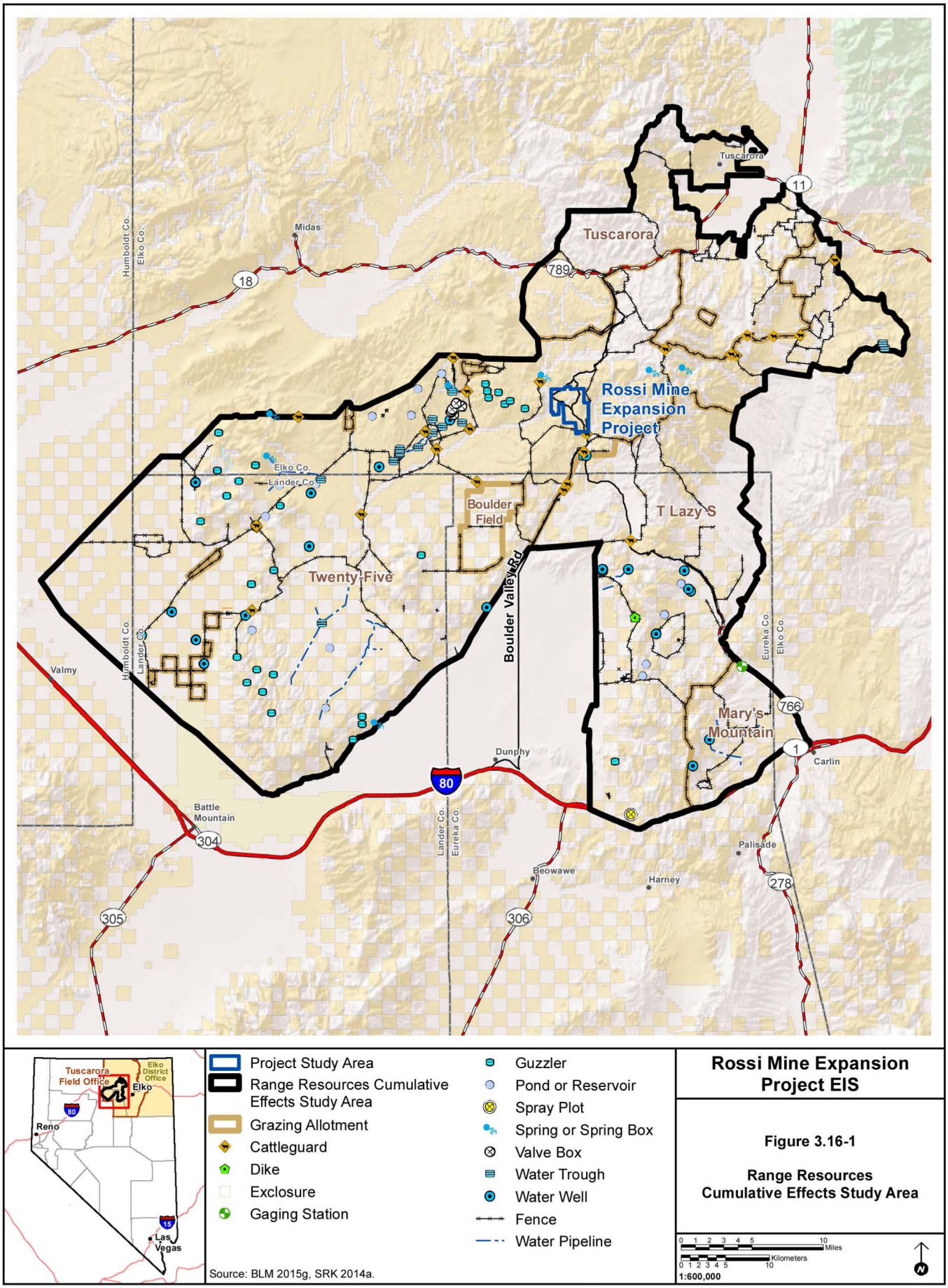

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Table 3.16-1. Grazing Allotments in the Study Area and CESA

Grazing Allotment Name	Allotment Acreage within the Study Area	Allotment Acreage within the CESA	Percent of Public Land in Total Allotment	Total Allotment Active AUMs[1,2]	Type of Livestock	General Season of Use	Category[3]
Boulder Field	0	11,893	51	838	Cattle	March 1 – May 31	Maintain
Mary's Mountain	0	34,949	51	1,408	Cattle	February 15 – October 31	Custodial
T Lazy S	0	176,875	44	11,907	Cattle	February 15 – November 30	Improve
Tuscarora	0	98,830	50	9,166	Cattle/ Horses	March 1 – December 15	Improve
Twenty-Five Allotment	3,731	524,083	67	34,130	Cattle/ Horses	March 1 – February 28	Improve

Source: BLM 2015c.

[1] One AUM represents the amount of forage necessary for the sustenance of one cow or its equivalent for a period of 1 month (43 CFR 4100.0-5).
[2] Actual use of forage is typically less than the amount authorized (i.e., active AUMs) because forage availability and demand vary based on factors such as drought, wildfire, and market conditions.
[3] The BLM categorizes the level of management required to properly administer each grazing allotment from low to high as custodial, improve,, or maintain in accordance with BLM Handbook 1740-1, Rel. 1-1509 (BLM 1987b), which has been augmented with additional criteria from BLM IM No. 2009-018 (BLM 2008d).

3.16.2 Environmental Consequences

Primary range resource issues include the proliferation of noxious weeds and non-native invasive plant species, suspension of active AUMs due to loss of forage from the proposed surface disturbance or exclusionary fencing, reduced access to existing water sources, and interference with seasonal livestock movement within the Twenty-Five Allotment.

3.16.2.1 Proposed Action

Direct impacts on range resources could result from project-related activities that disturb or exclude livestock from foraging areas, increase the risk of vehicular collisions with livestock, or expose livestock to hazardous chemicals or construction zone hazards. Indirect impacts from project-related activities that could affect livestock grazing are fugitive dust, which can affect forage quality and livestock health, or an increase in the establishment and spread of non-native invasive plant species and noxious weeds that are unpalatable or poisonous to livestock. These types of impacts would be adverse due to their potential to displace, injure, or kill livestock. Beneficial impacts could result from the development of additional water sources for livestock and the successful revegetation of existing disturbance through concurrent and final reclamation, which over the long term (approximately 3-5 years after reclamation), could increase the availability of forage for livestock within the project vicinity.

Expansion of existing operations at the Rossi Mine would result in 1,167 acres of new surface disturbance and a total of 2,063 acres of surface disturbance, which would reduce lands available for livestock grazing until they are reclaimed following the cessation of active mining activities. As shown in **Table 3.16-2**, 1,167 acres of surface disturbances are equivalent to a reduction of approximately 107 AUMs in the Twenty-Five Allotment. Upon cessation of mining activities and successful completion of reclamation, suspended AUMs would be returned to active status as determined by the BLM.

Increased project-related vehicle traffic, primarily on Antelope Creek and Boulder Valley roads, could increase the risk of vehicular collisions with livestock. To reduce the risk of collisions and minimize fugitive

dust emissions, HES has committed to applying gravel and water treatment to roads. These applications would minimize impacts to adjacent forage and livestock health.

Project-related disturbance and vegetation removal could increase the area's susceptibility to the colonization and spread of noxious weeds and/or non-native invasive plant species. These impacts could result in the conversion of native vegetation communities, which would reduce the amount of forage available to livestock. HES would assume responsibility for noxious weed control within the study area and would apply measures described in the Noxious and Invasive Weed Management Plan (HES 2016h) to minimize the potential for the spread of non-native plant species and/or noxious weed species, including the use of approved certified weed-free seed mixture, implementation of prompt and appropriate revegetation techniques, and establishing designated wash areas for vehicles and equipment exposed to possible noxious weed seeds. If invasive species or noxious weeds spread beyond the study area or if weed control measures are unsuccessful, adverse impacts could still occur. Discussion of non-native plant species is presented in Section 3.15, Noxious Weeds and Non-native Invasive Plant Species.

HES would protect existing range improvements in the study area, if applicable, which include a stock water trough and stock pond, from damage related to the proposed project. The stock water trough may require removal due to interfering with the mining operation and the stock pond would be reclaimed when no longer needed as it is a component of the water system. However, increased vehicle traffic, construction, and ongoing operational activities could limit access or cause livestock to avoid these water sources, even if they are functioning properly. Water sources outside the proposed PoO boundary would remain accessible for livestock.

Table 3.16-2. Acreage of Surface Disturbance and Forage Loss in Twenty-Five Allotment

Alternative	Allotment Acreage Excluded from Grazing	Projected Active AUMs Lost[1]	Percent Loss of Total Active AUMs in Allotment
Proposed Action	1,167	107	<1%
Reconfiguration Alternative	1,016	93	<1%
Livestock Fencing Alternative	2,967	272	<1%
No Action Alternative	908	112	<1%

[1] One AUM represents the amount of forage necessary for the sustenance of one cow or its equivalent for a period of 1 month (43 CFR 4100.0-5). Projected AUM loss was calculated based on the acres of project-related surface disturbance and other areas excluded from livestock grazing under each alternative multiplied by the average stocking rate of 10.9 acres per AUM for the Twenty-Five Allotment (i.e., total allotment acres / total grazing preference AUMs).

3.16.2.2 Reconfiguration Alternative

Direct and indirect impacts to range resources would be the same as described for the Proposed Action, except for the following:

- Under the Reconfiguration Alternative approximately 1,016 acres of new surface disturbance would be added to the 896 acres of previously authorized disturbance for a total of 1,912 acres. This represents approximately 151 less acres of disturbance under the Reconfiguration Alternative in comparison to the Proposed Action. The estimated AUM loss for the Reconfiguration Alternative would be 93 AUMs, or 14 fewer AUMs than the Proposed Action. Because this difference of 14 AUMs represents a small fraction (less than 1 percent) of the total active AUMs in the Twenty-Five Allotment, no notable difference in the level of impacts is anticipated.

3.16.2.3 Livestock Fencing Alternative

Direct and indirect impacts to range resources would be the same as described for the Proposed Action, except for the following:

- Installation of a perimeter fence around the mine facilities would result in the exclusion of livestock from approximately 1,804 more acres than the Proposed Action. The estimated forage

lost under the Reconfiguration Alternative would be 272 AUMs, or 165 more AUMs than the Proposed Action. Although this would reduce the amount of available forage in comparison to the Proposed Action. The total AUM loss under the Livestock Fencing Alternative still represents less than 1 percent of the total active AUMs in the Twenty-Five Allotment. Therefore, no notable difference in the level of impacts due to direct forage loss is anticipated.

- The perimeter livestock fence would prevent livestock from accessing the existing stock water trough and stock pond within the project site.
- The perimeter fence would exclude livestock from grazing within areas where they may be exposed to hazardous chemicals, construction vehicles and mining equipment, and other hazards associated with an active mining area, reducing the potential for adverse impacts in comparison to the Proposed Action.

The fence would be removed once the mine is reclaimed and revegetation is determined successful by the BLM and NDEP.

3.16.2.4 No Action Alternative

Effects of past and ongoing activities at Rossi Mine were addressed in prior environmental analyses listed in **Table 2-1**. Ongoing mining activities at Rossi Mine would continue to exclude lands from livestock grazing use, including 912 acres of existing authorized surface-disturbance, until they are reclaimed following the cessation of active mining activities. However, the proposed project would not be developed and no additional forage loss; increases in project-related vehicle traffic, noise, and dust; or increased risk of exposure to hazardous chemicals or construction zone hazards would occur. Therefore, impacts from ongoing development at Rossi Mine would be similar to baseline conditions described in Section 3.16.1, Affected Environment, and would gradually diminish with concurrent reclamation, final closure, and final reclamation of the Rossi Mine.

3.16.3 Cumulative Impacts

The CESA for range resources is defined in Section 3.16.1, Affected Environment, and is shown in **Figure 3.16-1.** Past, present, and RFFAs for mining and mineral exploration activities are identified in **Table 3.2-1** and their locations are shown in **Figure 3.2-1 and Figure 3.2-2**. **Figure 3.2-2** also illustrates some ROW actions.

3.16.3.1 Proposed Action

Table 3.16-1 summarizes key characteristics of grazing allotments within the CESA: Boulder Field, Mary's Mountain, T Lazy S, Tuscarora, and Twenty-Five Allotment. These allotments include a total of 57,449 active AUMs, where cattle grazing constitutes the majority of the active grazing preference. Roughly half of the acreage of each allotment is composed of federal lands.

Past, present, and RFFAs within the CESA have resulted, or would result, in approximately 42,437 acres of surface disturbance from mining exploration and development projects for locatable and salable minerals. Past, present, and RFFAs from utility and energy development have resulted, or would result, in up to 145 acres of additional disturbance, for a total cumulative disturbance of 42,582 acres. The Proposed Action disturbance of 1,167 acres represents approximately 3 percent of the total estimated disturbance from past, present, and RFFAs. Based on the estimated stocking rate for each allotment in the CESA, surface-disturbing activities associated with past, present, and RFFAs would result in the loss of 2,998 AUMs from the active grazing preference. The Proposed Action would reduce the active grazing preference by an additional 107 AUMs. Adding the incremental disturbance from the Proposed Action to past, present, and RFFAs would result in total loss of 3,104 AUMs from the active grazing preference, or approximately 4 percent of the AUMs within the CESA. Adverse cumulative effects to livestock grazing could include increased potential for establishment and spread of noxious and invasive plants and vehicle traffic. These effects could occur across a much larger area than the proposed disturbance area.

Climate Change

Climate change appears to be influencing both natural and managed ecosystems within northern Nevada. Recent warming in the Southwest is among the most rapid in the nation, significantly more than the global average in some areas (USGCRP 2009). Projections suggest continued strong warming in the region, with significant increases in temperature (USGCRP 2009) and decreases in precipitation (Seager et al. 2007). Potential changes to the project area resulting from the effects of climate change forecasted by the Central Basin and Range REA could include higher than normal growing season temperatures, contraction or expansion of some existing vegetation communities, the expansion of existing noxious weed populations, and the introduction of noxious weed species previously undocumented in the ecoregion and project area (Comer et al. 2013). These increases in average growing season temperatures are anticipated to result in low elevation basins throughout the Central Basin and Range ecoregion potentially transitioning from the existing cool semi-desert vegetation communities into very warm and sparsely vegetated desert landscapes more typical of the Mojave Basin and Range. Under such conditions the reduction of forage vegetation and available water may make livestock operations within the CESA unfeasible.

3.16.3.2 Reconfiguration Alternative

Cumulative impacts to range resources would be the same as described for the Proposed Action, with the exception of a reduction of 151 acres that would not be developed under the Reconfiguration Alternative.

3.16.3.3 Livestock Fencing Alternative

Cumulative impacts to range resources under the Livestock Fencing Alternative would be the same as described for the Proposed Action and Reconfiguration Alternative, except it would restrict livestock movements and inhibit herding practices. Upon successful reclamation and revegetation as determined by BLM and NDEP, the fence would be removed.

3.16.3.4 No Action Alternative

Under the No Action Alternative, past and present actions would continue as approved and RFFAs would be evaluated prior to approval. The proposed project would not be approved or implemented; therefore, no additional effects on range resources would occur from the Proposed Action. Effects of the No Action Alternative on range resources have been addressed in prior environmental analyses of past and present actions and the effects of RFFAs would be addressed through future analyses. Failing to approve the proposed project would not alter those effects, so there would be no cumulative effects on range resources from the No Action Alternative.

3.16.4 Potential Monitoring and Mitigation Measures

Issue: The proposed project could impede seasonal cattle movements between summer and winter grazing areas and depending on the alternative selected, may prevent livestock from accessing existing water sources within the proposed PoO boundary.

Mitigation Measure R-1: Coordinate with Twenty-Five Allotment permittee and the BLM to identify measures to facilitate cattle movement during seasonal cattle drives and evaluate the need to develop additional livestock water sources.

Effectiveness: The success of this measure in reducing potential impacts to livestock grazing operations would depend on the level of coordination maintained between HES, the permittee, and the BLM.

Details regarding long-term post closure vegetation monitoring are provided in Section 3.13, Soils and Reclamation.

3.16.5 Residual Impacts

Residual impacts to range resources could occur if invasive species or noxious weeds spread beyond the study area or if weed control measures are unsuccessful. This would reduce the amount and quality of forage available for livestock grazing.

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3.17 Wildlife and Aquatic Biological Resources

3.17.1 Affected Environment

The study area for wildlife resources and aquatic biological resources is the project area plus a 10-mile buffer, respectively. The CESAs for wildlife resources vary depending on the species and were determined based on wildlife use within the project region and important seasonal habitats for species such as mule deer. The CESA for general wildlife species was determined based on the two hydrographic basins that overlap the study area which include Boulder Flat #61 and Rock Creek Valley #62, which extend from north of the study area in Elko County south into Lander and Eureka counties and extends southwest to the north of I-80 near Battle Mountain and southeast of I-80 near the town of Palisade (**Figure 3.17-1**). The mule deer CESA encompasses all of NDOW Management Area 6 which includes Units 61, 62, 64, 66-68 (**Figure 3.17-2**). The CESA for aquatic biological resources encompasses the Maggie Creek Area, Rock Creek Valley, and Boulder Flat hydrographic basins along the Carlin Trend (see Section 3.14, Vegetation, including Riparian Zones and Wetland Area (**Figure 3.14-5**). These three hydrographic basins drain southward into the Humboldt River.

3.17.1.1 Wildlife Resources

As discussed in Section 3.14, Vegetation, including Riparian Zones and Wetland Areas, the study area includes a variety of landcover classes, the majority of which are comprised of Inter-Mountain Basins Big Sagebrush Steppe (52 percent of the study area), Great Basin Xeric Mixed Sagebrush Shrubland (15 percent of the study area), Inter-Mountain Basins Big Sagebrush Shrubland (12 percent of the study area), and Introduced Upland Vegetation/Annual Grassland (10 percent of the study area).The remaining 11 percent is either previously developed or disturbed. Some areas previously disturbed by mining activity or wildfire have been revegetated either purposefully or through natural processes over time. Although these previously disturbed areas vary in the types and densities of existing vegetation communities, they are considered to provide some level of habitat value for local wildlife and are therefore included in the impact analysis as suitable habitat.

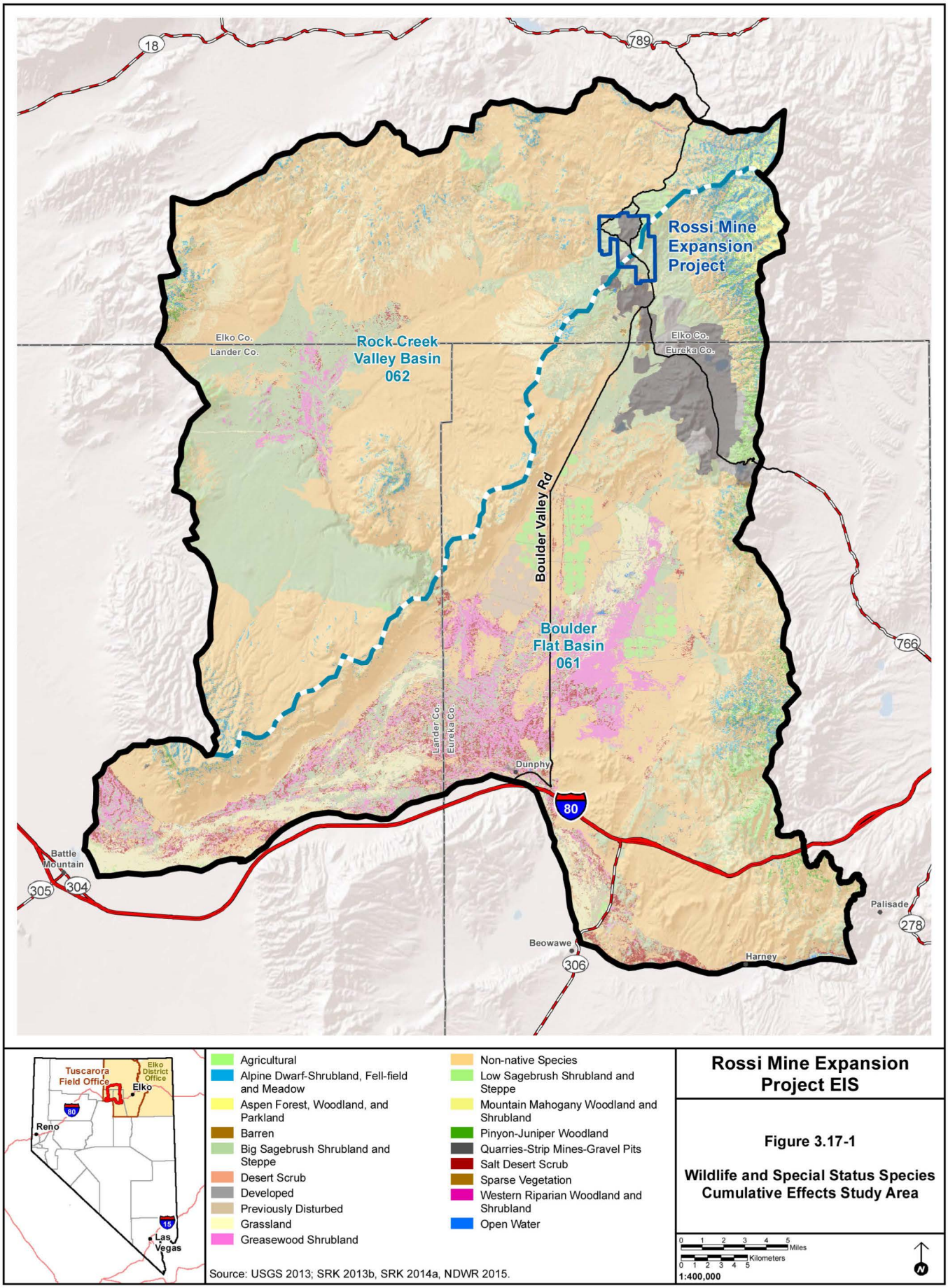
Wildlife species and habitats found within the study area are typical of the Central and Northern Basin and Range Ecoregions (Bryce et al. 2003). Available water for wildlife consumption is limited in the study area. Surface water features include unvegetated short-seasonal ponds, strips of moderately wet mesic meadows, and perennial springs supporting wetland vegetation. Riparian-specific features include willow and herbaceous riparian habitats (EcoSynthesis 2013).

Information regarding wildlife species and habitat within the study area and CESAs was obtained from a review of existing published sources, site-specific wildlife and habitat surveys, and the BLM, NDOW, and USFWS file information.

3.17.1.2 Big Game Species

Big game species are managed by NDOW, with species specific range designations and migration corridors delineated across the entire state. Mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), and elk (*Cervus canadensis*) are the primary big game species within the study area (SRK 2013b; NDOW 2014). The study area occurs entirely within NDOW's Management Area 6, specifically hunting unit 068.

Mule deer, pronghorn, and elk population numbers fluctuate slightly from year-to-year based on habitat conditions. Limiting factors within the study area include water availability and the amount of suitable habitat. Seasonal use and movement patterns in the vicinity of the study area depend on weather and forage availability and quality.



Rossi Mine Expansion Project EIS

Figure 3.17-1

Wildlife and Special Status Species Cumulative Effects Study Area

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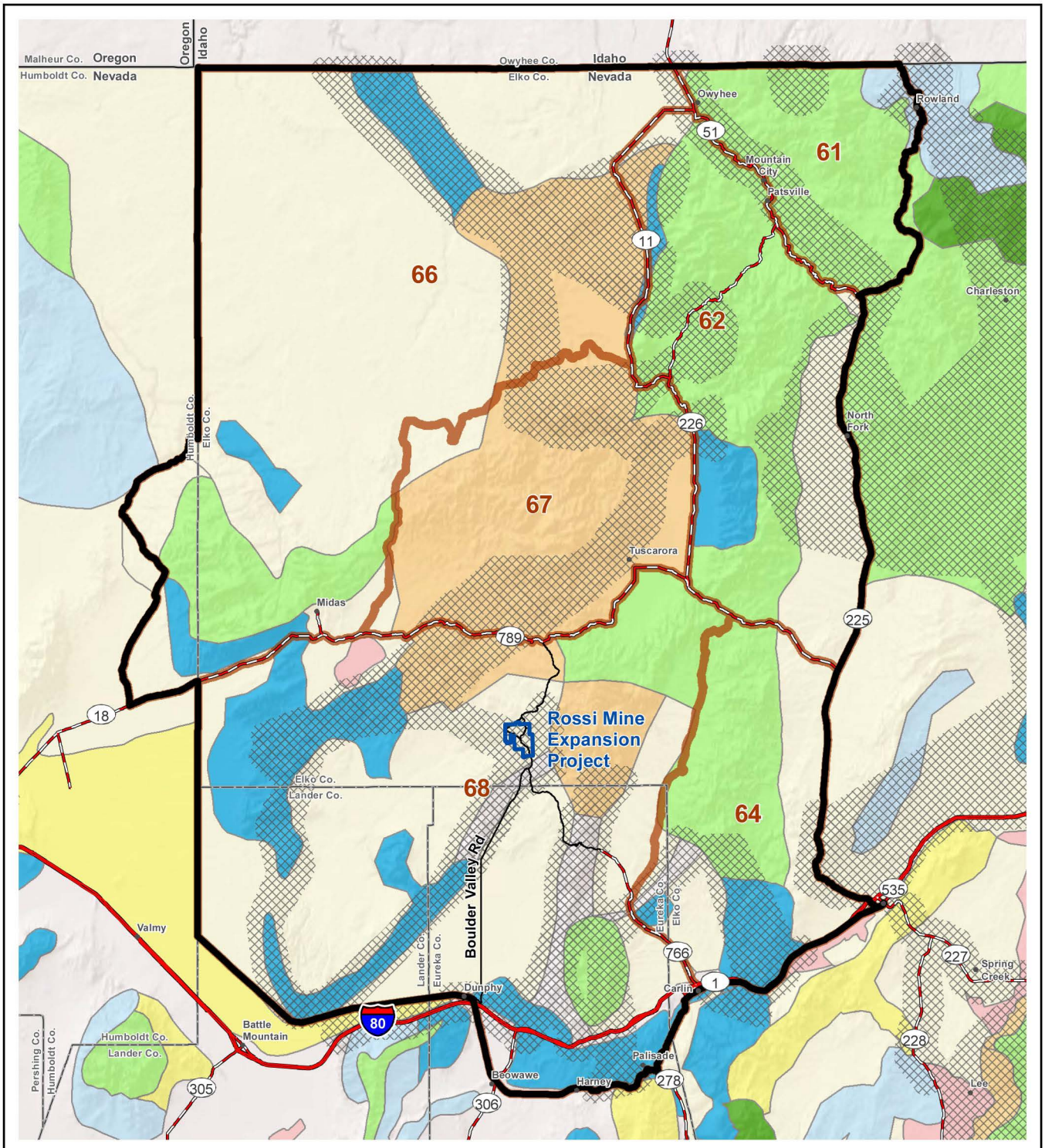

Project Study Area
Big Game Cumulative Effects Study Area
NDOW Hunt Unit
Mule Deer Movement Corridor

Mule Deer Seasonal Ranges

- Agricultural Area
- Limited Use Range
- Crucial Summer Range
- Summer Range
- Transition Range
- Crucial Winter Range
- Winter Range
- Yearlong Range

Source: SRK 2014a, NDOW 2014, USCB 2014d.

Rossi Mine Expansion Project EIS

Figure 3.17-2

Mule Deer Habitat in the Cumulative Effects Study Area

0 2 4 6 8 10 20 Miles
0 2 4 6 8 10 20 Kilometers
1:900,000

N

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Mule Deer

The population numbers for mule deer have been stable in Management Area 6 for the past couple of years. A total of 6,495 deer were classified during a helicopter survey conducted in December 2016 and is the largest sample ever observed since 1992 (NDOW 2017c). An abbreviated spring helicopter survey was conducted in April 2016, with a total of 2,990 deer classified yielding a ratio of 28 fawns: 100 adults. This observed fawn ratio indicated a 50% overwinter fawn loss. This percentage of loss is reflective of early season snow, above average winter snowpack and the continued loss of transitional habitat and winter range over the last decade.

This mule deer herd can increase rapidly due to high quality summer habitat and associated high numbers of fawns; however, poor winter range conditions in Area 6 can dictate long-term population levels which have occurred since the 1960s (NDOW 2015b).

Big game species including mule deer require tags from NDOW to be hunted. The number of mule deer tags issued reflects the previous year's population and number of mule deer that can be safely taken by hunting activities without adversely affecting the total population of the herd. **Table 3.17-1** below shows the compiled mule deer tag numbers for Management Area 6 (excluding Unit 065) from 2010 through 2015. There were a total of 2,926 tags issued for mule deer in 2015 in Management Area 6. The average number of tags for the past 5 years is approximately 2,402. Long-term Management Area 6 population trends indicate a steady decline of mule deer since monitoring began in the 1950s (MDWGC 2012).

Table 3.17-1. Management Area 6 Mule Deer Tags Issued by NDOW between 2010 and 2015

Year	Mule Deer Tags Issued
2010	1318
2011	1147
2012	3194
2013	2747
2014	3079
2015	2926

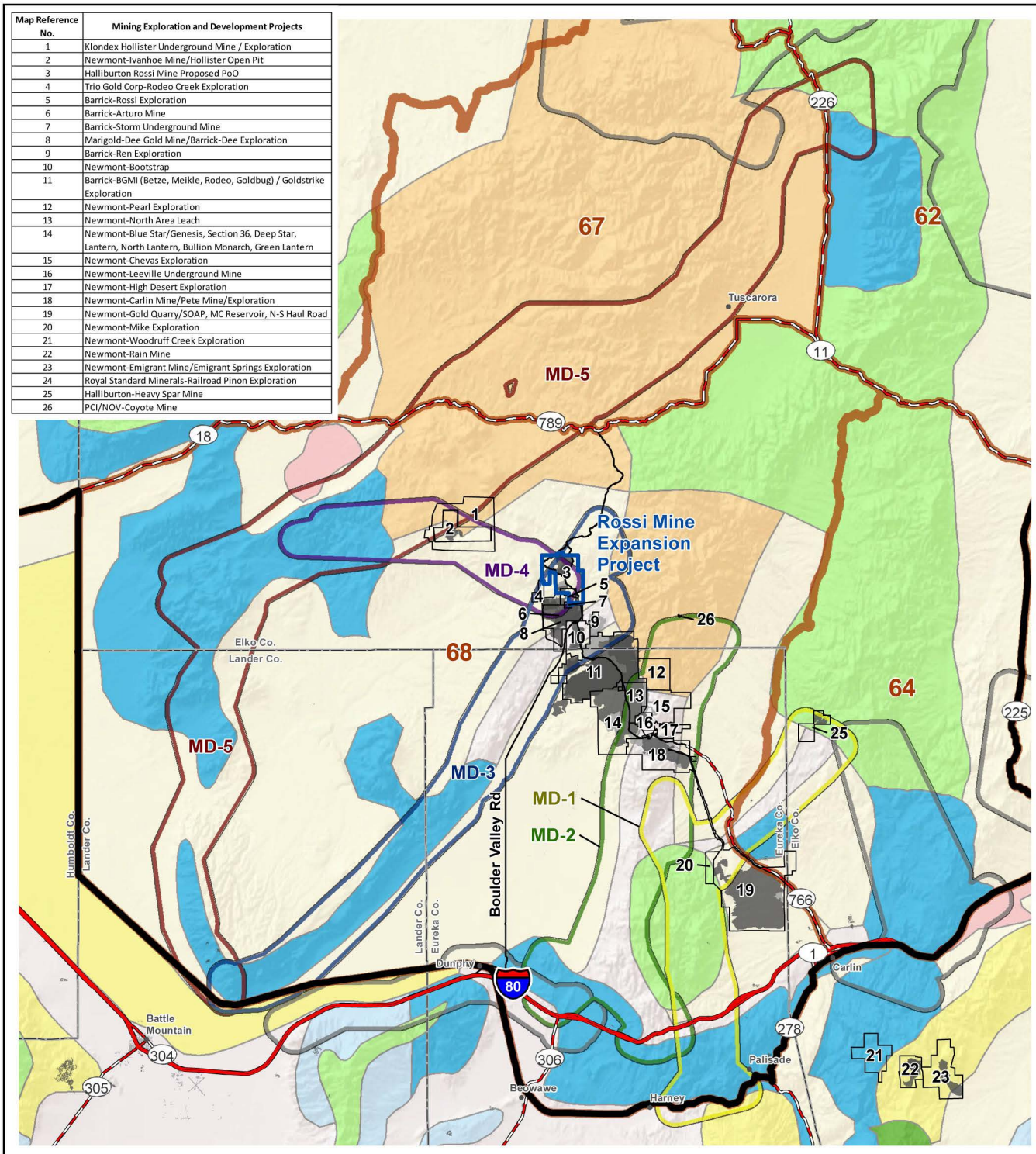
Source: NDOW 2016a.

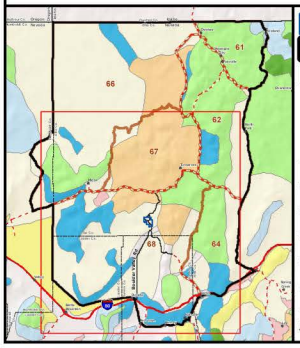
Mule deer use of the study area is variable; the majority of the mule deer in the study area and surrounding vicinity typically spend the summer months in the Tuscarora Mountains and Independence Range, north of the study area, and winter near the Dunphy Hills, Sheep Creek Range, and Izzenhood Range areas, south of the study area (BLM 2010b, BLM 2010c, BLM 2008a). The study area is entirely comprised of mule deer limited use habitat, which may be used by mule deer throughout the year depending on forage availability and conditions (**Figure 3.17-2**).

The study area is geographically located between important mule deer summer and winter range and supports seasonal migration of mule deer between these ranges as shown in **Figure 3.17-3**. A total of five separate migration corridors that cross the Carlin Trend area have been identified through surveys of mule deer seasonal movement and telemetry collaring studies previously conducted by NDOW and the BLM (**Figure 3.17-3**). The entire project study area is classified as a mule deer movement corridor which is primarily used by mule deer but may also be used by pronghorn and elk depending on weather patterns and snow conditions. A wildlife movement corridor is defined as a linear habitat with a primary function of connecting at least two significant habitat areas (Sawyer et al. 2005). A large herd of mule deer migrates south from its summer range in the Tuscarora Mountains, Independence Range, and Bull Run Mountains to winter range in the lower elevations of Boulder Valley and the Dunphy Hills (BLM 2010b, BLM 2010c, BLM 2008a). Recent and historic wildfires have burned approximately 1.5 million acres of rangeland in Area 6 which have changed the vegetation composition and allowed

invasive cheatgrass (*Bromus tectorum*) to spread throughout mule deer range. Habitat changes and cheatgrass invasion of vegetation communities in combination with the significant expansion of Carlin Trend mining developments along the east side of the Tuscarora Range have limited remaining unimpeded north/south big game movement as presented in **Figure 3.17-3** (NDOW 2014, BLM 2008a).

Map Reference No.	Mining Exploration and Development Projects
1	Klondex Hollister Underground Mine / Exploration
2	Newmont-Ivanhoe Mine/Hollister Open Pit
3	Halliburton Rossi Mine Proposed PoO
4	Trio Gold Corp-Rodeo Creek Exploration
5	Barrick-Rossi Exploration
6	Barrick-Arturo Mine
7	Barrick-Storm Underground Mine
8	Marigold-Dee Gold Mine/Barrick-Dee Exploration
9	Barrick-Ren Exploration
10	Newmont-Bootstrap
11	Barrick-BGMI (Betze, Meikle, Rodeo, Goldbug) / Goldstrike Exploration
12	Newmont-Pearl Exploration
13	Newmont-North Area Leach
14	Newmont-Blue Star/Genesis, Section 36, Deep Star, Lantern, North Lantern, Bullion Monarch, Green Lantern
15	Newmont-Chevas Exploration
16	Newmont-Leeville Underground Mine
17	Newmont-High Desert Exploration
18	Newmont-Carlin Mine/Pete Mine/Exploration
19	Newmont-Gold Quarry/SOAP, MC Reservoir, N-S Haul Road
20	Newmont-Mike Exploration
21	Newmont-Woodruff Creek Exploration
22	Newmont-Rain Mine
23	Newmont-Emigrant Mine/Emigrant Springs Exploration
24	Royal Standard Minerals-Railroad Pinon Exploration
25	Halliburton-Heavy Spar Mine
26	PCI/NOV-Coyote Mine





Project Study Area
Big Game CESA
Mine Plan Boundaries
Quarries-Strip Mines-Gravel Pits
Developed/Disturbed Areas

Mule Deer Corridor Groups
MD-1
MD-2
MD-3
MD-4
MD-5
Other Corridor

NDOW Hunt Unit

Mule Deer Seasonal Ranges
Agricultural Area
Limited Use Range
Crucial Summer Range
Summer Range
Transition Range
Crucial Winter Range
Winter Range
Yearlong Range

Source: BLM 2010b, SRK 2014a, NDOW 2014, USCB 2014d.

Rossi Mine Expansion Project EIS

Figure 3.17-3

Mule Deer Migration Corridors and Seasonal Ranges within the Carlin Trend Area

0 1 2 3 4 5 10 Miles
0 1 2 3 4 5 10 Kilometers
1:600,000

N

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Pronghorn

Similar to mule deer, pronghorn have been affected by wildfires and the loss of vital sagebrush communities in recent years. Pronghorn numbers have been stable to increasing in Units 067-068 over the past several years. NDOW ground surveys classified 822 pronghorn during February 2017 surveys (NDOW 2017c). The entire study area is designated as pronghorn summer range. Pronghorn crucial winter range occurs approximately five miles south of the study area along the north edge of the Boulder Valley (**Figure 3.17-4**).

Elk

The population of elk in Units 062, 064, 066-068 has been observed to be somewhat stable over the past 5 years with some minor fluctuations. Elk populations were observed to have increased by an average of 14 percent annually between 2003 and 2012; however, the growth of this herd has declined since 2013 by approximately 12 percent (NDOW 2015b). Aerial surveys in January 2017 resulted in the classification of 457 elk. The majority of the study area is considered to be low-density habitat for elk by NDOW. There are approximately 3,598 acres (96 percent of the study area) of elk limited use range and 144 acres (4 percent of the study area) of elk crucial winter range located within the study area (**Figure 3.17-5**).

Mountain Lion

NDOW also classifies mountain lion as a big game species. Mountain lion habitat is considered to be in good condition throughout the Eastern Region and population trends are stable averaging approximately 17 individuals harvested in the 061-068 Units from 2009 to 2015 based on NDOW harvest data (NDOW 2015b).

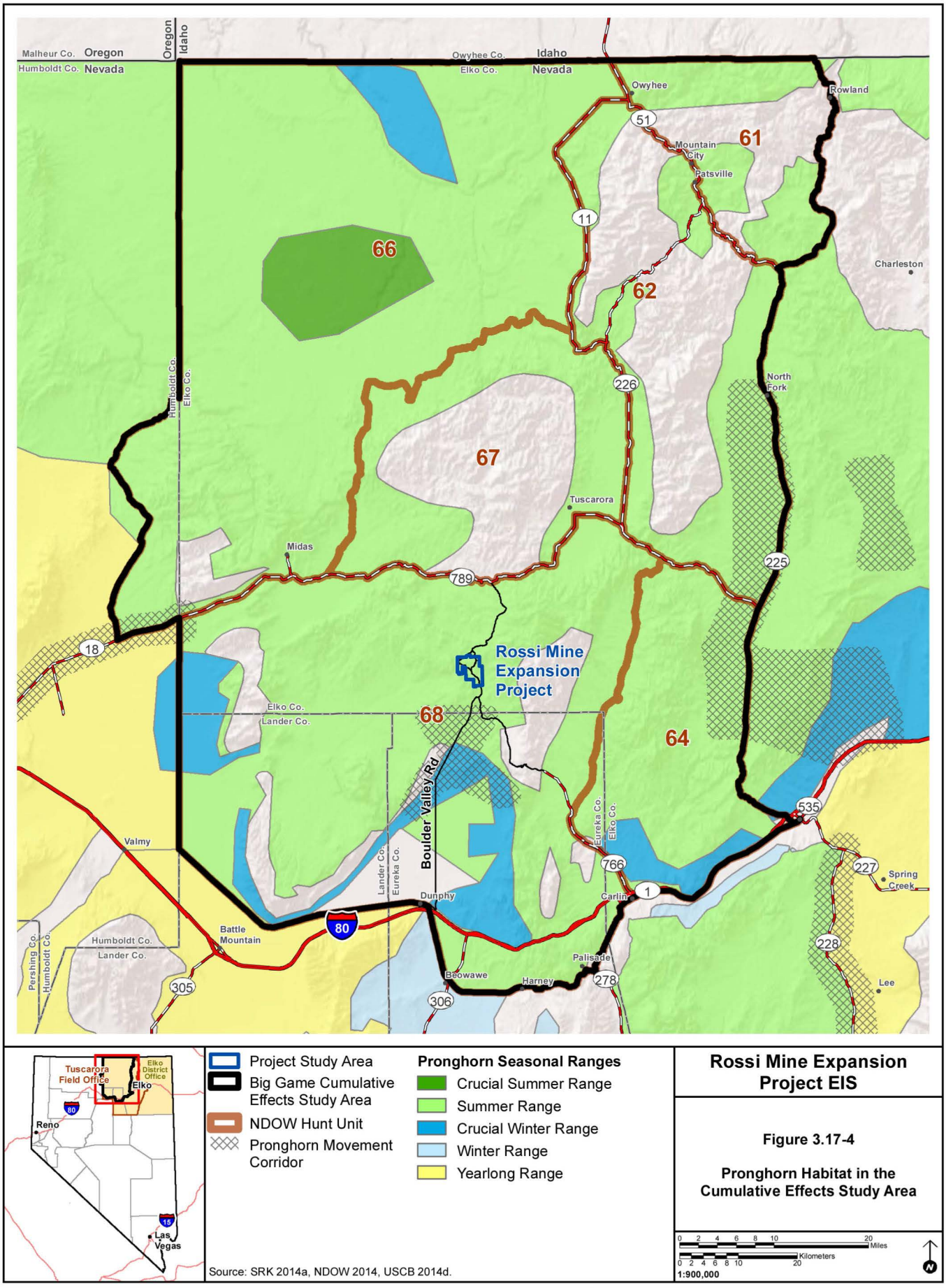
3.17.1.3 Small Game Species

Several upland game bird species are found within the study area. Species that have been documented within the study area include mourning dove (*Zenaida macroura*) and chukar (*Alectoris chukar*). Mourning doves are found in a wide range of habitats in close proximity to water and are most likely to occur within the study area during spring, summer, and early fall (Wildlife Action Plan Team 2012). A mourning dove nest was observed in late May in the study area (SRK 2013b). Chukar occur in hills, rocky ridges, and hillsides. Two different pairs of chukar and nests were observed in the study area on the mid-elevations of the east-facing slope in Section 22 (SRK 2013b). The greater sage-grouse (*Centrocercus urophasianus*) is listed as a BLM sensitive species and is discussed in detail in Section 3.18, Special Status Species.

Four rabbit species have the potential to occur in the study area. The desert cottontail (*Sylvilagus audubonii*) and black-tailed jackrabbit (*Lepus californicus*) were observed during wildlife surveys conducted in the study area. The white-tailed jackrabbit (*Lepus townsendii*) has also been observed within the project area. The pygmy rabbit (*Brachylagus idahoensis*) is listed as a BLM sensitive species and is discussed in Section 3.18, Special Status Species.

The NAC 503.025 classifies several mammal species as furbearers. Furbearer species that may occur within the study area include gray fox, kit fox, bobcat, muskrat, and mink (NDOW 2014). Furbearing species are unlikely to occur in the study area due to the lack of riparian habitat and associated vegetative structural diversity that typically supports these species. Other mammal species that may occur within the study area include badger (*Taxidea taxus*), coyote (*Canis latrans*), gopher (*Thomomys* spp.), kangaroo rat (*Dipodomys* spp.), Townsend's ground squirrel (*Spermophilus townsendii*), and vole (*Microtus* spp.) (SRK 2013b).

Limited areas of wetland habitat for waterfowl populations occur in the study area. Species that have been observed within the study area include Canada goose (*Branta candensis*), cinnamon teal (*Anas cyanoptera*), mallard (*Anas platyrhychos*), and redhead (*Aythya americana*) (SRK 2013b).



Rossi Mine Expansion Project EIS

Figure 3.17-4

Pronghorn Habitat in the Cumulative Effects Study Area

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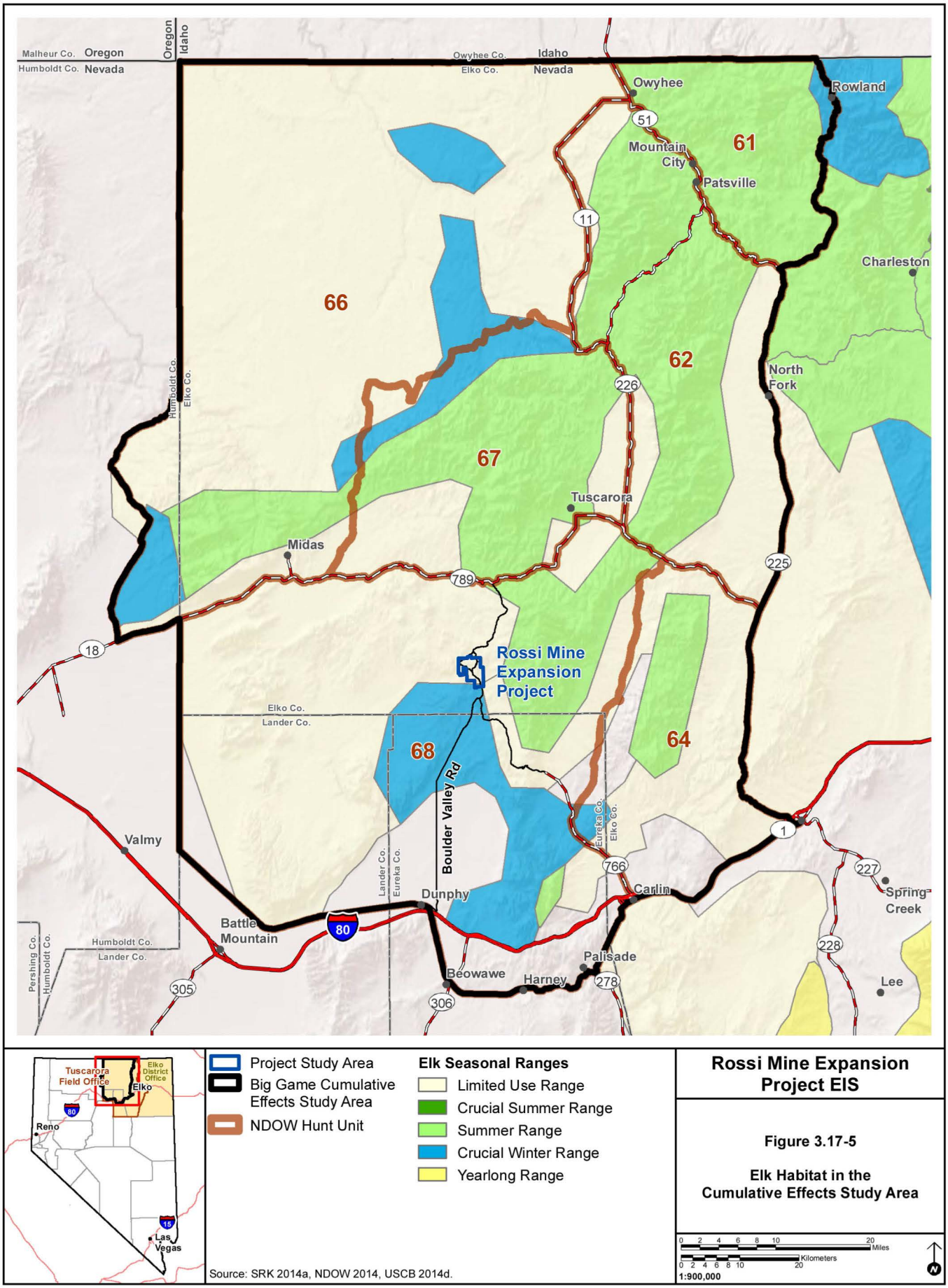

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3.17.1.4 Nongame Species

A diversity of nongame species (e.g., small mammals, migratory birds, raptors, reptiles, and amphibians) occupies the study area. Habitats within the study area (e.g., sagebrush shrubland and steppe, grassland) support both resident and seasonal nongame species.

Bats

A number of bat species are known to inhabit the project region. Detection surveys for bat species were conducted in May 2012 and July 2012 in the study area according to BLM recommendation. A total of four acoustic survey nights were conducted using six separate acoustic detectors located in areas of suitable roosting habitat (i.e., rock outcrops) and foraging habitat (i.e., wet drainages, stock ponds).

Detected bats include Brazilian free-tailed bat (*Tadarida brasiliensis*), California myotis (*Myotis californicus*), little brown bat (*Myotis lucifugus*), small-footed myotis (*Myotis ciliolabrum*), and Yuma myotis (*Myotis yumanensis*) (SRK 2013b). In addition to these bat species that were detected during acoustic surveys, suitable habitat for the big brown bat (*Eptesicus fuscus)*, fringed myotis (*Myotis thysanodes)*, hoary bat (*Lasiurus cinereus)*, long-eared myotis (*Myotis evotis)*, long-legged myotis (*Myotis volans)*, pallid bat (*Antrozous pallidus)*, silver-haired bat (*Lasionycteris noctivagans)*, Townsend's big-eared bat (*Corynorhinus townsendii*), western pipistrelle (*Parastrellus hesperus*), and the spotted bat (*Euderma maculatum*) occurs within the project area. All of these bat species are designated as BLM sensitive species (BLM 2015d). These species are discussed in further detail in Section 3.18, Special Status Species.

Roosting habitat is available in the study area and consists primarily of rock outcrops, the largest of which (approximately 30 feet high) are found in the western and central areas of the project area. Smaller rock outcrops (less than 30 feet high) are present west of and along the ridgelines in the eastern portion of the project area. The pits located in the study area are unlikely to be used by bats as maternity or hibernating colony locations as these are active mine sites with dirt walls and few to no crevices from which bats can grasp and hang (SRK 2013b).

Migratory Birds and Raptors

Nongame birds encompass a variety of avian species including migratory bird species that are protected under the Migratory Bird Treaty Act (MBTA) (16 United States Code 703–711) and Executive Order 13186 (66 FR 3853). Pursuant to Executive Order 13186, a MOU between the BLM and USFWS outlines a collaborative approach to promote the conservation of migratory bird populations. The purpose of the MOU is to strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds in coordination with state, tribal, and local governments. This MOU identifies specific activities where cooperation between the BLM and USFWS would contribute to the conservation of migratory birds and their habitat. In addition, the BLM Nevada State Office prepared Migratory Bird Applicant Committed Environmental Protection Measures for the Sagebrush Biome in order to assist BLM field offices in the consideration of migratory birds in land management activities (BLM 2003). In Nevada, all birds protected under the MBTA also are state protected (NAC 503.050). Many of the BLM sensitive migratory bird species found in Nevada also are identified in the Nevada Partners in Flight (PIF) Bird Conservation Plan (Neel 1999). This plan, along with the Birds of Conservation Concern (BCC) Plan (USFWS 2008), prioritizes migratory bird species for management actions according to habitat types.

Several baseline biological surveys were conducted within the study area in 2013 (SRK 2013b) during the breeding season months of April through July. Baseline surveys were not conducted during the winter months, therefore avian species that would be more likely to occur within the study area during the winter, including bald eagles and rough-legged hawks, were less likely to be observed during surveys. In total, 39 avian species were observed in the study area during baseline surveys and are presented in **Table 3.17-2** below. In addition to the species listed in **Table 3.17-2**, other avian species that occur in northern Nevada and could potentially occur within the project area are included in the NDOW publication Birds of Northeastern Nevada (NDOW 2015a).

Table 3.17-2. Migratory and Resident Bird Species Potentially Occurring within the Study Area

Common Name	Scientific Name	Status[1]	Observed in Study Area[2]
American avocet[3]	*Recurvirostra americana*		Yes
American coot[3]	*Fulica americana*		Yes
American robin	*Turdus migratorius*		Yes
Bald eagle	*Haliaeetus leucocephalus*	BLM, BCC	No
Black-billed magpie	*Pica hudsonia*		Yes
Black-chinned sparrow	*Spizella atrogularis*	BCC	No
Black rosy-finch	*Leucosticte atrata*	BLM, BCC, PIF	No
Black swift	*Cypseloides niger*	BCC	No
Black-throated sparrow	*Amphispiza bilineata*		Yes
Brewer's blackbird	*Euphagus cyanocephalus*		Yes
Brewer's sparrow	*Spizella breweri*	BLM, BCC	Yes
Brown-headed cowbird	*Molothrus ater*		Yes
Burrowing owl	*Athene cunicularia*	BLM, PIF	No
Calliope hummingbird	*Stellula calliope*	BCC, PIF	No
Canada goose[3]	*Branta canadensis*		Yes
Chukar	*Alectoris chukar*		Yes
Cinnamon teal[3]	*Anas cyanoptera*		Yes
Cliff swallow	*Petrochelidon pyrrhonota*		Yes
Common nighthawk	*Chordeiles minor*		Yes
Common poorwill	*Phalaenoptilus nuttallii*		Yes
Common raven	*Corvus corax*		Yes
Eared grebe	*Podiceps nigricollis*	BCC	No
Ferruginous hawk	*Buteo regalis*	BLM, BCC, PIF	No
Flammulated owl	*Otus flammeolus*	BCC	No
Golden eagle	*Aquila chrysaetos*	BLM	Yes
Gray flycatcher	*Empidonax wrightii*	PIF	No
Gray partridge	*Perdix perdix*		No
Greater sage-grouse	*Centrocercus urophasianus*	BLM, BCC, PIF	Yes
Green-tailed towhee	*Pipilo chlorurus*	BCC	No
Horned lark	*Eremophila alpestris*		Yes
House finch	*Carpodacus mexicanus*		Yes
Killdeer	*Charadrius vociferous*		Yes
Lark sparrow	*Chondestes grammacus*		Yes

Table 3.17-2. Migratory and Resident Bird Species Potentially Occurring within the Study Area

Common Name	Scientific Name	Status[1]	Observed in Study Area[2]
Lewis woodpecker	*Melanerpes lewis*	BLM, BCC	No
Loggerhead shrike	*Lanius ludovicianus*	BLM, BCC, PIF	Yes
Long-billed curlew	*Numenius americanus*	BCC	No
Mallard[3]	*Anas platyrhynchos*		Yes
Marbled godwit	*Limosa fedoa*	BCC	No
Mourning dove	*Zenaida macroura*		Yes
Mountain bluebird	*Sialia currucoides*		Yes
Northern goshawk	*Accipiter gentilis*	BLM	No
Northern harrier	*Circus cyaneus*		Yes
Peregrine falcon	*Falco peregrinus*	BLM, BCC	No
Pinyon jay	*Gymnorhinus cyanocephalus*	BLM, BCC	No
Prairie falcon	*Falco mexicanus*	PIF	Yes
Red-tailed hawk	*Buteo jamaicensis*		Yes
Red-winged blackbird	*Agelaius phoeniceus*		Yes
Redhead[3]	*Aythya americana*		Yes
Rock wren	*Salpinctes obsoletus*		Yes
Rough-legged hawk	*Buteo lagopus*		No
Sage sparrow	*Amphispiza belli*	BCC, PIF	Yes
Sage thrasher	*Oreoscoptes montanus*	BLM, PIF	Yes
Short-eared owl	*Asio flammeus*		No
Spotted sandpiper[3]	*Actitis macularia*		Yes
Spotted towhee	*Pipilo maculatus*		No
Swainson's hawk	*Buteo swainsoni*	BLM, PIF	No
Tricolored blackbird	*Agelaius tricolor*	BCC	No
Turkey vulture	*Cathartes aura*		Yes
Western kingbird	*Tyrannus verticalis*		Yes
Western meadowlark	*Sturnella neglecta*		Yes
Western snowy plover	*Charadrius nivosus*	BLM, BCC	No
White-headed woodpecker	*Picoides albolarvatus*	BCC	No
Williamson's sapsucker	*Sphyrapicus thyroideus*	BCC	No
Willow flycatcher	*Empidonax traillii*	BCC	No
Vesper sparrow	*Pooecetes gramineus*	PIF	Yes
Virginia's warbler	*Leiothlypis virginiae*	BCC	No

Table 3.17-2. Migratory and Resident Bird Species Potentially Occurring within the Study Area

Common Name	Scientific Name	Status[1]	Observed in Study Area[2]
Yellow-headed blackbird[3]	*Xanthocephalus*		Yes
Yellow rail	*Coturnicops noveboracensis*	BCC	No

Sources: BLM 2015a; SRK 2013b; USFWS 2008; Neel 1999.

[1] BLM = BLM Sensitive Species; BCC = USFWS Birds of Conservation Concern; PIF = Nevada Partners in Flight Priority Bird Species.
[2] Identified during baseline biological surveys in spring 2013.
[3] Recorded only at the stock pond.

Any of these species are associated with a variety of habitats; however, most avian species observed are associated with sagebrush and grassland habitats.

Raptor species that potentially occur as residents or migrants within the study area include eagles (golden and bald eagles), hawks (e.g., red-tailed hawk, ferruginous hawk, rough-legged hawk, and Swanson's hawk), falcons (e.g., prairie falcon, American kestrel), northern harrier, and turkey vulture (SRK 2013b). Thirty-one golden eagle nest sites were identified and monitored within a 10-mile radius around the study area; seven of these nests were active and 24 nests were inactive. Nest sites were attributed as golden eagle sites either through confirmation of golden eagle activity at the site or by site specific characteristics common to golden eagle nests. Golden eagles commonly nest in large stick nests located upon cliff faces and can reuse nest sites for several years (Floyd et al. 2007). Golden eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) and are discussed in Section 3.18, Special Status Species. Field surveys within the 10-mile buffer of the PoO boundary also identified nine active red-tailed hawk nests, one active ferruginous hawk nest, and two active prairie falcon nests. No raptor nests have been found within the PoO boundary; four active nests were observed within one mile of the PoO boundary in 2015 (Stantec 2015).

Details on bird species designated as BLM Sensitive Species including Brewer's sparrow, greater sage-grouse, loggerhead shrike, and sage thrasher are discussed further in Section 3.18, Special Status Species.

Reptiles

Several species of reptiles and amphibians were observed in the project area during baseline wildlife surveys. Reptiles that were detected include desert horned lizard (*Phrynosoma platyrhinos*), Great Basin gopher snake (*Pituophis catenifer*), sagebrush lizard (*Sceloporus gracious*), side-blotched lizard (*Uta stansbuiriana*), striped whipsnake (*Masticophis taeniatus*), and western fence lizard (*Sceloporus occidentalis*) (SRK 2013b). These species occupy a wide variety of habitats and are most active during the summer and early fall months (BLM 2008a).

3.17.1.5 Aquatic Biological Resources

Riparian Habitat

Riparian habitat is minimal within the study area and is limited primarily to areas adjacent to constructed ponds and wetlands. Narrow patches of riparian willow habitat are found around small portions of the perimeter of the large perennial pond (feature W-2, **Figure 3.14-4**) located to the south of the jig plant processing area. Another area of riparian willow habitat occurs along a roadside drainage ditch to the east of this perennial pond. Vegetation in these areas is dominated by coyote willow (*Salix exigua*) and willow herb (*Epilobium ciliatrum*) (EcoSynthesis 2013).

Riparian herbaceous habitat occurs in areas that exhibit consistent surface water flows including areas south of the Queen Lode Complex, and north of the King North WRDF (**Figure 3.4-4**). These areas were dominated by coyote willow, Baltic rush (*Juncus balticus*), meadow barley (*Hordeum brachyantherum*), Nebraska sedge (*Carex nebrascensis*), American speedwell (*Veronica americana*), and rabbitsfoot grass (*Polypogon monspeliensis*) (EcoSynthesis 2013).

Wetlands

Two small perennial ponds occur at the south end of the jig plant processing area. These ponds (W-2 and W-3, **Figure 3.14-4**) are artificial features created by excavation and/or construction of an earthen berm. There is wide fluctuation in water level in these wetlands and they likely are not biologically functional ponds; however, the water level is deep enough to support wetland vegetation including patches of cattail and coyote willow (EcoSynthesis 2013).

Numerous small seasonal ponds are scattered throughout the study area, all of which are created by humans. These ponds are inundated during the spring and/or summer and are generally unvegetated or sparsely vegetated. Vegetation of the ponds is variable depending on the duration of inundation. The most common and consistently present plant species are sand knotweed (*Polygonum aviculare*), annual hairgrass (*Deschampsia danthonioides*), and meadow barley (*Hordeum brachyantherum*). The driest of the ponds also support small amounts of upland weeds such as cheatgrass (*Bromus tectorum*), tumble mustard (*Sisymbrium altissimum*), and poverty weed (*Iva axillaris*) (EcoSynthesis 2013).

Aquatic Communities

Due to a lack of high volume perennial flows from spring features SP-001 and SP-002 and an existing connection to perennial water bodies (**Figure 3.14-4**), it is unlikely that wetlands or riparian habitats within the study area support fish species. These areas may support amphibian species. An adult pacific tree frog was observed in late April in a rock outcrop in the northern portion of the study area; however no known water was present within a quarter-mile of the observation. Pacific treefrogs were heard chorusing at night in a drainage approximately one mile northwest of the study area (SRK 2013b).

3.17.2 Environmental Consequences

Terrestrial and aquatic biological resources related issues were determined through consultation with the BLM, NDOW, and USFWS. The primary issues related to terrestrial wildlife include loss or alteration of native habitats; increased habitat fragmentation; individual and population displacement; and direct mortality or injury of wildlife. The primary issues for aquatic biological resources include habitat alteration and the impacts of sedimentation and increased salinity on aquatic species due to surface disturbance activities; and potential spills from vehicle traffic and equipment during construction and operation phases of the project.

The potential impacts of the proposed project on terrestrial wildlife and aquatic biological resources can be classified as short-term (temporary) and long-term in duration. Short-term impacts result from habitat disturbance and removal due to construction and from activities associated with mine operation and occur during the active life of the mine and until reclamation is successfully completed. Short term impacts would cease upon mine closure and completion of successful reclamation. Long-term impacts include permanent changes to habitats and the wildlife and aquatic populations that depend on those habitats, regardless of reclamation success.

3.17.2.1 Proposed Action

Wildlife Resources

Surface Disturbance

Under the Proposed Action approximately 1,167 acres of new short-term surface disturbance would result from mining activity. This proposed surface disturbance, in addition to the 896 acres of previously authorized disturbance would result in a total of approximately 2,063 acres.

Disturbance associated with the Proposed Action would be reclaimed, with the exception of 194 acres of expanded and new open pits that would not be backfilled and reclaimed. Approximately 53 acres of Mixed Mountain and Low Sagebrush, 23 acres of Mixed Black, Wyoming and Mountain Sagebrush, 16 acres of annual grasslands, 6 acres of Mixed Wyoming and Mountain Sagebrush, one acre of meadow habitat, and 95 acres of previously disturbed lands would be permanently unavailable to wildlife species.

Direct impacts to wildlife from mine-related surface disturbance would include short-term and long-term reduction or loss of habitat. Habitat loss or alteration would result in direct losses of smaller, less mobile species of wildlife, such as small mammals and reptiles, and the displacement of more mobile species into adjacent habitats. In areas where habitats are densely populated, animal displacement could result in some unquantifiable reductions in local wildlife populations. Mine-related surface disturbance would also result in incremental increase in habitat fragmentation at the mine site until reclamation is completed and vegetation re-established. Indirect impacts would include increased noise, increased human presence, especially during the construction phase, and the potential for increased vehicle-related mortalities. The degree of the impacts on wildlife species would depend on factors such as the sensitivity of the species, seasonal use patterns, type and timing of project activity, and physical parameters (e.g., topography, cover, forage, and climate).

Exploration activities within the project area would also impact wildlife species and approximately 67 acres of suitable habitat. Impacts from exploration would include surface disturbance resulting from construction of exploration roads, drill pads, and other exploration infrastructure as described in Section 2.3.10, Exploration. Indirect impacts resulting from exploration activities would include increased human presence and noise during road and pad construction and active drilling operations. Active exploratory drilling could occur over a 24 hour period; therefore, additional impacts resulting from artificial lighting may occur to wildlife species such as displacement, disorientation, and interruption of roosting and resting individuals. Exploration activity would also result in increased fugitive dust and short-term habitat fragmentation. Exploration activities within the project area are not subject to seasonal timing restrictions for mule deer migration areas and other sensitive habitat. Exploration activities may result in an increase of human presence and noise during sensitive periods. Although exploration activities may be occurring in the migration corridor and dependent upon weather conditions occurring at the time of the migration, mule deer would continue to either move rapidly or slowly through or around the area.

Reclamation of mining disturbance and removal of mining support and ancillary facilities would occur as presented in Section 2.3.12, Closure and Reclamation Plan. Impacts of reclamation and removal of mining facilities would be similar to impacts resulting from mine construction and operation, including the presence of vehicles, equipment, and reclamation staff within the PoO boundary. During reclamation, increased dust, vibration, and noise would result in increased temporary disturbance in the areas where reclamation is actively being implemented. Periodic monitoring of reclamation success would result in the presence of reclamation staff, vehicles, and equipment within the PoO boundary.

Game Species

As indicated in Section 3.17.1.2, Big Game Species, big game species including mule deer, pronghorn, and elk have been documented in the study area. Big game may experience higher levels of mortality due to the construction of new roads under the Proposed Action which would result in 42 acres of new surface disturbance, and associated increased vehicular traffic during construction, expansion, and development. Although records of collisions involving Rossi Mine vehicles and wildlife indicate a low probability of mortality, vehicular traffic collisions may injure or kill individual big game species, and local populations may experience higher levels of mortality due to an increased number of roads and use of existing roads in the immediate project vicinity. Big game may also experience mortality due to increased vehicular traffic and construction equipment.

Additional direct impacts to all big game species include the incremental long-term reduction of potential forage and the incremental increase in habitat fragmentation from vegetation removal associated with mine development activities. Development of the Proposed Action would also decrease the quality of suitable big game habitat resulting from changes in floral species composition and/or an increase in invasive species during the development phase. Direct habitat loss and indirect reduction in habitat quality would result in displacement of big game. Displacement of big game would be most significant adjacent to heavily traveled roads because roads are often open to unregulated use. Mule deer,

pronghorn, and elk may decrease habitat use in suitable habitat adjacent to roads within the study area and could result in big game species traveling farther to meet their nutritional and energy needs (Sawyer et al. 2009, Sawyer et al. 2005, Rost and Bailey 1979). These impacts would also affect recreation opportunities for local big game hunting within the area of the Rossi Mine. Discussion of impacts to hunting opportunity is presented in Section 3.11, Recreation and Wilderness.

The Proposed Action would disturb approximately 1,167 acres of mule deer limited use range and movement corridor consisting primarily of sagebrush shrubland and steppe habitat. Approximately 973 acres of mule deer limited use habitat would be reclaimed and considered short-term disturbance while 194 acres would be permanent surface disturbance (**Figure 2-4**). This anticipated loss of habitat would result in an incremental reduction in the amount of available habitat for mule deer in the study area. Discussion of cumulative impacts to mule deer migration from past, present, and future projects within the Carlin Trend area is presented in Section 3.17.3, Cumulative Impacts. The reduction of available habitat would result in the increase in use of disturbed areas by mule deer during migration. This could lead migrating mule deer to increase their rate of movement when they encounter infrastructure and human disturbance (Sawyer and Brittell 2014). Mule deer may also experience increased overall migration time by navigating a greater amount of obstacles, resulting in less efficient and longer movement pathways (Blum et al. 2015). These behavioral changes during migration may affect the timing of migration, lost foraging opportunities, and increased output in energy which could adversely affect mule deer (Sawyer and Brittell 2014).

Under the Proposed Action, HES would sequence the construction of the Queen West WRDF, Queen Lode WRDF, and Dawn WRDF to provide mule deer access to migration corridors for the greatest possible amount of time before placing waste rock within the corridor (SRK 2014a). HES is limited in its ability to maintain a 3,280 foot-wide migration corridor by the locations of mineral deposits within the PoO boundary, the technical and economic feasibility aspects of ore and waste rock handling procedures, and mineral entry to the south of the Rossi Mine by the previously authorized Arturo Mine. In addition, portions of the QLC North and QLC East WRDFs would be regraded, providing a 2,000-foot corridor before construction of the Dawn WRDF begins if exploration drilling expands the QLC pit. NDOW recommends that mule deer migratory corridor widths consist of a minimum of one km (approximately 3,280 feet) (NDOW 2012a). These measures would reduce adverse effects on mule deer and mule deer migration. However, mule deer would continue to travel rapidly or slowly either through or maneuver around the mining activity. The Rossi Mine Expansion Project may have a significant impact on the mule deer migration routes in the vicinity of the mine until the mine is successfully reclaimed.

Impacts to pronghorn would be similar to those discussed above for mule deer. Potential direct impacts would include the temporary reduction of 973 acres and long-term reduction of approximately 194 acres of summer range. Potential direct impacts to elk limited use habitat would include the temporary disturbance of 973 acres and long-term reduction of approximately 194 acres within the study area; while there would be 60 acres of temporary surface disturbance in crucial winter range and no long-term surface disturbance in crucial winter range for elk. Unlike mule deer and pronghorn, elk prefer to forage on grasses rather than sagebrush. The Proposed Action would result in the temporary conversion of approximately 823 acres of sagebrush habitat to grassland habitat during the early stages of reclamation activities, which would favor elk and may lead to short-term population increases and expansion into previously unoccupied habitat. Impacts to mountain lions are expected to be low, as this species occurs in low densities in and around the study area.

Direct impacts to small game species (e.g., mourning dove and chukar) would include the short-term reduction of 973 acres and long-term reduction of 194 acres of potentially suitable habitat. Potential impacts would also include displacement from the disturbance areas and increased habitat fragmentation until reclamation has been completed and vegetation is successfully re-established. In most instances, suitable habitat adjacent to disturbed areas would be available for use by these species which utilize smaller habitat areas for life history requirements than big game species. Potential impacts to small game from the Proposed Action are expected to be low.

Nongame Species

Impacts to nongame species would be similar to those described above for small game species. Direct impacts to nongame species (e.g., small mammals, migratory birds, raptors, reptiles, and amphibians)

would include the short-term reduction of 973 acres and the long-term reduction of 194 acres of potentially suitable habitat. Additional impacts specific to migratory birds and raptors are described below.

Impacts would also include displacement from the disturbed areas and increased habitat fragmentation until vegetation is re-established. In most instances, suitable habitat adjacent to disturbed areas would be available for use by these species; however, displacement would increase competition and could result in some local reductions in wildlife populations if adjacent habitats have a higher density of nongame species.

Direct mortality and injury due to vehicle collisions would be similar for small mammals as for big game species. Indirect impacts on mammal species would also be similar to those described for big game, with the exception of impacts to seasonal habitats and migratory corridors which are not delineated for other mammal species in the study area. Habitat fragmentation would have a greater impact on small mammals where roads and other disturbed areas lacking vegetation would present a formidable barrier to movement due to lack of cover and vulnerability to predation. Potential impacts to nongame species from mine development are expected to be low.

Direct impacts on amphibian and reptile species would be similar to those described for small mammals. Mortalities due to vehicular collisions would likely be higher for reptiles than for amphibians, because reptiles spend more of their life cycles in terrestrial systems, as opposed to aquatic systems. Amphibians may be prevented from moving through disturbed upland habitats located between the limited amounts of aquatic habitat in the study area. As a result, genetic exchange between local populations could decrease local populations.

Migratory Birds and Raptors

As described in Section 3.17.1.4, Nongame Species, a variety of resident and migratory bird species (e.g., raptors and songbirds) have been identified as potentially occurring within the study area. Potential direct impacts to bird species would include the short-term reduction of 973 acres and long-term reduction of 194 acres of potentially suitable breeding, roosting, and foraging habitat. Raptor mortalities could increase under the Proposed Action due to vehicular collisions similar to big game species. All new proposed power distribution lines would be buried effectively eliminating any increases to potential impacts to migratory birds and raptors. The Proposed Action would result in decreased quality of habitat for raptor prey species due to changes in vegetation community composition and/or an increase in invasive species during mine development, which would result in reduced prey availability.

Impacts to other migratory bird species would be similar to those described for raptors excluding the impacts on prey availability and predation which are not applicable to other birds that do not prey on small mammals. Impacts for migratory birds and raptors are expected to have little effect on local bird populations based on the amount of suitable breeding and foraging habitat in the area surrounding the study area which would not be affected by the Proposed Action.

HES would attempt to conduct surface disturbing activities outside the avian breeding season to prevent the destruction of active bird nests or of young birds during the avian breeding season for sagebrush-grassland habitats (March 1 – July 31). Surveys for active nests within areas to be cleared of vegetation would be conducted by a qualified biologist if it becomes necessary to clear land during the breeding season. HES's proposed construction, operation, and reclamation procedures would incorporate measures to protect eagles. Surveys would be conducted prior to ground disturbance during the breeding and nesting seasons (March 1 – July 31) to determine the presence or absence of eagles as well as other raptor species. HES would avoid areas by using a buffer zone developed in coordination with the BLM and NDOW if nesting or brooding eagles are determined to be present. See Section 2.3.13, Applicant Committed Environmental Protection Measures, for more information about protective measures for nesting migratory birds including raptors.

Human Presence and Noise

The main noise generating activities under the Proposed Action would include the expanded existing pits, the new Dawn Pit, WRDFs, and the ore processing site. Ore crushing under the Proposed Action would continue as currently conducted under existing authorizations so the noise from the processing site is not expected to increase relative to existing operations. Noise emissions from surface exploration activities

would be generated by heavy equipment constructing drill sites, operating drill rigs, and drilling support equipment. Mine traffic traveling on on-site haul roads and the Boulder Valley Road would be an additional source of noise as well.

The most common wildlife responses to noise and human presence are avoidance or accommodation. Avoidance would result in displacement of animals from an area larger than the actual disturbance acreage footprint. The total extent of habitat loss as a result of wildlife avoidance response cannot be predicted because the degree of this response varies between different species and can also vary between individuals of the same species. After initial avoidance of human activity and noise-generating areas, some wildlife species may acclimate to the activities and begin to reoccupy areas formerly avoided. For example, during the initial development phases, it is likely that big game (i.e., pronghorn and mule deer) would be displaced from a larger area than the actual disturbed sites due to the avoidance response (Sawyer et al. 2009, Sawyer et al. 2005, Rost and Bailey 1979); however, these big game species have demonstrated an ability to acclimate to a variety of activities as long as human harassment levels do not increase substantially. Studies have demonstrated a robust habituation response of ungulates to increased human activity (Stankowich 2008). Therefore, it is possible that the extent of displacement would decrease after the first few years of mine operation (Ward 1976). Potential impacts could also include nest abandonment or the loss of eggs or young for raptors and migratory bird species. Impacts of noise upon greater sage-grouse are presented in Section 3.18, Special Status Species.

The proposed project is in the Bootstrap Mining District which has experienced consistent mining activities over the past 100 years. Therefore, the immediate vicinity around the study area has sustained human activity associated with mining for many years which would minimize the potential impacts related to increased human presence and noise in the study area. The Rossi Mine has been in operation since 1947.

Water Quality and Quantity

Wildlife populations within the study area could be affected by exposure to accumulations of water that may be present in ditches and ponds within the study area. Species likely affected by changes to water quantity or quality include big game, upland game birds and small game animals, nongame birds (e.g., migratory birds and raptors), nongame mammals, reptiles, and amphibians. HES may remove accumulations of water collected in open pits from meteoric precipitation. HES may also erect temporary fencing around new pits and ponds to prevent access and injury to wildlife in coordination with the BLM and NDOW.

As discussed in Section 3.4.1.2, Proposed Action, groundwater data suggest that there is a potential for groundwater to be intercepted in the proposed expansion of the King Pit and QLC Pit resulting in the formation of a pit lake. Based on the available data, and recognizing that the water levels in the area of the west lobe of the King Pit are uncertain, there may be potential for groundwater flow to be encountered in the west lobe of the King Pit. Depending on the inflow rates, groundwater inflows combined with runoff from pit walls and direct precipitation there may be sufficient flow for development of pit lakes in the west lobe of the King Pit and the QLC Pit. If pit lakes were to develop as a result of mining activity under the Proposed Action, the potential for adverse effect to wildlife species may occur. Areas of open water occur infrequently in the project area and it is likely that wildlife could attempt to utilize pit lake areas for drinking, thermal regulation, or other uses. Potential monitoring and mitigation measures for water resources discussed in Section 3.4.4, Potential Monitoring and Mitigation Measures, present a set of measures for monitoring of the potential for pit lakes to develop, evaluation of water quality of pit lakes that may occur, and mitigation measures to reduce or eliminate adverse effects to terrestrial and avian wildlife species. Specific mitigation measures that could be implemented to eliminate or reduce the potential for wildlife species to be adversely affected could include 1) reduction in the depth of open pit mining or partial pit backfilling to preclude pit lake development; 2) utilizing treatment options such as adding amendments to modify pit lake water quality concentrations; 3) measures designed to reduce exposure pathways or receptor access (wildlife fencing, avian deterrents, or other); and 4) other appropriate measures as approved by the BLM, NDOW, and NDEP.

Surface disturbance under the Proposed Action would increase the amount of erosion and sedimentation in the study area, which would affect water quality and could result in adverse indirect impacts on amphibian species. HES would implement and maintain stormwater control features and BMPs in accordance with the Rossi Mine SWPPP (AECOM 2012c) and the *Nevada Contractor's Field Guide for*

Construction Site Best Management Practices (NDEP 2008a) which would minimize these impacts to amphibians and other wildlife species.

Hazardous Materials Spill

The probability of a transportation-related spill along the transportation route is discussed in Section 3.7, Hazardous Materials and Solid Waste. The potential for wildlife exposure to toxic chemicals as a result of a transportation-related spill would be greatest if an accident were to occur near aquatic habitats. Spills in dryland habitat would pose minimal risk to most wildlife species since these spills would be adjacent to highways or roads and could be quickly contained and cleaned. Chemical materials of greatest concern would be diesel fuel. Diesel spills can contaminate soils, surface water, and groundwater in addition to adversely affecting aquatic and vegetative life. Although unlikely, a diesel spill could ignite from the accident and cause a wildland fire. Diesel contamination has a low potential to result in long-term impacts to soil, surface water, and groundwater due to the rapid containment and cleaning of the area. Fuels and hydrocarbons used during mining and processing operations would continue to be stored in areas protected by secondary containment measures. A list of fuels and hydrocarbons proposed for use during mining and processing operations, proposed storage quantities, and proposed usage rates is provided in **Table 2-6** of this EIS.

Proposed Communication Site

The installation of the proposed communications tower would result in temporary impacts from the presence of construction equipment and personnel at the communication site and the removal of approximately 0.009 acre of vegetation, as discussed in Section 2.3.9.11, Communication Tower Site. During the life of the mine, the communications tower may result in adverse impacts to avian species that could collide with the tower. The communication tower would not include guy wires or nighttime lighting; therefore, the risk of collision for avian species is considered to be minimal. The communication tower would provide an elevated perching location for predatory raptor and corvid (common raven [*Corvus corax*]) or common crow (*Corvus brachyrhynchos*) species, which could result in increased predation of terrestrial prey species within the immediate area around the tower and the viewshed of a perching raptor or corvid.

Aquatic Biological Resources

Surface Disturbance

Direct impacts on aquatic habitat and species would involve disturbances to stream, wetland, or pond habitat as a result of activities within or near these waterbodies. Construction activities associated with the expansion of the King North WRDF would occur in the area of the perennial stream (W-1) located within the study area (**Figure 3.14-4**). Intermittent streams and springs/seeps located in the central and southern portions of the study area where the Queen East WRDF, QLC, and Dawn WRDF are proposed for construction would be affected as well. Construction activities could result in soil disturbance and subsequent increased erosion, sedimentation, and salinity of surface waters either in the study area or downstream to the Boulder Creek and/or Little Coyote Creek drainages. The majority of streams within the study area are intermittent; therefore, sediment input to the drainages would likely be localized to areas near the proposed disturbance areas. Biological communities in these drainages are limited to macroinvertebrates and algae which can tolerate intermittent flow and low water levels. Applicant committed environmental protection measures include engineering practices and BMPs for sediment control which would reduce sediment input from project facilities and disturbed areas into these drainages, as defined by the site Storm Water Pollution Prevention Plan. Project-related impacts of added sediment into the drainages and associated impacts to aquatic biota (where present) are considered to be minor with the implementation of erosion control measures.

The expansion of existing facilities and construction of new facilities may impact the two small perennial ponds (W-2 and W-3) at the southern portion of the active mining area and the small unnamed seasonal ponds located throughout the study area; however, all ponds in the study area are human-made and only support habitat for aquatic invertebrates and vegetation. No fish or amphibian species were observed in these wetlands within the study area. Pacific tree frogs were heard chorusing at night in a drainage one mile northwest of the study area during surveys in 2013 (EcoSynthesis 2013).

Water Quality and Quantity

Water management activities would be operated in a similar manner as the existing system. HES would implement and maintain stormwater control features and BMPs in accordance with the Rossi Mine SWPPP (AECOM 2012c) and the *Nevada Contractor's Field Guide for Construction Site Best Management Practices* (NDEP 2008a). No impacts are likely to occur to aquatic biological resources.

Hazardous Materials Spill

Vehicle and equipment use in areas near wetlands or streams pose a risk to aquatic species from fuel spills or leaks reaching these waterbodies. The magnitude of the impact if a spill occurred would depend upon the volume spilled and the extent of dispersal within the waterbody. Adverse effects on aquatic species, primarily macroinvertebrates, could occur depending on the factors involving spill volume and hydrology conditions in the waterbody if fuel entered the waterbody. Spilled fuel products could result in mortalities to aquatic species or habitat degradation due to impacts to water quality. A list of fuels and hydrocarbons proposed for use during mining and processing operations, proposed storage quantities, and proposed usage rates is provided in **Table 2-6** of this EIS. HES would maintain and implement a SPCCP for hydrocarbons and potential releases as part of applicant committed environmental protection measures, which would reduce spill risks to a low level. As a result, potential for spill impacts on aquatic biological resources is considered to be low.

3.17.2.2 Reconfiguration Alternative

Surface Disturbance

Potential impacts to game and non-game wildlife species under the Reconfiguration Alternative would be similar to the Proposed Action but reduced in scope. The Reconfiguration Alternative was developed by the BLM, HES, and NDOW to address potential adverse impacts to migrating mule deer under the Proposed Action. Under the Reconfiguration Alternative, the sequencing of construction for the modified Dawn WRDF would be phased to ensure the conservation of a minimum 2,000 foot wide corridor for use by migrating mule deer. NDOW recommends that mule deer migratory corridor widths consist of a minimum of one km (approximately 3,280 feet) (NDOW 2012a). HES is limited in its ability to maintain a 3,280 foot-wide migration corridor by the locations of mineral deposits within the PoO boundary, the technical and economic feasibility aspects of ore and waste rock handling procedures, and mineral entry to the south of the Rossi Mine by the previously authorized Arturo Mine. Data collected under the proposed mule deer monitoring program discussed in Section 3.17.4, Potential Monitoring and Mitigation Measures, would assist BLM and NDOW in determining the efficacy of the 2,000 foot wide corridor in comparison to the NDOW recommend 3,280 foot wide corridor.

The modifications to facilities under the Reconfiguration Alternative would result in a reduced final footprint of the proposed Dawn WRDF which would reduce the amount of temporary surface disturbance in mule deer limited use range and movement corridor to 872 acres (approximately 13 percent less than the Proposed Action). This alternative would result in less adverse impacts specifically to seasonal mule deer movements within the project area; however, all wildlife species would experience less direct impacts from temporary habitat loss and fragmentation under the Reconfiguration Alternative as compared to the Proposed Action. The total amount of long-term surface disturbance to the mule deer limited-use range and migration corridor would be 144 acres. All other direct and indirect impacts associated with this alternative would be similar to the Proposed Action.

Reclamation of mining disturbance and removal of mining support and ancillary facilities would occur as presented in Section 2.3.12, Closure and Reclamation Plan. Impacts of reclamation and removal of mining facilities would be similar to impacts resulting from mine construction and operation, including the presence of vehicles, equipment, and reclamation staff within the PoO boundary. During reclamation, increased dust, vibration, and noise would result in increased temporary disturbance in the areas where reclamation is actively being implemented. Periodic monitoring of reclamation success would result in the presence of reclamation staff, vehicles, and equipment within the PoO boundary.

Human Presence and Noise

Impacts to wildlife would be the same as discussed under the Proposed Action.

Water Quality and Quantity

Impacts to wildlife would be the same as discussed under the Proposed Action.

Hazardous Materials Spill

Impacts to wildlife would be the same as discussed under the Proposed Action.

3.17.2.3 Livestock Fencing Alternative

Surface Disturbance

The Livestock Fencing Alternative (Fencing Alternative) would be similar to the Proposed Action, except that a three or four strand, wildlife friendly livestock exclusion fence would be installed around the perimeter of the PoO boundary as shown in **Figure 2-15**. Fences would be constructed according to wildlife friendly specifications discussed in Section 2.4.3, Livestock Fencing Alternative.

The construction of livestock fencing under the Fencing Alternative would result in 7 acres of short-term surface disturbance which would be in addition to the 973 acres of short-term surface disturbance under the Proposed Action resulting in a total of 990 acres of surface disturbance (0.7 percent greater than the Proposed Action) due to the construction of the livestock exclusion fence. Impacts due to long-term surface disturbance would be the same under the Fencing Alternative as under the Proposed Action. Potential impacts to big game resulting from the Fencing Alternative would include potential injury or mortality of individuals becoming entangled in or colliding with the fence itself in addition to the fact that migrating mule deer and other wildlife species would be forced to negotiate the fence as an obstacle to movement. Due to the wildlife friendly design of the Fencing Alternative, the risk of serious injury or mortality would be considered low. In the long-term, the Fencing Alternative would potentially reduce adverse impacts to big game species as big game species could be diverted away from areas of increased mining activity and traffic (i.e., King South WRDF, QLC North WRDF, and QLC East WRDF) which would reduce the potential for collisions with mining activity and traffic. All other aspects of the Proposed Action and Reconfiguration Alternative would remain the same if the Fencing Alternative is chosen for implementation by the BLM. The fence would be removed once the mine is reclaimed and revegetation is determined successful by the BLM and NDEP.

3.17.2.4 No Action Alternative

Surface Disturbance

Under the No Action Alternative, the proposed project would not be developed, and impacts to wildlife and aquatic resources would not occur beyond those impacts resulting from previously authorized disturbance. Under this alternative, 1,167 acres of potential wildlife habitat would not be disturbed or lost, as described under the Proposed Action. Additional habitat fragmentation and animal displacement would not occur, limiting the impacts to wildlife resources to existing conditions. Closure and reclamation of the existing and authorized mine disturbance and surface exploration activities within the project area would be conducted under the terms of current permits and approvals.

New disturbance to springs and seeps would not occur other than what was previously authorized under existing permits and approvals. Therefore, potential sedimentation on aquatic species and their habitat would not occur to the Little Coyote Creek and Boulder Creek drainages. A low level risk of fuel spills on aquatic habitat would continue to exist for the No Action Alternative, although the SPCC Plan would be implemented to reduce spill risks.

Human Presence and Noise

Under currently authorized disturbance, impacts resulting from human presence and noise include avoidance or accommodation similar to what is discussed under the Proposed Action. No additional impacts to wildlife would be expected under the No Action Alternative.

Water Quality and Quantity

Under currently authorized disturbance, impacts to water quality and quantity are similar to what is discussed under the Proposed Action. No additional impacts to wildlife would be expected under the No Action Alternative.

Hazardous Materials Spill

Under currently authorized disturbance, impacts to wildlife from potential hazardous materials spills are similar to what is discussed under the Proposed Action. No additional impacts to wildlife would be expected under the No Action Alternative.

3.17.3 Cumulative Impacts

The CESA for wildlife and aquatic biological resources is defined in Section 3.17.1, Affected Environment, and is shown in **Figure 3.17-1** and **Figure 3.17-2.** The past, present, and RFFAs are discussed in Section 3.2, Past, Present, and Reasonably Foreseeable Future Actions. RFFAs from mining and exploration activities are identified in **Table 3.2-1**; their locations are shown in **Figures 3.2-1 and 3.2-2**. **Figure 3.2-2** also shows some ROW actions**.**

3.17.3.1 Proposed Action

Wildlife Resources

The CESA for wildlife resources encompasses the extent of the Boulder Flat (#61) and Rock Creek Valley (#62) Hydrographic Basin (**Figure 3.17-1**) while the mule deer CESA comprises Management Area 6 (Hunting Units 061, 062, 064, 066, 067, and 068) (**Figure 3.17-2**). The CESAs include contiguous areas that provide important seasonal habitat for general wildlife species as well as mule deer. Cumulative impacts on wildlife in the CESAs have resulted primarily from disturbance related to mining, pipeline, transmission line, and fluid minerals projects; grazing and agriculture activities; and wildfires and wildfire re-seeding efforts. Development of reasonably foreseeable mine projects would continue to impact big game in their respective CESAs; however, most mine areas proposed for development within the Carlin Trend have been within or adjacent to existing mine areas (BLM 2010b, BLM 2010c).

Past, present, and RFFAs in the wildlife and mule deer CESAs have resulted, or would result, in the direct disturbance of habitat (**Table 3.17-3**). A portion of the cumulative disturbance areas have been, or would be, reclaimed or have recovered materially (i.e., wildfire areas). The reclaimed areas, and areas associated with habitat conversion, would be capable of supporting wildlife use; however, species composition and densities may change.

Management goals outlined by the Area 6 Mule Deer Working Coalition (MDWGC 2012) include the following principles:

- Develop habitat management practices that are understood by all stakeholders and are applied towards actions and activities considered for permit, authorization, or development on public or private lands.
- Promote maintenance of historic / adequate north-south movement corridors associated with wildlife.
- Reduce fragmented and degraded sagebrush habitat and move towards a healthier condition.
- Link existing and restored sagebrush / mule deer habitat.
- Encourage cooperation between private, state and federal landowners.
- Inform and educate landowners and the general public regarding the mule deer issue as it relates to various uses on lands in the area.

Wildfire throughout the wildlife and mule deer CESAs has contributed to cumulative impacts on all wildlife species. As shown in **Figure 3.2-3**, from 1980 to 2017, 439,909 acres of potential wildlife habitat have been affected by large-scale wildfires (NNRDA No Date, BLM 2017b). Wildfire has resulted in the temporary and long-term loss of shrubs and other vegetation that provides forage and cover to a variety

of wildlife species, which in turn has adversely affected mule deer and pronghorn herds throughout their respective CESAs. Impacts of wildfires to terrestrial wildlife species include loss of habitat (forage and cover) which can lead to mortality of big game species including mule deer and pronghorn, as well as other species. Wildfire also results in a reduction of canopy cover and forb and grass diversity, elements of plant communities which may recover with time. Approximately 1,668 acres within the PoO boundary have burned since 2000, which contributes incrementally to the cumulative impacts of wildfire on wildlife species (SRK 2013b, BLM 2017b).

Cumulative impacts to wildlife resources would be predominantly related to habitat loss, habitat fragmentation and animal displacement as described in Section 3.17.2.1, Proposed Action. Mining has removed wildlife habitat within the Carlin Trend area of the wildlife and mule deer CESAs as a function of fencing and/or disturbance associated with mining operations. Impacts to local mule deer migration under the Proposed Action are anticipated to be substantial due to the removal of the existing undisturbed migration corridor located between the Rossi Mine and Arturo Mine. Construction of the Dawn WRDF would effectively narrow the area for mule deer moving between important seasonal habitats near the Rossi Mine until reclamation is completed. Mule deer would have to navigate through active mining areas at the Rossi and Arturo mines resulting in increased stress and energy expenditure and potential for mortality from collisions with mining equipment. Mule deer that choose to instead navigate around the Rossi and Arturo mines to reach important seasonal habitats would be forced to travel several extra miles, thus increasing stress levels and energy expenditures that would likely result in increased mortality during harsh winter conditions. Other direct impacts to big game species include mortalities or injury resulting from vehicle collisions as well as indirect impacts such as avoidance, restriction of movement (due to new facilities or roads), displacement of animals from the RFFAs during all seasons, and increased potential for poaching/hunting.

The type and nature of cumulative impacts to raptor species would be similar to the direct and indirect impacts described in Section 3.17.2.1, Proposed Action, and would include direct mortality through vehicular traffic collisions due to increased access and activity in the area. Indirect impacts include habitat loss, degradation, and habitat fragmentation, as well as disturbance and displacement from areas with human activities. Nesting raptors in particular would be susceptible to these cumulative impacts especially due to mining activities in the Carlin Trend which has resulted in bird displacement and habitat fragmentation in areas that may currently be at the peak population for resident raptor species.

Small game species, small mammals, migratory birds, reptiles, and amphibians that occur in the CESA would continue to occupy their respective ranges and breed successfully; however, population numbers may decrease relative to the amount of cumulative habitat loss and disturbance from incremental development.

Table 3.17-4 presents information regarding the acreages of cumulative impacts from development projects located within NDOW Hunt Unit 068 which incorporates the majority of mining and other development within the central portion of the Carlin Trend mining area, which is a defined area within this hunt unit.

Table 3.17-3. Cumulative Wildlife, Mule Deer, Pronghorn, and Elk Habitat Disturbance

CESA and Habitat Type[1]	Total Acres of Habitat	Acres of Habitat Disturbed by Fire	Acres Disturbed by the Proposed Action	Acres of Habitat Disturbed by Mining Operations (Past, Present, and RFFAs)[2]	Acres of Habitat Disturbed by Utility and Energy Development (Past, Present, and RFFAs)	Total Acres of Habitat Disturbed	Percentage of CESA Habitat Disturbed by Cumulative Actions
Wildlife	632,757	439,909	1,167	40,374	419	481,869	76
Mule Deer – Limited Use/ Migration Movement Corridor	1,714,971	690,717	1,167	31,425	344	723,653	42
Pronghorn – Summer	2,754,695	1,318,501	1,167	23,891	1,629	1,345,188	49
Elk – Limited Use	2,103,387	943,031	1,108	23,287	1,609	969,035	46
Elk – Crucial Winter	348,082	269,575	59	12,689	4	282,327	81

Sources: SRK 2013b; NDOW 2014; BLM 2007a, BLM 2017b.

[1] The CESA for general wildlife species includes extent of the Boulder Flat (#61) and Rock Creek Valley (#62) Hydrographic Basin; the CESA for big game species (mule deer, pronghorn, elk) is the entire Management Area 6.
[2] See **Table 3.2-1** for a breakdown of mining projects.

Table 3.17-4. Cumulative Wildlife, Mule Deer, Pronghorn, and Elk Habitat Disturbance within Hunt Unit 068

CESA and Habitat Type	Total Acres of Habitat	Acres of Habitat Disturbed by Fire	Acres Disturbed by the Proposed Action	Acres of Habitat Disturbed by Mining Operations (Past, Present, and RFFAs)[1]	Acres of Habitat Disturbed by Utility and Energy Development (Past, Present, and RFFAs)	Total Acres of Habitat Disturbed	Percentage of Unit 068 Habitat Disturbed by Cumulative Actions
Wildlife	601,496	436,383	1,167	24,409	385	462,344	77
Mule Deer – Limited Use/ Migration Movement Corridor	1,630,244	687,635	1,167	19,843	316	708,961	43
Pronghorn – Summer	2,618,601	1,347,688	1,167	15,086	1,497	1,365,438	52
Elk – Limited Use	1,999,470	937,854	1,108	14,704	1,478	955,144	47
Elk – Crucial Winter	330,885	268,370	59	8,012	4	276,445	84

Sources: SRK 2013b; NDOW 2014; BLM 2007a, BLM 2017b.

[1] See **Table 3.2-1** for a breakdown of mining projects.

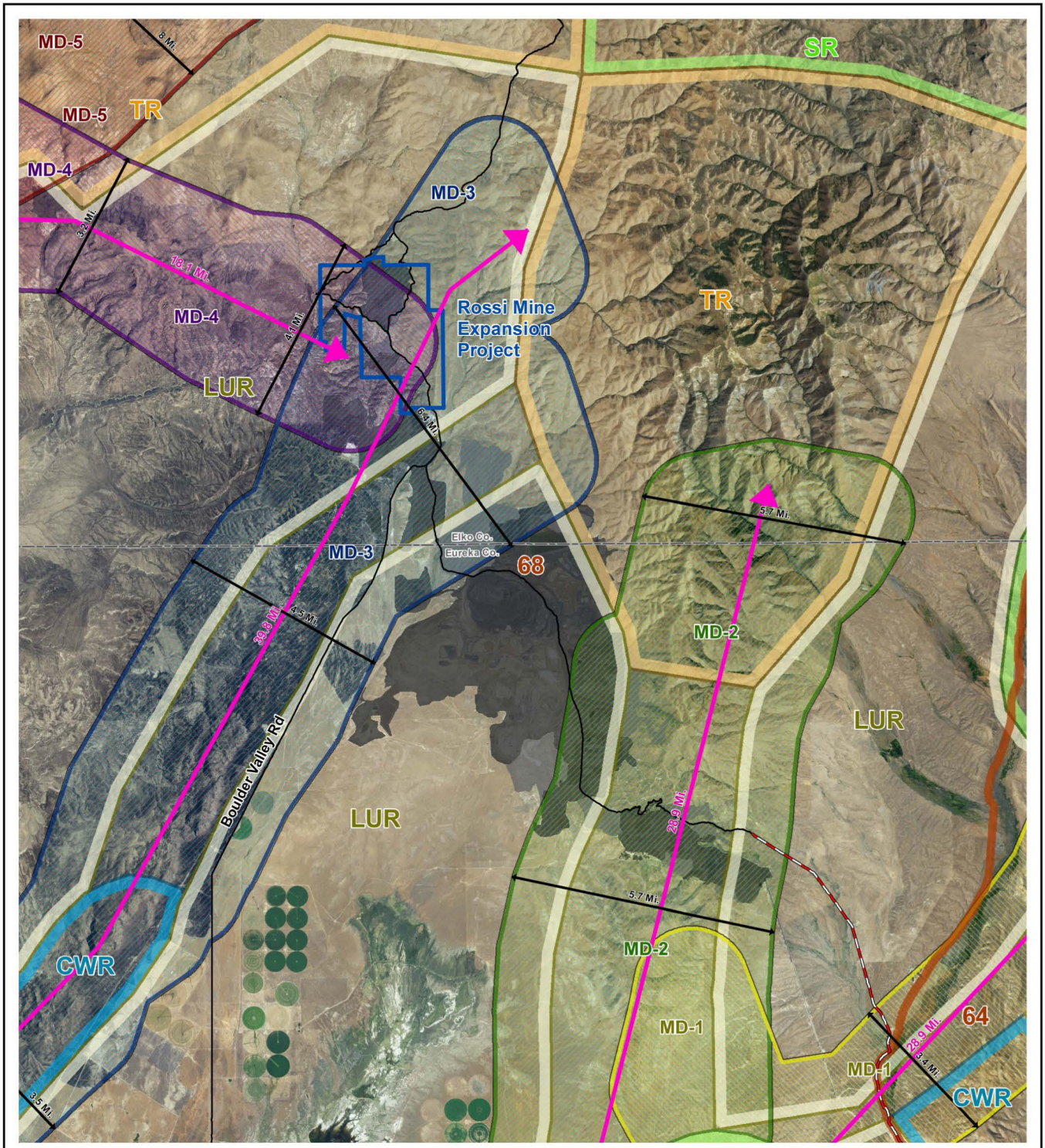
Mule Deer

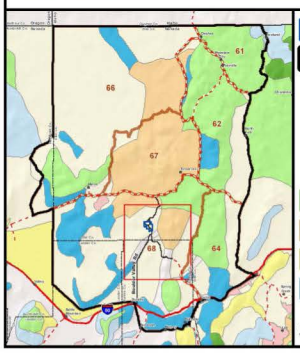
Big game species, especially mule deer utilizing habitat in Units 062 and 068, would be most susceptible to the cumulative impacts described above due to encroaching human activities along the foothills of the Tuscarora Range and the Carlin Trend which have resulted in animal displacement and habitat fragmentation in areas that are utilized as migration corridors between summer and winter ranges. NDOW collaring data demonstrated that mule deer tend to avoid large-scale mine disturbance areas along the Carlin Trend and choose specific routes through mine sites. Current migration routes used by mule deer in the Boulder Valley and Dunphy Hills area represent the remnants of historic migration corridors in the Carlin Trend and are further restricted by encroaching mine expansions and associated human activities including the Proposed Action (BLM 2010b, BLM 2010c). Existing disturbance from past and present projects that impacts the mule deer migration corridor is presented in **Figure 3.17-6**. Exploration and mining activity in the Carlin Trend over the past 100 years have significantly limited the available undisturbed habitat that mule deer require to migrate successfully between seasonal ranges in the project vicinity. This reduction of suitable migration corridors in conjunction with large expanses of wildfire in important summer and winter mule deer ranges has contributed to the steady decline of Area 6 mule deer herd numbers observed since the 1960s.

Anticipated disturbance under the Proposed Action and other RFFA that impact the mule deer migration corridor is presented in **Figure 3.17-7**. **Figure 3.17-8** provides a comparison of the existing and authorized development at the Rossi and Arturo mines in relation to the mule deer migration corridor with the areas of surface disturbance that would result under the Proposed Action. Under existing authorization the width of the current mule deer migration corridor between the Rossi and Arturo mines would remain at approximately 3,466 feet at its narrowest point (**Figure 3.17-8**). The lower half of **Figure 3.17-8** presents the anticipated widths of the mule deer migration corridor under the Proposed Action and the final build out of the Arturo Mine that was approved in 2014. Under this scenario, the width of the existing mule deer migration corridor would be reduced to approximately 314 feet at the narrowest point between the east lobe of the Arturo Mine and the proposed Dawn WRDF. This constriction would effectively discourage and may remove the ability for mule deer to migrate through the area using the existing migration corridor as the slopes of the proposed WRDF and Arturo open pit would be difficult for mule deer to navigate and the increased noise and human presence resulting from mining activity would discourage mule deer from using what remains of the migration corridor. Under this scenario, mule deer would be forced to navigate through areas of active mining or to travel around the north side of the Rossi Mine to access the important seasonal habitats to the northeast and southwest of the project area. Mule deer could also migrate around the southern end of the Carlin Trend mines although this would add considerable distance to the migration and would likely result in increased mortality.

Human related disturbances have been shown to divert time and energy away from foraging, resting, and other activities that improve fitness, which would be important to wintering ungulates whose nutritional condition is closely linked to survival (Frid and Dill 2002; Gill et al. 1996). These human-related disturbances on wildlife energetics, demography, and habitat selection are particularly important among temperate ungulates whose survival depends on minimizing energy expenditures during winter (Hobbs 1989; Parker et al. 1984). Furthermore, animals displaced from disturbed sites may experience greater intraspecific competition or density dependent effects when congregating into smaller areas of undisturbed or suboptimal habitat (Gill and Sutherland 2000).

Due to the level of past, present, and RFFAs in the CESA, there is limited availability of undeveloped, suitable habitat for mule deer in the CESA. In addition, indirect impacts from ongoing projects and RFFAs could extend far beyond the footprint of disturbance, resulting in synergistic adverse effects on the limited amount of undeveloped habitat available for migration between important seasonal ranges within certain portions of the species range. As a result, the Proposed Action could create a situation in which mule deer are displaced from the project area and have limited suitable areas in the CESA in which to transition between important seasonal habitats that support their life history requirements; thus contributing to adverse cumulative impacts to mule deer.





Project Study Area
Big Game CESA
Developed Areas
Quarries-Strip Mines-Gravel Pits

Mule Deer Seasonal Ranges
Summer Range (SR)
Transition Range (TR)
Limited Use Range (LUR)
Crucial Winter Range (CWR)

Source: BLM 2010b, SRK 2014a, NDOW 2014.

NDOW Hunt Unit

Mule Deer Corridor Groups
MD-1
MD-2
MD-3
MD-4
MD-5
Corridor Length
Corridor Width

Rossi Mine Expansion Project EIS

Figure 3.17-6

Existing Mining Disturbance and Mule Deer Movement Corridors within the Project Area

0 1 2 3 Miles
0 1 2 3 Kilometers
1:200,000

N

2/20/2018

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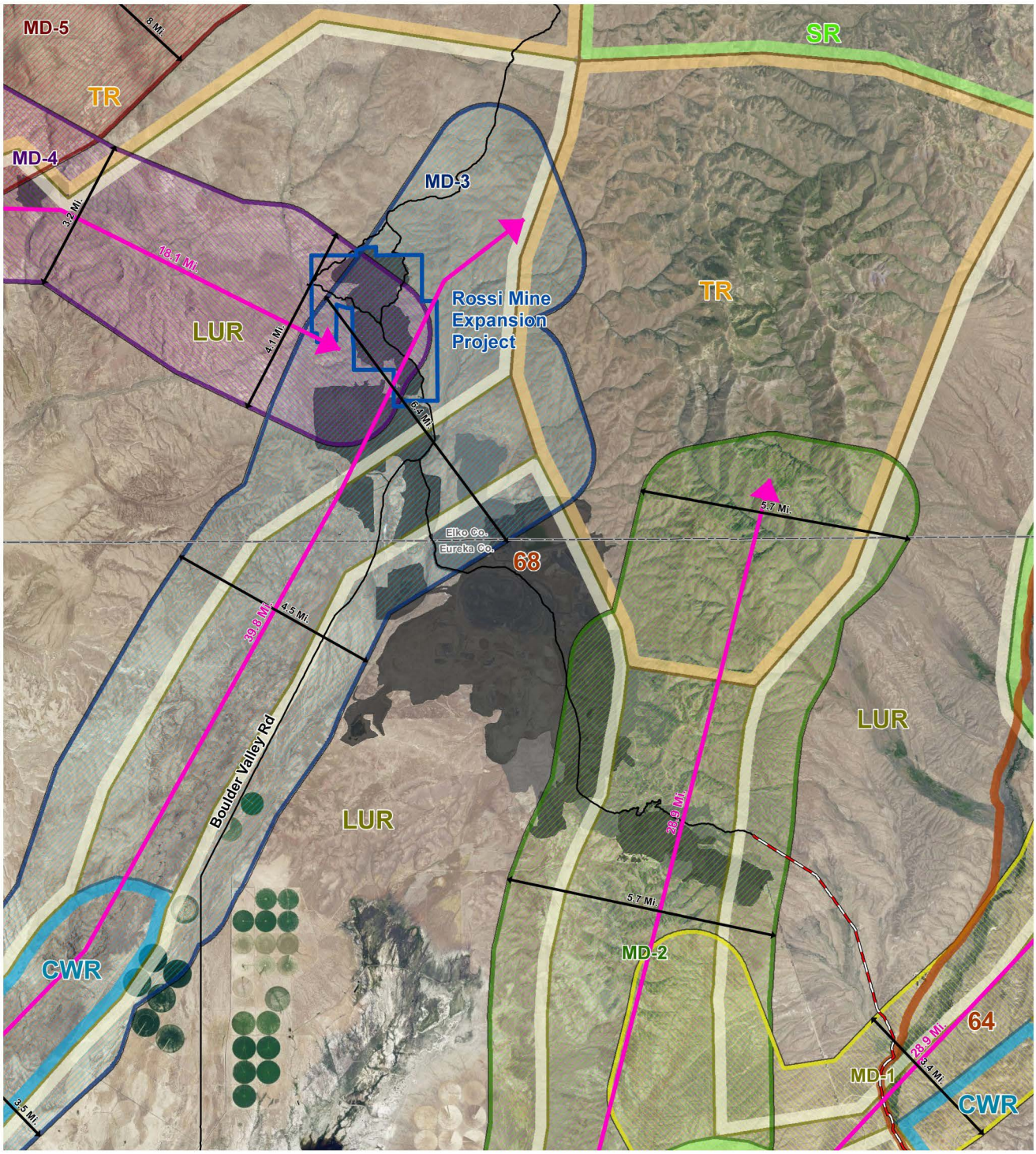

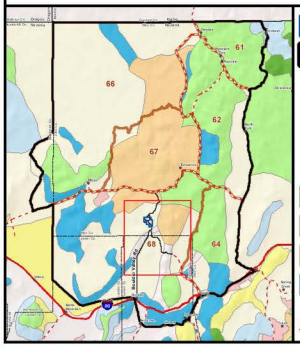

Project Study Area
Big Game CESA
Developed Areas
Quarries-Strip Mines-Gravel Pits

Mule Deer Seasonal Ranges

Summer Range (SR)
Transition Range (TR)
Limited Use Range (LUR)
Crucial Winter Range (CWR)

Source: BLM 2010b, SRK 2014a, NDOW 2014.

NDOW Hunt Unit

Mule Deer Corridor Groups

MD-1
MD-2
MD-3
MD-4
MD-5
Corridor Length
Corridor Width

Rossi Mine Expansion Project EIS

Figure 3.17-7

Rossi Proposed Action and Proposed/Existing Mining Disturbance and Mule Deer Movement Corridors within the Project Area

0 1 2 3 Miles
0 1 2 3 Kilometers
1:200,000

N

11/10/2017

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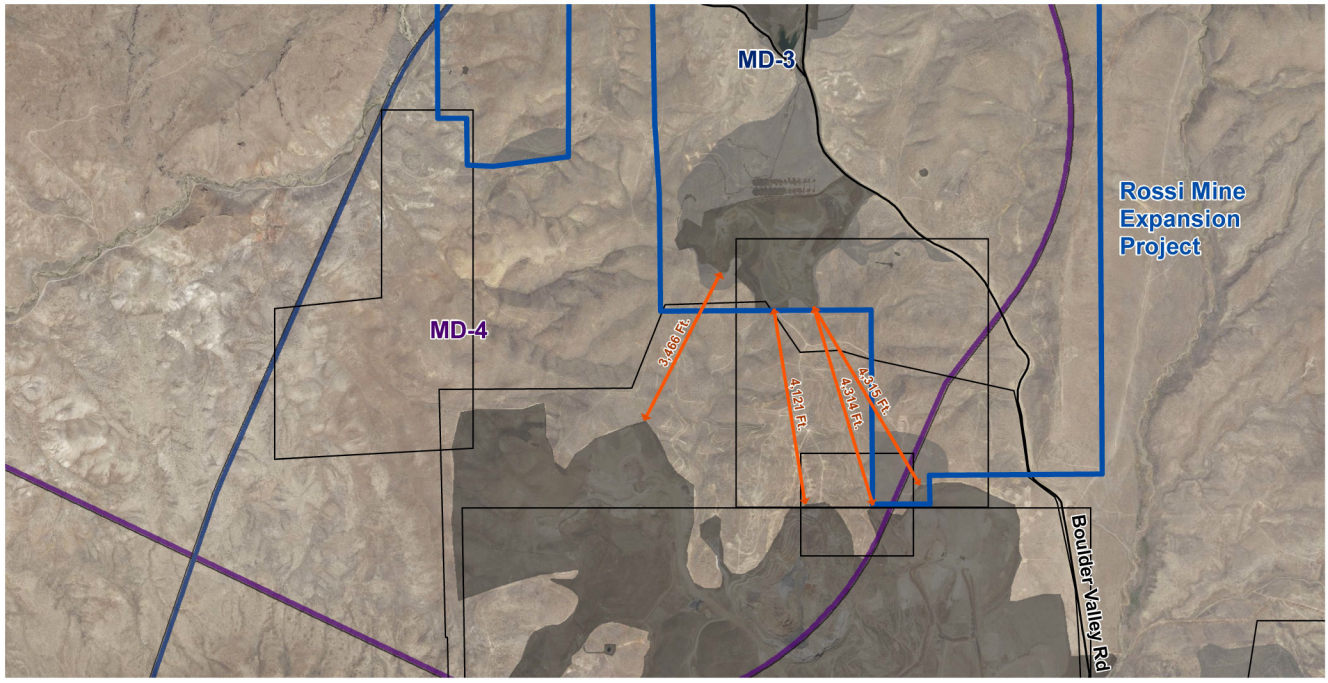
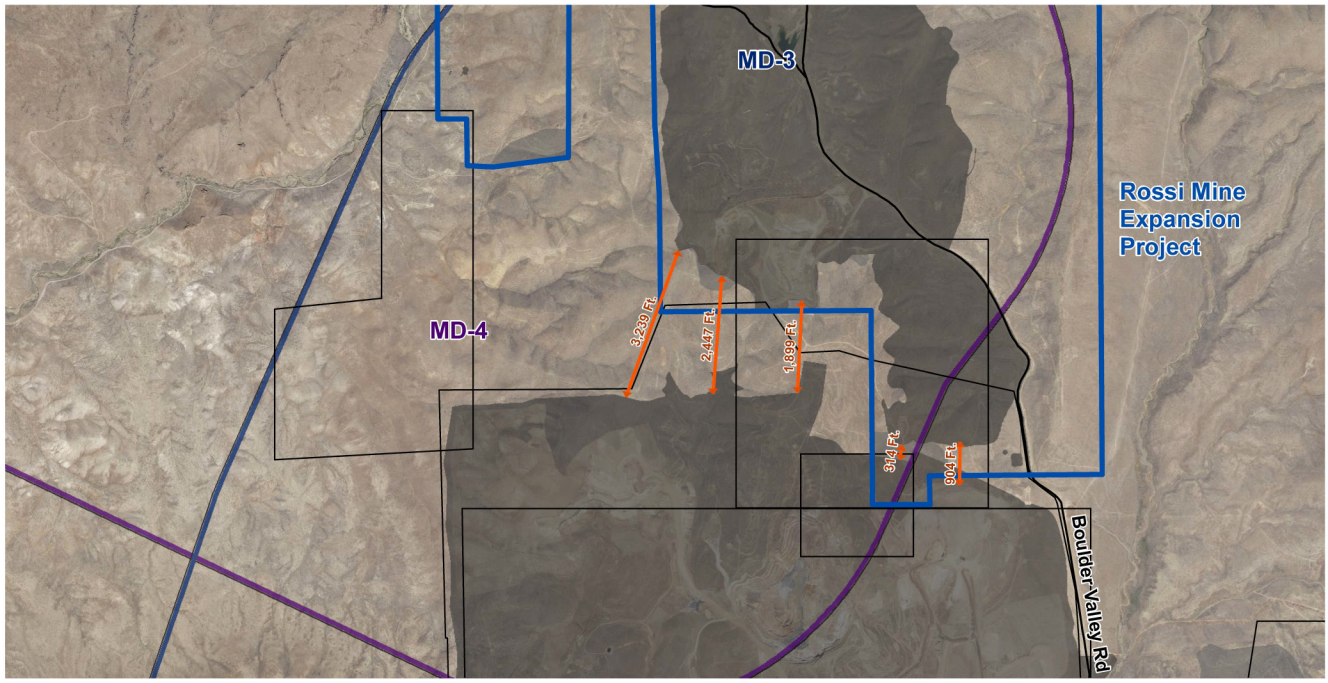
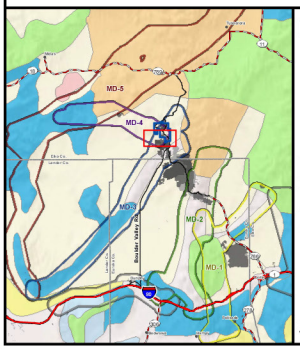
Existing/Authorized Disturbance



Proposed Disturbance (Proposed Action)





Mine Plan Boundaries
Developed Areas
Quarries-Strip Mines-Gravel Pits

Mule Deer Corridor Groups

MD-3
MD-4
Reduced Corridor Width

Source: BLM 2010b, SRK 2014a, NDOW 2014.

Rossi Mine Expansion Project EIS

Figure 3.17-8

Mule Deer Movement Corridors between Rossi Mine Proposed Action and Authorized Arturo Mine

0 0.25 0.5 0.75 1 Miles
0 0.5 1 Kilometers
1:48,000

10/12/2017

Aquatic Biological Resources

The CESA for aquatic biological resources includes portions of the Maggie Creek, Rock Creek Valley, and Boulder Flat Hydrographic Basins (**Figure 3.14-5**). The proposed project would contribute minor adverse impacts on aquatic biological resources in Maggie Creek and Rock Creek as a result of erosion from surface disturbance activities and low risk from potential fuel spills. These impacts would combine with other past, present, and RFFAs in the Maggie Creek, Rock Creek Valley, and Boulder Flat Hydrographic Basin. Erosion control measures have been required on other mining projects in the CESA to reduce sediment input to Boulder Creek; however, collectively, these projects likely have resulted in some low level of sediment input into the drainage. The proposed project could contribute incrementally to sediment into the Boulder Creek.

Other activities such as livestock grazing and agricultural development in the CESA would contribute to adverse impacts on aquatic biological resources. Potential cumulative effects to aquatic habitat and species include degradation of habitat from livestock grazing, conversion of native riparian and wetland plant communities to vegetation dominated by noxious weeds and non-native invasive plant species, and new roads. Mitigation programs implemented by other mining projects would reduce these potential impacts to the Hydrographic Basin.

Climate Change

Potential changes to the project area resulting from the effects of climate change forecasted by the Central Basin and Range Rapid EcoRegional REA could include higher than normal growing season temperatures, contraction or expansion of some existing vegetation communities, the expansion of existing noxious weed populations, and the introduction of noxious weed species previously undocumented in the ecoregion and project area (Comer et al. 2013). Regarding temperature increases specifically, the Central Basin and Range REA forecasts an average increase in average summer maximum daytime temperatures of approximately 5°F within the project area by 2060 (Comer et al. 2013). These increases in average growing season temperatures are anticipated to result in low elevation basins throughout the Central Basin and Range ecoregion potentially transitioning from the existing cool semi-desert vegetation communities into very warm and sparsely-vegetated desert landscapes more typical of the Mojave Basin and Range. These potential shifts in vegetation communities could result in changes to wildlife species diversity and population densities. A number of studies have documented a decrease in biomass and productivity resulting from climate change in the Southwest. Anderson-Teixeira et al. (2011) found that the amount of above-ground plant biomass decreased as temperature increased and precipitation decreased in a central New Mexico study. With increasing atmospheric CO_2 levels, cheatgrass and other introduced annual grasses are expected to proliferate and continue to outcompete native species which can be expected to increase the frequency and size of wildfires in the area (Smith et al. 2000). An increase in wildfire frequency may result in the reduction of important seasonal habitats for big game and other wildlife species within the project area and CESA. Ultimately, biodiversity in the CESA could be significantly reduced, which in turn might alter ecosystem processes such as primary production, nutrient dynamics and landscape water balance.

3.17.3.2 Reconfiguration Alternative

Cumulative effects under the Reconfiguration Alternative would be similar to wildlife resources discussed for the Proposed Action, except that 151 fewer acres of wildlife habitat would be disturbed during the life of the mine and 50 fewer acres would be disturbed permanently. Implementation of this alternative would result in less cumulative impacts to seasonal movements of mule deer by reducing the final footprint of the proposed Dawn WRDF which would maintain a larger area of current limited use range and movement corridors.

Anticipated disturbance under the Reconfiguration Alternative and other RFFAs that impact the mule deer migration corridor is presented in **Figure 3.17-9**. **Figure 3.17-10** provides a comparison of the existing and authorized development at the Rossi and Arturo mines in relation to the mule deer migration corridor with the areas of surface disturbance that would result under the Reconfiguration Alternative. Under existing authorization the width of the current mule deer migration corridor between the Rossi and Arturo mines would remain at approximately 3,466 feet at its narrowest point (**Figure 3.17-10**). The lower half of

Figure 3.17-10 presents the anticipated widths of the mule deer migration corridor under the Reconfiguration Alternative and the final build out of the Arturo Mine that was approved in 2014. Under this scenario, the width of the existing mule deer migration corridor would be reduced to approximately 1,787 feet at the narrowest point between the east lobe of the Arturo Mine and the proposed Dawn WRDF. Although the proposed Dawn Pit is located in the middle of the migration corridor, this facility would be prioritized for development and would be mined and reclaimed prior to the development of the proposed Dawn WRDF. The resulting long-term constriction of the migration corridor would reduce the ability for mule deer to migrate through the area in comparison to the No Action Alternative. In comparison to the Proposed Action, the remaining undisturbed or reclaimed sections of this important mule deer migration corridor would allow for increased use of the corridor during seasonal migrations. As a result of the configuration of facilities to allow for the maintenance of an unobstructed corridor, cumulative impacts to migrating mule deer would be less pronounced under the Reconfiguration Alternative.

The cumulative impacts of the Reconfiguration Alternative to aquatic biological resources would be similar to those described for the Proposed Action. The potential for erosion and sedimentation within the Hydrographic Basin would be less under the Reconfiguration Alternative as compared to the Proposed Action due to the smaller footprint of the proposed Dawn WRDF.

3.17.3.3 Livestock Fencing Alternative

Cumulative effects under the Livestock Fencing Alternative would be the same as those discussed under the Proposed Action, except that an additional 7 acres would be temporarily disturbed. Upon successful reclamation and revegetation as determined by BLM and NDEP, the fence would be removed.

3.17.3.4 No Action Alternative

Cumulative impacts resulting from past, present, and RFFAs to wildlife resources for the No Action Alternative would generally be the same as those described for the Proposed Action. However, there would be 1,167 acres less of surface disturbance and associated habitat fragmentation within the CESA under the No Action Alternative. Impacts to the existing mule deer migration corridor would be limited to those resulting from previously authorized actions for the Rossi Mine and Arturo Mine.

Potential sediment and fuel spill risks would continue to exist within the CESA under the No Action Alternative; however, existing sediment-control and spill plans would be used to minimize impacts to the Hydrographic Basins in the CESAs. These low level impacts would combine with other surface disturbance activities associated with RFFAs within the CESA.

3.17.4 Potential Monitoring and Mitigation Measures

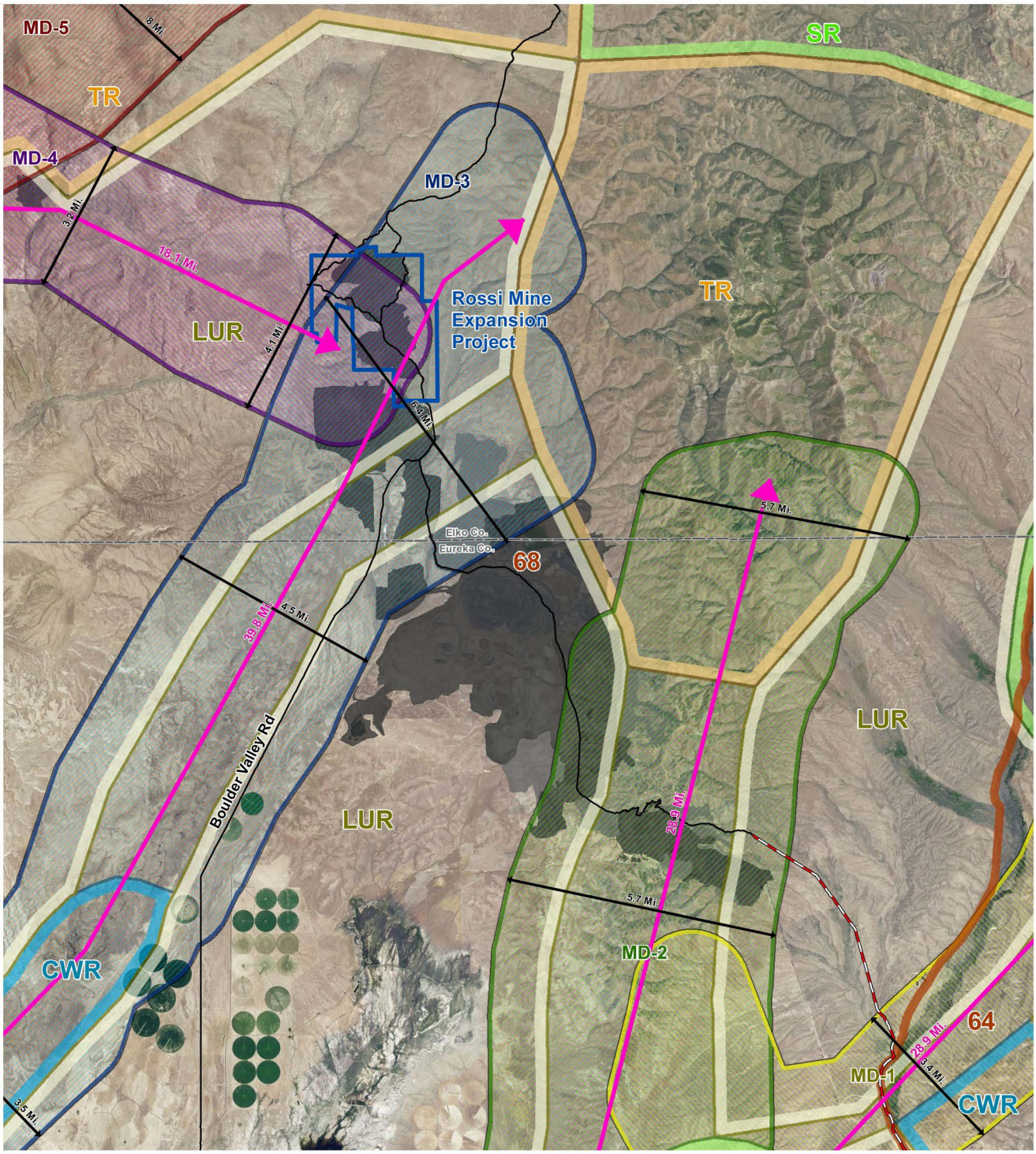
Off-site compensatory mitigation for wildlife is a voluntary action under the 43 CFR 3809 Regulations and BLM IM 2018-093. HES is considering whether to voluntarily conduct the following potential monitoring and mitigation measures or a variation of them. Accordingly, the voluntary mitigation has been included and analyzed in this document. HES is required to complete reclamation of the surface disturbance associated with the Rossi Mine for both mining operations and exploration activities, as outlined in this document at section 2.3.12. In the event that HES does not volunteer to conduct any of the potential monitoring or mitigation measures described below, the reclamation of the mining operations and exploration activities would restore mule deer habitat in the migration corridors upon completion of the reclamation activities either concurrently or at the end of the mine life. However, approximately 194 acres of open pits for the Proposed Action or 144 acres of open pits for the Reconfiguration Alternative would remain at the end of the mine life and would not be reclaimed. HES has also proposed design features and applicant committed environmental protection measures in Table 2-16 to address migrating mule deer concerns resulting from the proposed action in order to minimize impacts to mule deer migration.

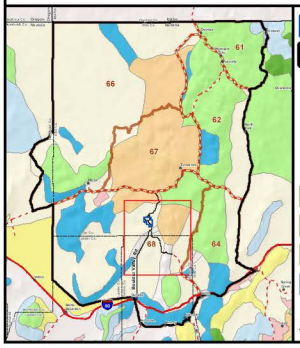
Issue: Impacts to mule deer transition habitat and the migration corridor located between the Rossi Mine and the Arturo Mine.

Mitigation Measure WL-1: HES could voluntarily mitigate for acres of transitional migratory habitat within the migration corridor that would be disturbed by the expansion of the King Pit and western portion of the

QLC Pit at a 1:1 ratio or variation such as the permanent loss of open pit acreage. Under the Proposed Action, approximately 1,167 acres would be temporarily disturbed by mining activity and 194 acres would be permanently removed by open pits for the proposed action and 144 acres of open pits would remain unreclaimed for the Reconfiguration Alternative.

HES's decision to implement compensatory mitigation could include habitat enhancements at the primary off-site habitat enhancement area identified by BLM in coordination with NDOW (**Figure 3.17-11**). These primary off-site habitat enhancement areas are located within the 2017 Rooster Comb fire perimeter. An alternative to treating the specific primary off-site locations identified on **Figure 3.17-11** would be for HES to coordinate with the BLM to supplement the BLM's fire rehabilitation efforts within the 2017 Rooster Comb fire perimeter. The BLM would assist HES in the formation of a wildlife working group (WWG) to implement this mitigation item, which would be comprised of representatives from BLM, HES, NDOW, the current grazing permittee and others. Habitat enhancements would include, but are not limited to, mechanical soil treatments, browse species seeding, herbicide treatment, prescribed burn treatments, development of fire breaks, fencing to provide rest from livestock grazing, cultural resource inventories, or other habitat enhancements beneficial to the Area 6 mule deer. This mitigation measure may include fencing the treatment area for a minimum of three growing seasons.





Project Study Area
Big Game CESA
Developed Areas
Quarries-Strip Mines-Gravel Pits

Mule Deer Seasonal Ranges

Summer Range (SR)
Transition Range (TR)
Limited Use Range (LUR)
Crucial Winter Range (CWR)

Source: BLM 2010b, SRK 2014a, NDOW 2014.

NDOW Hunt Unit

Mule Deer Corridor Groups

MD-1
MD-2
MD-3
MD-4
MD-5
Corridor Length
Corridor Width

Rossi Mine Expansion Project EIS

Figure 3.17-9

Rossi Reconfiguration Alternative and Proposed/Existing Mining Disturbance and Mule Deer Movement Corridors within the Project Area

0 1 2 3 Miles
0 1 2 3 Kilometers
1:200,000

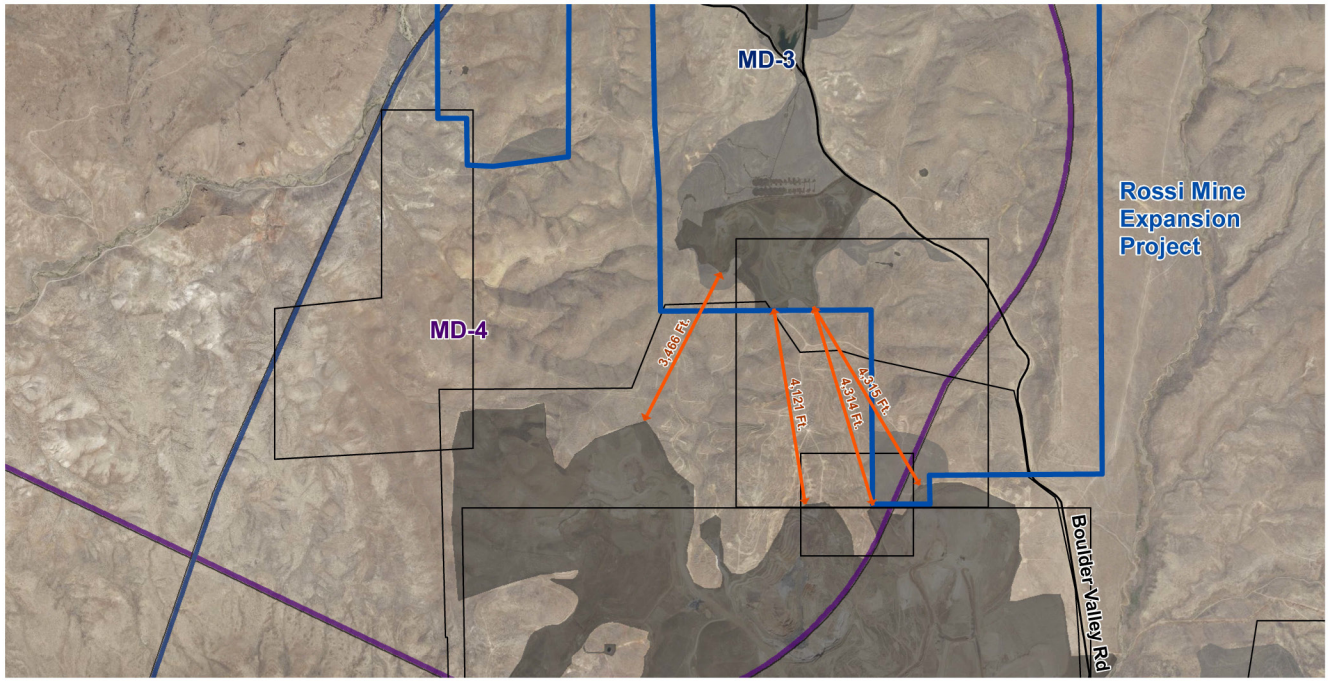
N

10/12/2017

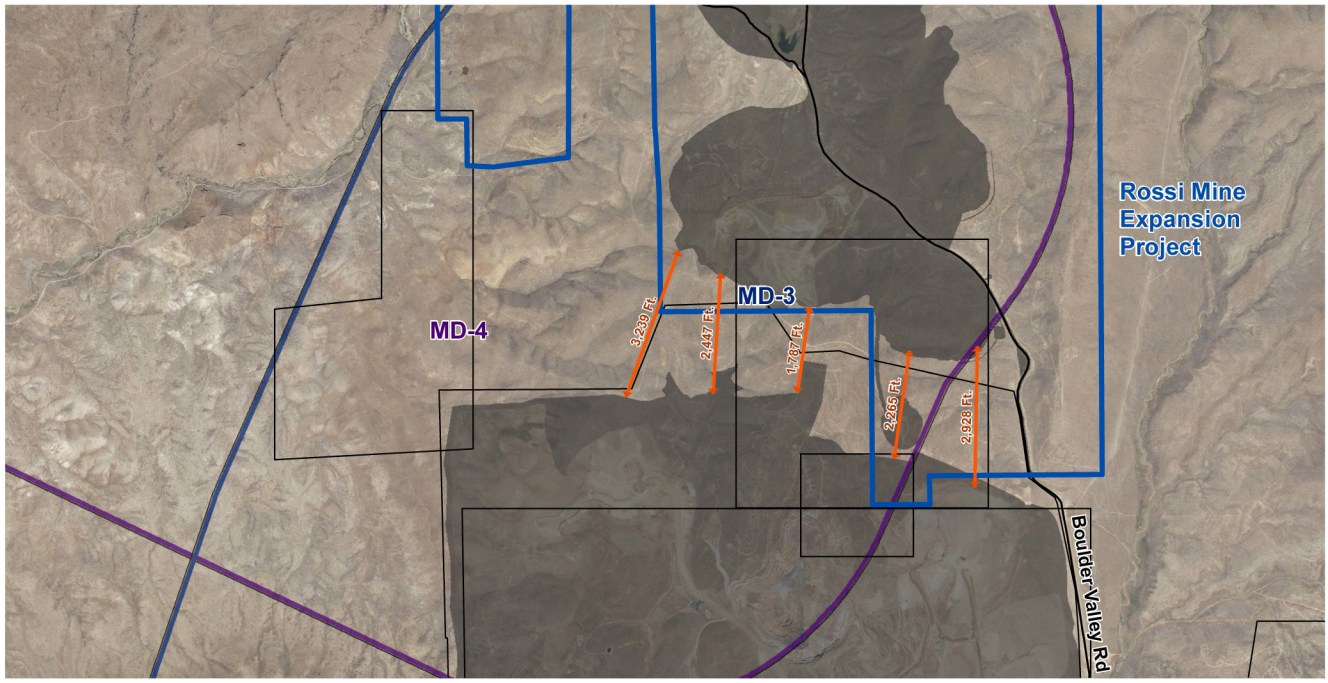
K:\Projects_4\Halliburton\00391_15_RossiMineEIS\Figures\Doc\EIS\02_PDEIS_v02\Ch_03\ROS_Figure_03-17-09_MuleDeerCorridors_ReconfigurationAlt.mxd

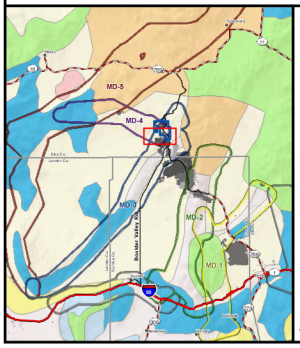
K:\Projects_4\Halliburton\00391_15_RossiMineEIS\Figures\Doc\EIS\02_PDEIS_v02\Ch_03\ROS_Figure_03-17-10_MuleDeerPinch_Ross\RAArturo.mxd

Existing/Authorized Disturbance



Proposed Disturbance (Reconfiguration Alternative)





Mine Plan Boundaries
Developed Areas
Quarries-Strip Mines-Gravel Pits

Mule Deer Corridor Groups

MD-3
MD-4
Reduced Corridor Width

Source: BLM 2010b, SRK 2014a, NDOW 2014.

Rossi Mine Expansion Project EIS

Figure 3.17-10

Mule Deer Movement Corridors between Rossi Mine Reconfiguration Alternative and Authorized Arturo Mine

0 0.25 0.5 0.75 1 Miles
0 0.5 1 Kilometers
1:48,000

N

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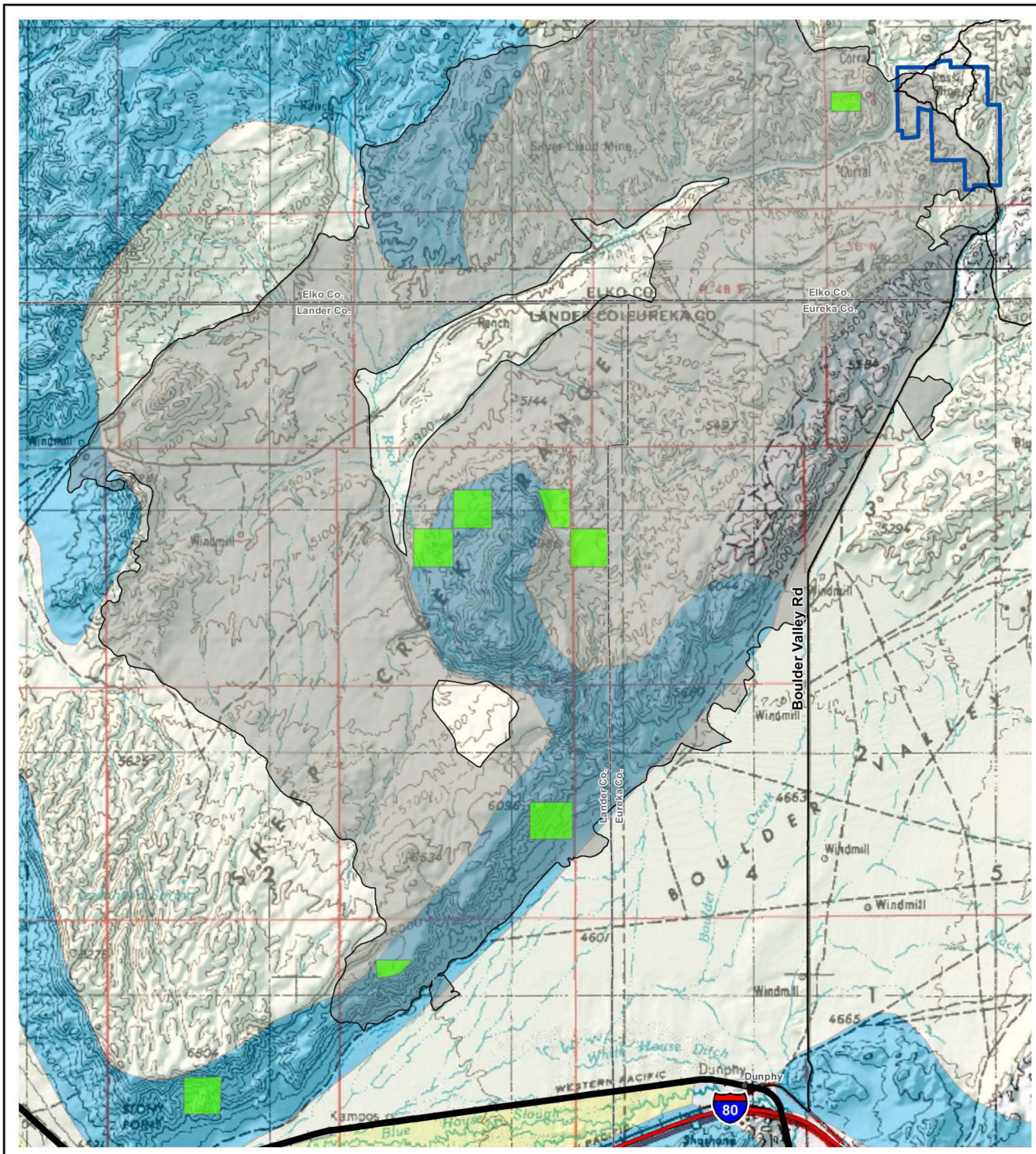


The types of habitat enhancement efforts that could be considered for funding and implementation under WL-1 include but are not limited to:

- **Seeding Treatments** – Possible seeding treatments include broadcast and drag, drill, broadcast/aerial, harrow, disking and hand.
- **Mechanical Treatment** – To provide for an adequate seedbed, mechanical treatments would include disking (plowing), harrowing and mowing existing grasses.
- **Livestock Grazing and Protective Fencing** – Rest from livestock grazing.
- **Herbicide Treatment** – A combination of Imazapic and Glyphosate herbicide treatments would be used to suppress nonnative annuals and crested wheatgrass in order to introduce shrubs, forbs and grasses into the treatment areas.
- **Prescribed Burn Treatments** – Controlled burns would be used to reduce fuels, control competing vegetation, and improve wildlife habitat.
- **Cultural Resource Inventory** – Treatment areas located on public lands would require a cultural resource inventory prior to implementation of any ground disturbing habitat enhancement efforts. Cultural resource needs would be determined by the BLM. The BLM would be required to complete Section 106 Consultation with SHPO, prior to any implementation of the voluntary compensatory mitigation measures on public lands.

Restoration activities would occur within an 8-year period and would commence within 1–2 years of the initiation of the project approval.

3.17.4.1 Monitoring of Compensatory Mitigation Effectiveness

The desired outcome of habitat enhancements is the production of a functioning and stable habitat for mule deer and other native wildlife species within the final selected treatment parcel from the potential parcels identified in **Figure 3.17-11**. HES's decision to implement compensatory habitat enhancements and vegetation rehabilitation treatments would be monitored using techniques outlined by the USGS in the Strategy for Monitoring Post-fire Rehabilitation Treatments Handbook. Treatment goals would be set by the BLM or a WWG, if established, prior to treatment implementation and would include consideration of site conditions pre-treatment, treatment method and species planted. Invasive species management treatments (including chemical, manual and mechanical treatments) would be considered effective if greater than 80 percent of the targeted weed species are affected by the treatment during the year. Infestation size and density would be measured annually to determine progress and to adapt management plans for treatment areas.

3.17.4.2 Monitoring of Area 6 Mule Deer Movements

According to NDOW, HES is also considering whether to voluntarily participate in assisting NDOW to actively monitor mule deer seasonal movements through the Rossi Mine area by providing funding or other assistance to NDOW's mule deer collaring and monitoring program for the Area 6 mule deer population. Under this measure, HES could provide initial funding of $8,025 to cover the costs of purchasing GPS collars and annual maintenance payments of $3,400 to cover the costs of data recovery and annual re-collaring efforts for collars that drop off due to mortality or battery issues. The annual maintenance cost could continue through the proposed 8-year life of mine extension. These costs represent approximately 25% of the total collaring estimated study costs. The remaining 75% of collaring study costs would be covered by a 3 to 1 matching federal Pittman–Robertson grant received through NDOW. NDOW would apply for matching grant funding from federal Pittman-Robertson upon the approval of the Rossi Mine ROD. A copy of the data would be provided to the BLM either in a report or an acceptable format determined by the BLM and NDOW.

Effectiveness: If HES decides to voluntarily participate in assisting NDOW, implementation of this mitigation measure help to determine and document where mule deer travel or migrate in the vicinity of the Rossi Mine. This action would provide information to the NDOW and BLM regarding how mule deer are traversing through and around the Rossi Mine in order for the agencies to determine to what extent the mule deer migration routes are actually impacted.

Issue: Impedances to mule deer migration within the migration corridor.

Mitigation Measure WL-2: HES, in coordination with the BLM and NDOW, would conduct an annual field review of the mule deer migration corridor in the vicinity of the Dawn Pit and Dawn WRDF prior to September 30th to determine if any impedances to migration exist. In the event that unnecessary impedances do exist within the migration corridor, HES would take corrective action to reduce or eliminate the impedance prior to October 30th of that year. This measure would occur until the earthwork portion of reclamation is completed at the Dawn Pit and southern end of the Dawn WRDF.

Effectiveness: Implementation of this mitigation measure would avoid and reduce project-related impacts to mule deer by ensuring that unnecessary impedances to migration within the corridor are removed prior to seasonal migration periods.

3.17.5 Residual Impacts

Under the Proposed Action, residual impacts to wildlife resources would include the permanent loss of 194 acres of wildlife habitat resulting from open pits that would not be reclaimed. These permanent impacts would include 53 acres of Mixed Mountain and Low Sagebrush, 23 acres of Mixed Black, Wyoming and Mountain Sagebrush, 16 acres of annual grasslands, 6 acres of Mixed Wyoming and Mountain Sagebrush, one acre of meadow habitat, and 95 acres of previously disturbed lands that would be permanently unavailable to wildlife species. The loss of shrub-dominated communities would represent a long-term change in wildlife habitat composition (i.e., shrub-dominated communities to grass/forb-dominated communities) under the Proposed Action because it would take approximately 25 years for mature shrubs to become established in these communities.

Under the Reconfiguration Alternative, residual impacts to wildlife resources would include the permanent loss of 144 acres of wildlife habitat, resulting from open pits that would not be reclaimed. These permanent impacts would include 48 acres of Mixed Mountain and Low Sagebrush; 10 acres of Mixed Black, Wyoming, and Mountain Sagebrush; 16 acres of annual grasslands; 1 acre of meadow habitat; and 69 acres of previously disturbed lands that would be permanently unavailable to wildlife species.

3.18 Special-Status Species

3.18.1 Affected Environment

The study area for special-status species is the project area boundary. The CESA for the majority of special-status species is the same as the CESA described for general wildlife species in Section 3.17.1, Wildlife and Aquatic Biological Resources (**Figure 3.17-1**). Similar to the general wildlife CESA, this CESA is also based on wildlife use within the project region and important seasonal habitats. The greater sage-grouse (GRSG) CESA is the Tuscarora Population Management Unit (PMU), which is a general delineation of GRSG populations based on aggregations of leks, understanding of habitats, and potential topographical boundaries to populations (such as mountains and valleys) (NGSGCT 2004) (**Figure 3.18-1**). The CESA for special-status aquatic resources is the same as the CESA for aquatic biological resources presented in Section 3.17, Wildlife and Aquatic Biological Resources, and encompasses portions of the Maggie Creek, Rock Creek Valley, and Boulder Flat hydrographic basins (**Figure 3.14-5)**.

3.18.1.1 Regulatory Framework

Special-status species are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. Included in this category are federally listed species that are protected under the Endangered Species Act (ESA), the BGEPA, and species designated as sensitive by the BLM. In addition, there is a State of Nevada protected animal list (Nevada Administrative Code 501.100–503.104) that the BLM has incorporated, in part, into its sensitive species list.

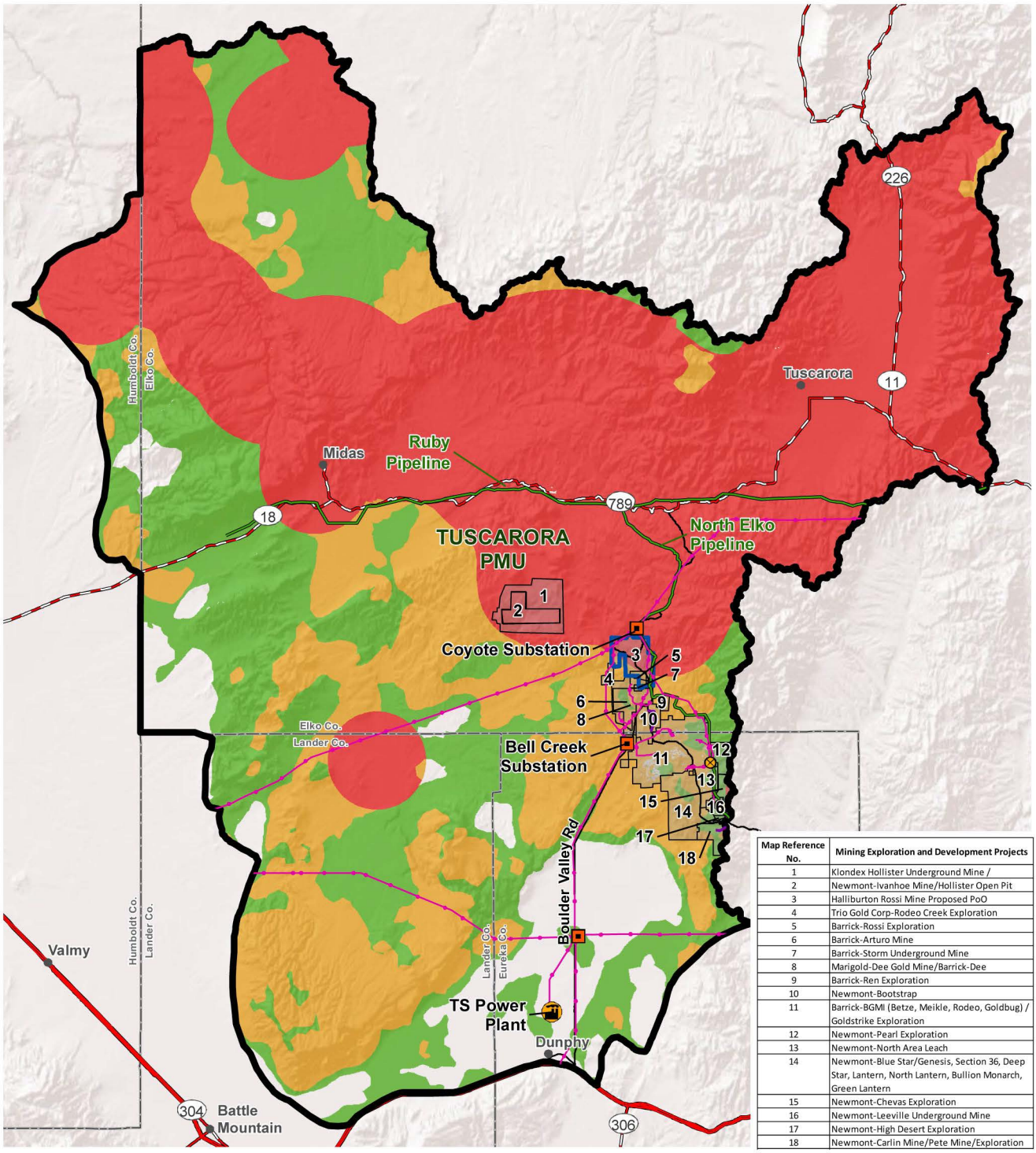
Endangered Species Act

In accordance with the ESA, as amended, the lead agency (BLM) in coordination with the USFWS must ensure that any action that they authorize, fund, or carry out would not adversely affect a federally listed threatened or endangered species. In addition, as stated in Special-Status Species Management Policy 6840 (6840 Policy) (Rel. 6-125), it also is BLM policy "to conserve and/or recover ESA-listed species and the ecosystems on which they depend so that ESA provisions are no longer needed for these species, and to initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing of these species under the ESA." There are no known occurrences of ESA plant or wildlife species that have been observed or have the potential to occur in the study area (USFWS 2015, SRK 2013b).

Bald and Golden Eagle Protection Act

Nongame birds are protected under the Migratory Bird Treaty Act (MBTA) and are discussed in Section 3.17.1.4, Nongame Species. In addition to the MBTA, bald and golden eagles are protected under the BGEPA (16 USC 668 et seq.). This statute prohibits anyone without a permit from committing "take" of bald and golden eagles, including their parts, nests, and eggs. "Take" is defined as the actions to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest and disturb. In 2009, the USFWS implemented two rules authorizing new permits under BGEPA.

- 50 CFR 22.26 would authorize limited "take" of bald and golden eagles where the "take" is associated with, but is not the purpose of an activity and cannot practicably be avoided.
- 50 CFR 22.27 would authorize the intentional take of eagle nests where necessary to alleviate safety hazards to people or eagles; to ensure public health and safety; where a nest prevents the use of a human-engineered structure; and when an activity, or mitigation for the activity, will provide a net benefit to eagles. Only inactive nests are allowed to be taken, except in the case of safety emergencies.



Map Reference No.	Mining Exploration and Development Projects
1	Klondex Hollister Underground Mine /
2	Newmont-Ivanhoe Mine/Hollister Open Pit
3	Halliburton Rossi Mine Proposed PoO
4	Trio Gold Corp-Rodeo Creek Exploration
5	Barrick-Rossi Exploration
6	Barrick-Arturo Mine
7	Barrick-Storm Underground Mine
8	Marigold-Dee Gold Mine/Barrick-Dee
9	Barrick-Ren Exploration
10	Newmont-Bootstrap
11	Barrick-BGMI (Betze, Meikle, Rodeo, Goldbug) / Goldstrike Exploration
12	Newmont-Pearl Exploration
13	Newmont-North Area Leach
14	Newmont-Blue Star/Genesis, Section 36, Deep Star, Lantern, North Lantern, Bullion Monarch, Green Lantern
15	Newmont-Chevas Exploration
16	Newmont-Leeville Underground Mine
17	Newmont-High Desert Exploration
18	Newmont-Carlin Mine/Pete Mine/Exploration

Mine Boundary (Proposed)
Greater Sage-grouse Cumulative Effects Study Area

Greater Sage-grouse Management Categories (2014)
- Priority Habitat Management Area (PHMA)
- General Habitat Management Area (GHMA)
- Other Habitat Management Area (OHMA)

Source: BLM 2010b, BLM 2015a, SRK 2014a.

Existing and Reasonably Foreseeable Projects
- Metering Station
- Power Plant
- Substation
- Pipeline
- Road
- Transmission Line
- Mine Plan Boundaries

Rossi Mine Expansion Project EIS

Figure 3.18-1

Greater Sage-grouse Cumulative Effects Study Area

0 1 2 3 4 5 10 Miles
0 1 2 3 4 5 10 Kilometers
1:600,000

N

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BGEPA provides the Secretary of Interior (Secretary) with the authority to issue eagle-take permits only if the Secretary is able to determine that the take is compatible with the preservation of the eagle. This take must be "…consistent with the goal of increasing or stable breeding populations."

A total of 52 special-status wildlife species were identified as potentially occurring within the study area (BLM 2015d, Stantec 2015, SRK 2014f, SRK 2013b). These species, their associated habitats, and their potential for occurrence within the study area are summarized in **Appendix D**, Special-Status Species Potentially Occurring within the project area. Occurrence potential for each species within the study area and CESA was evaluated for each species based on their habitat requirements and/or known distribution. Eleven special-status wildlife species were confirmed by baseline surveys to occur within the study area are described below.

The study area for special-status plant species is the same as described for vegetation in Section 3.14, Vegetation, including Riparian Zones and Wetland Areas. No special-status plant species have been observed in the study area during baseline surveys; however, seven BLM sensitive species have the potential to occur in the study area based on the availability of suitable habitat. One State of Nevada protected species, the mountain ball cactus (*Pediocactus simpsonii*) was observed in the study area (SRK 2013b). These species and their potential for occurrence in the study area are summarized in **Appendix D**, Special-Status Species Potentially Occurring within the project area.

3.18.1.2 Mammals

Special-Status Bat Species

Federal and state sensitive bat species that have been identified as potentially occupying appropriate habitat types within or near the study area include Brazilian free-tailed bat (*Tadarida brasiliensis*), California myotis (*Myotis californicus*), little brown myotis (*Myotis lucifugus*), western small-footed myotis (*Myotis ciliolabrum*), and Yuma myotis (*Myotis yumanensis*). These species were detected during four acoustic night surveys; two nights in May and June and two nights in July and August, 2012 at a variety of suitable bat roosting and foraging areas in the study area. Marginal roosting and suitable foraging habitat is present in portions of the study area (SRK 2013b). In addition to those bat species detected during acoustic surveys, suitable habitat for the big brown bat (*Eptesicus fuscus)*, fringed myotis (*Myotis thysanodes)*, hoary bat (*Lasiurus cinereus)*, long-eared myotis (*Myotis evotis)*, long-legged myotis (*Myotis volans)*, pallid bat (*Antrozous pallidus)*, silver-haired bat (*Lasionycteris noctivagans)*, Townsend's big-eared bat (*Corynorhinus townsendii*), western pipistrelle (*Parastrellus hesperus*) and the spotted bat (*Euderma maculatum*) occurs within the project area.

Suitable bat foraging habitat is generally located near perennial water sources. Within the project area, suitable foraging habitat occurs in the areas of wetland and riparian vegetation associated with wetland features W-1 through W-7 (**Figure 3.14-4**). Additional marginal quality roosting habitat within the vicinity of the study area includes rock outcrops located near the western edge of the project area that may provide potential roosting habitat for bats.

Big Brown Bat

The Big-brown bat occurs throughout Nevada in low desert to high mountain habitats. The big brown bat is a medium- to large-sized bat that is known to roost in buildings, bridges, mines, caves, hollow trees, and rock crevices (Agosta 2002). Their primary diet includes beetles and they usually forage within a few kilometers of their roost. This bat can be locally common in some urbanized environments. Although this species was not detected during baseline acoustic surveys suitable habitat occurs within the project area.

Brazilian Free-tailed Bat

The Brazilian free-tailed bat occurs throughout Nevada in low desert to high mountain habitats predominantly at lower elevations (690-8,360 feet amsl) and is more common in southern Nevada. This species roosts in a variety of structures including cliff faces, mines, caves, buildings, bridges, and hollow trees (Bradley et al. 2006). This species was detected during acoustic surveys at a rock outcrop

in a draw near the western edge of the project area on May 29, 2012 and has been previously recorded southeast of the project area along the Humboldt River near Elko, Nevada (SRK 2013b, Bradley et al. 2006).

California Myotis

The California myotis is a year-round resident found throughout Nevada at low and middle elevations (690-8,950 feet amsl) and is found in a variety of habitats including lower Sonoran desert scrubs and forests. The California myotis is a crevice-roosting species and selects day roosts which include mines, caves, buildings, rock crevices, hollow trees, and under exfoliating bark. This species hibernates but may also actively forage during the winter months (Bradley et al. 2006). California myotis was possibly detected on May 28, 2012 at two locations associated with wetland features W-2 and W-3 (**Figure 3.14 4**); a positive acoustic identification could not be determined between California myotis and Yuma myotis for these saved acoustic files (SRK 2013b). This species has not been observed in the project region otherwise; however there is suitable foraging habitat and marginal roosting habitat located near the western edge of the project area.

Fringed Myotis

The fringed myotis ranges across much of western North America, occurring most commonly at middle elevations although its distribution is considered patchy (WBWG 2016). The species appears to be most common in drier woodlands (oak, pinyon-juniper, ponderosa pine) but is found in a wide variety of habitats including desert scrub, mesic coniferous forest, grassland, and sage-grass steppe. It feeds on a variety of invertebrate taxa and the relative importance of prey items may vary according to prey availability, geography, or time period (WBWG 2016). Although this species was not detected during baseline acoustic surveys suitable habitat occurs within the project area.

Hoary Bat

The hoary bat occurs throughout Nevada in coniferous forest habitats but is also know to forage in open habitats. The species is known for its relatively large size and golden-colored fur. Common roosting sites include coniferous and deciduous trees and caves. In the Pacific Northwest, hoary bats are common where they are highly associated with forested habitats (WBWG 2016). Primary food sources include beetles, moths, grasshoppers, dragonflies, and wasps. Although this species was not detected during baseline acoustic surveys suitable habitat occurs within the project area.

Little Brown Myotis

The little brown myotis occurs primarily in northern areas of Nevada at higher elevations often associated with coniferous forest and available water sources. This species hibernates during the winter; however, not hibernating colonies have been located within Nevada. Roost sites include hollow trees, rock outcrops, occasionally mines and caves, and most often roosts in buildings and other human structures (Bradley et al. 2006). Little brown myotis was acoustically detected within the project area on May 28 at two locations associated with wetland features W-2 and W-3 (**Figure 3.14-4**), and July 10 and 11, 2012 at a rock outcrop in a draw near the west end of the project area (SRK 2013b). This species has been previously recorded in Elko County north and northeast of the study area (Bradley et al. 2006).

Long-eared Myotis

The long-eared myotis occurs throughout Nevada in a diverse array of habitats, including lowland, montane, and subalpine woodlands, forests, shrublands, and meadows, wooded stream courses, and areas over water bodies (Adams 2003). The species is known to roost in abandoned buildings, caves, mine shafts, cliff crevices, and hollow trees (WBWG 2016). Although this species was not detected during baseline acoustic surveys suitable habitat occurs within the project area.

Long-legged Myotis

The long-legged myotis occurs throughout Nevada mainly in montane, and subalpine woodlands, and forests, but can also be observed in shrublands, meadows, and riparian courses and areas over water bodies (Adams 2003). The species is known to roost in abandoned buildings, caves, mine shafts, cliff crevices, and hollow trees (WBWG 2016). Although this species was not detected during baseline acoustic surveys suitable habitat occurs within the project area.

Pallid Bat

The pallid bat occurs throughout Nevada mainly in mountainous areas, intermontane basins, and lowland desert scrub arid deserts and grasslands often near rocky outcrops and water (Adams 2003). The species is known to roost in rock crevices, buildings, rock piles, tree cavities, shallow caves, and abandoned mines (WBWG 2016). Although this species was not detected during baseline acoustic surveys suitable habitat occurs within the project area.

Silver-haired Bat

The silver-haired bat occurs throughout Nevada mainly in forested habitats but has been observed in more open habitats during migration (WBWG 2016). This species may roost in hollow trees, under sloughing bark, in rock crevices, and occasionally under wood piles, in leaf litter, under foundations, and in buildings, mines and caves. Although this species was not detected during baseline acoustic surveys suitable habitat occurs within the project area.

Spotted Bat

The spotted bat occurs throughout Nevada in a diverse array of habitats, including lowland, montane, and subalpine woodlands, forests, shrublands, and meadows, wooded stream courses, and areas over water bodies (Adams 2003). The species is known to roost in cracks, crevices, and caves found high in fractured rock cliffs. (WBWG 2016). Although this species was not detected during baseline acoustic surveys suitable habitat occurs within the project area.

Townsend's Big-eared Bat

The silver-haired bat occurs throughout Nevada mainly in forested habitats but has been observed in more open habitats during migration (WBWG 2016). This species may roost in hollow trees, under sloughing bark, in rock crevices, and occasionally under wood piles, in leaf litter, under foundations, and in buildings, mines and caves. Although this species was not detected during baseline acoustic surveys suitable habitat occurs within the project area.

Western Pipistrelle

The western pipistrelle occurs throughout western and northern Nevada mainly in desert mountain ranges, desert scrub flats, shrub-steppe, rocky canyons, and associated riparian zones, particularly in areas with cliffs (Adams 2003). Potential roosts include crevices in cliffs, rock outcrops, caves, mines, and buildings, and possibly sometimes rodent burrows and spaces under rocks. Night roosts may include sagebrush shrubs (Johnson and Cassidy 1997). Although this species was not detected during baseline acoustic surveys suitable habitat occurs within the project area.

Western Small-footed Myotis

The western small-footed myotis is found throughout Nevada year-round at the middle and higher elevations (1,670-9,055 feet amsl) and occupies a variety of habitats including desert scrub, grasslands, sagebrush steppe, greasewood, piñon-juniper woodlands, pine-fir forests, agricultural lands, and urban areas. This species roosts in caves, mines, and trees and hibernates in areas that are drier and colder than other bat species. A large colony (>100 individuals) was found in an abandoned mine near Eureka, approximately 100 air miles from the Rossi project area. The western small-footed myotis was detected on May 29, 2012 at a rock outcrop in a draw and has been observed north of the study area in the Santa Renia Mountains (SRK 2013b, Bradley et al. 2006).

Yuma Myotis

The Yuma myotis is a year-round resident of Nevada and is more common in the southern and western portions of the state primarily at low to middle elevations (1,475-7,675 feet amsl). This species occurs in a variety of habitats including sagebrush, salt desert scrub, agriculture, playa, and riparian habitats. This species may be more tolerant of human habitats and appears to thrive in relatively urbanized environments. Yuma myotis roosts in buildings, trees, mines, caves, bridges, and rock crevices during the day and in a variety of human-made structures during the night. Yuma myotis was possibly detected acoustically in the study area on May 28, 2012 at two locations associated with wetland features

W-2 and W-3 (**Figure 3.14-4**); however, a positive acoustic determination could not be distinguished between Yuma myotis and California myotis. This species has been documented east of the study area in the Tuscarora Mountains and based on available suitable foraging and marginal roosting habitat it likely occurs within the project area.

Other Mammals

Pygmy Rabbit

The pygmy rabbit has a patchy distribution throughout the northern Great Basin and is typically found in areas of tall, dense sagebrush cover. This species is considered a sagebrush obligate species as pygmy rabbits are highly dependent on dense canopied sagebrush to provide both food and shelter throughout the year. Pygmy rabbits usually remain near dense cover and are most abundant in areas with suitable soils for burrowing (75 FR 60516). Field surveys for pygmy rabbit were conducted in the study area between May 21–23 and July 10–11, 2012. No pygmy rabbits or pygmy rabbit sign (e.g., burrows, scat, tracks, dust baths, runways, carcass, etc.) were observed in the study area. Potentially suitable pygmy rabbit habitat is present in the lower elevation drainages in the central portions of the study area. Vegetation within these drainages are typical of the characteristics of pygmy rabbit habitat including very tall, large, and dense big sagebrush shrubs and areas of loamy soil. There are limited areas outside of the draws that provide large robust Wyoming sagebrush (*Artemisia tridentate* ssp. *wyomingensis*) and basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) that could also provide suitable habitat for this species.

3.18.1.3 Birds

Bald Eagle

Bald eagles typically inhabit areas near open water and forage upon fish and waterfowl but may also be observed in areas where roadkill provides foraging opportunity (NDOW 2015a). In Northern Nevada, bald eagles can be found roosting in trees or large sagebrush near valley bottoms and are more commonly found foraging away from areas of open water during the winter in northern Nevada (NDOW 2012b). Although no active bald eagle nests or suitable nesting substrate (large trees near open water) occurs within the project study area, bald eagles are known to forage within the project vicinity during the winter months (NDOW 2017a). This species was not observed in the study area during surveys in spring and summer 2012.

Brewer's Sparrow

The Brewer's sparrow breeds throughout northern Nevada and is found in primarily montane sagebrush and salt desert scrub habitats comprised of sagebrush, greasewood, and perennial upland grasses and prefers areas dominated by shrubs. This species breeds between mid-April and early August and places its nest in the dense crown of a tall shrub (approximately two feet above ground). This species was observed in the study area during surveys in spring and summer 2012.

Ferruginous Hawk

Within the Great Basin, ferruginous hawks typically nest within juniper trees along the edges of woodland habitats adjacent to more open grassland or shrubland habitats. This species also commonly nests upon rock outcrops (Floyd et al. 2007). Ferruginous hawks have been observed to focus foraging efforts on ground squirrels. Because ground squirrels typically enter aestivation by late July or early August, ferruginous hawks typically fledge their young and leave the area by early August (GBBO 2010). This species was not observed in the study area during surveys in spring and summer 2012.

Golden Eagle

The golden eagle is a year-long resident of Nevada with a distribution that is largely restricted to the western portion of the state with some of its highest densities in the shrub-steppe habitats of the Great Basin. This species occurs in a wide variety of habitats throughout Nevada and tends to avoid forests,

large agricultural areas, and urban areas. Limiting factors for golden eagle populations are prey densities and the availability of nest sites near suitable prey populations which include jackrabbits, cottontails, and larger rodents such as ground squirrels. Golden eagles often nest on cliffs, in trees, steep hillsides, or occasionally on the ground and territory sizes are large and a pair may defend an area on average 5,000–8,600 acres in size while breeding (GBBO 2010).

Ground-based surveys were conducted for nesting golden eagles on April 25, May 30, and June 26, 2012; May 9, June 11, and June 24–25, 2014; and April 9 and May 28, 2015. No active golden eagle nests were detected within the study area during surveys in 2012. Thirty-one golden eagle nest sites were monitored within a 10 mile radius of the study area during the most recent survey period in 2015. A summary of the active nests observed within the 10-mile buffer of the study area is provided below in **Table 3.18-1**.

Table 3.18-1. Active Golden Eagle Nests in the Rossi Mine Study Area

Date Observed	Distance from Study Area	Notes
May 9 and June 11, 2014[1]	1 mile west of study area	Observed at mid-level on a cliff face, one eaglet was seen.
May 9 and June 11, 2014[1]	4 miles west of study area	Observed at the lower half of a cliff face, two eaglets were seen.
May 9 and June 11, 2014[1]	10 miles northwest of study area	Observed at mid-level on a cliff face, one eaglet was seen.
May 9 and June 11, 2014[1]	9.5 miles northwest of study area	Observed at mid-level on a cliff face, two eaglets were seen.
April 9 and May 28, 2015[2]	9 miles northwest of study area	Observed 2 nests on a cliff face, one eaglet was seen in the lower nest.
April 9 and May 28, 2015[2]	10.5 miles northwest of study area	Observed a nest on the top of rocks, one broken egg was seen
April 9 and May 28, 2015[2]	9 miles northwest of study area	Observed nest on snow, one eaglet seen.
April 9 and May 28, 2015[2]	4 miles west of study area	Observed two nests on a rock outcrop, one eaglet seen.
April 9 and May 28, 2015[2]	9 miles southwest of study area	Observed one adult incubating three eaglets.
April 9 and May 28, 2015[2]	1 mile west of study area	Observed two nests on a rock outcrop, three chicks seen on the larger of the two nests.
April 9 and May 28, 2015[2]	3 miles west of study area	Observed adult on nest with two eggs.

[1] Source = SRK 2014f.
[2] Source = Stantec 2015.

No active golden eagle nests have been observed within the study area during field surveys; however, this species has a high potential to occur in the study area due to the presence of active nests in areas adjacent to the study area and the availability of suitable foraging habitat.

Greater Sage-grouse

The GRSG current range includes sagebrush habitats in 11 western United States and two Canadian provinces (USFWS 2013). Sagebrush is a key component of GRSG habitat on a year-round basis and is used to provide forage, nesting areas, security, and thermal cover. Dense sagebrush stands that reach above snow levels comprise winter habitat and areas with a significant herbaceous understory are necessary for brood-rearing. In Nevada, GRSG males begin displaying on leks in March and hens typically begin nesting in April and May (USFWS 2013, Neel 1999).

GRSG populations and habitats are currently managed in Nevada by NDOW. The USFWS found that listing the GRSG was not warranted on October 2, 2015 (80 FR 59858). The BLM also applies protective stipulations during critical periods of the life cycle to ensure that activities do not lead to degradation of

habitat or disrupt breeding, nesting, and brood-rearing activities, resulting in a further decline of GRSG numbers. As a result of the March 2010 USFWS finding of "warranted but precluded," the BLM, in coordination with the USFS, developed a landscape-level management strategy to offer the highest protection for GRSG in the most important habitat areas. The BLM Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (GRSG Amendment) (BLM 2015a) include GRSG habitat management objectives to avoid and minimize additional disturbance in GRSG management areas and target restoration of and improvements in the most important habitat areas.

Under the GRSG Amendment, habitat management categories have been identified by the BLM in coordination with respective wildlife agencies to help apply management guidelines designed to protect and/or manage GRSG habitat. These habitat management categories are referred to as Priority Habitat Management Areas (PHMA), General Habitat Management Areas (GHMA), and Other Habitat Management Areas (OHMA) (BLM 2015a). The management categories are defined under the GRSG Amendment as follows:

- **PHMA:** BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. Areas of PHMA largely coincide with areas identified as priority areas for conservation in the USFWS's Conservation Objectives Team report. These areas include breeding, late brood-rearing, and winter concentration areas and migration or connectivity corridors.
- **GHMA:** BLM-administered lands where some special management will apply to sustain GRSG populations; these are areas of occupied seasonal or year-round habitat outside of PHMA.
- **OHMA:** BLM-administered lands previously identified as unmapped habitat in the Draft GRSG Amendment that are within the planning area and contain seasonal or connectivity habitat areas. These areas also were identified in recent habitat modeling efforts (Coates et al. 2014) as containing characteristics of unmapped but suitable GRSG habitat. No OHMA occurs within the project study area.

The 2015 GRSG Amendment includes habitat management categories as delineated by the August 2014 version of the Coates et al. GRSG habitat model for Nevada (Coates et al. 2014). The BLM has been using this August 2014 habitat map to conduct conservation efforts and NEPA analysis under the direction of the GRSG Amendment. A revision to the August 2014 map was published in March of 2015 to include updated habitat selection modeling, updated lek information, additional major road and urban area information, and a reduction to the extent of the management categories to the Biologically Significant Units (BSU). The Nevada BLM is in the process of adopting the March 2015 habitat category map to replace the August 2014 version. Until the March 2015 map is formally adopted the Nevada BLM is including analysis of both the August 2014 and March 2015 map versions in this EIS. The acreage difference in habitat categories between the August 2014 and March 2015 maps within the Rossi project area is minimal. **Table 3.18-2** summarizes the GRSG habitat management categories for the August 2014 and March 2015 map versions.

Table 3.18-2. Existing Acreage of Greater Sage-grouse Habitat Management Categories within the Rossi Mine Study Area

Habitat Type	August 2014 Map (acres)	March 2015 Map (acres)	Percent Change
PHMA	2,712	2,657	-2%
GHMA	1,019	1,074	+5%
OHMA	-	-	-
Total	**3,731**	**3,731**	**-**

Sources: Coates et al. 2014; Coates et al. 2015.

Under the August 2014 habitat map, there are 2,712 acres of PHMA (73 percent of the study area) within the study area, and 1,019 acres of GHMA (27 percent of the study area) in the study area as presented in

Figure 3.18-2. Under the March 2015 habitat map, there are 2,657 acres of PHMA (71 percent of the study area) within the study area, and 1,074 acres of GHMA (29 percent of the study area) in the study area as presented in **Figure 3.18-3**. No areas of OHMA currently occur within the study area under either the August 2014 or March 2015 habitat maps.

Sagebrush Focal Areas (SFA) are a subset of PHMA and were derived from GRSG stronghold areas described by the USFWS which are strongholds for GRSG and have been noted as having the highest densities of GRSG and other criteria important for the persistence of the species. There are no SFAs within the study area; the closest designated SFA occurs approximately 24 miles to the north of the project area.

Greater Sage-grouse Lekking/Breeding/Nesting Habitat

The center of breeding activity for the GRSG is referred to as a strutting ground or lek. Leks are characterized as flat, sparsely vegetated areas within large tracts of sagebrush (Connelly et al. 2004). Males begin to appear on leks in March, with peak attendance of leks occurring from late-March to mid-April (Connelly et al. 2004). Nesting generally commences 1 to 2 weeks after mating and may continue as late as early June. GRSG nesting habitat typically is centered on active leks and consists of medium to tall sagebrush with a perennial grass understory (Connelly et al. 2000). Studies have shown that taller sagebrush with larger canopies and more residual understory cover usually lead to higher nesting success for this species (Connelly et al. 2004, Connelly et al. 2000).

GRSG population levels are generally cyclic, meaning they experience alternative periods of increases and decreases. GRSG populations in Nevada have displayed a significant downward trend in both numbers and distribution. Nevada counted 8,994 male GRSG in ground counts in 2015 (11 percent of the range-wide total). The number of active leks counted that met the criteria for inclusion in a population trend analysis varied widely between 1965–2015 from a low of 27 leks between 1965 and 1979 to a high of 376 between 2008 and 2015. Historic lek surveys were conducted at a much smaller scale across Nevada prior to 1980 therefore the low number of leks included in population analyses (27) is likely a result of lower sampling effort statewide. The average males per lek have also fluctuated, between about 16 and 27 since 1982 and are approximately 21 average males per lek in 2015 (WAFWA 2015).

Four known leks (Squaw Creek 4, Alkali Spring, North Santa Renia 36SE, and Little Coyote Creek) were identified by NDOW within a 4-mile radius of the study area and were surveyed in 2012 (Table 3.18-3). Field surveys of GRSG lek attendance were conducted on April 3–4, and 25–26, 2012; March 29, April 5 and 11, 2014; March 26 and April 9, 16, and 23, 2015; and April 6 and 20, and May 6 and 11, 2016. Little Coyote Creek lek (approximately one mile northeast of the study area) was the only lek site that was active in 2012; a total of 12 males were observed during the ground surveys, no females were observed. An additional five males were observed at this lek during an April 20, 2012 helicopter survey. No other GRSG activity was observed in the study area during field surveys (SRK 2013b).

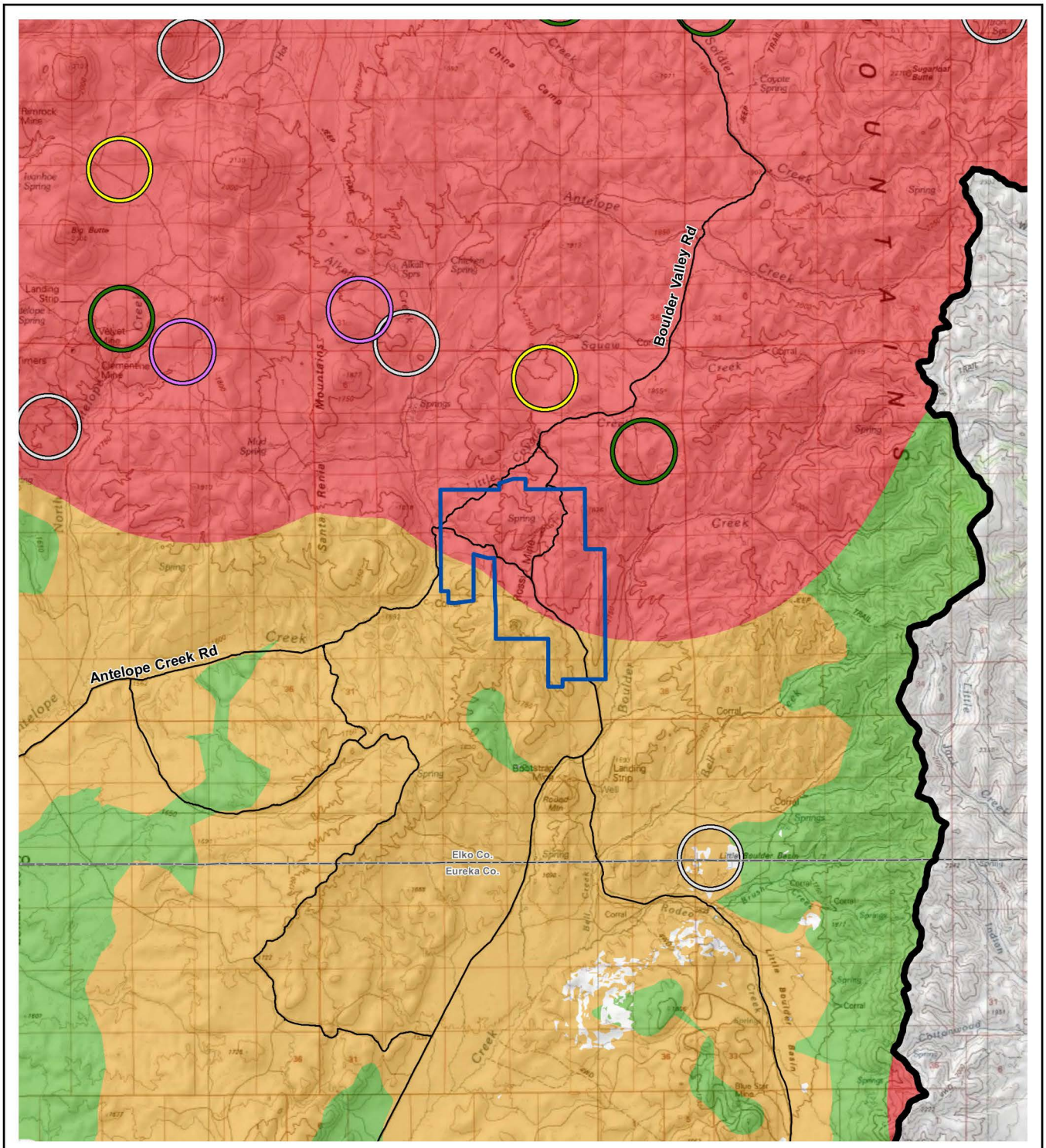
Table 3.18-3. Greater Sage-grouse Leks within 4 Miles of the Rossi Mine Project Area

Name	NDOW Lek Status[3]	Distance from Existing Disturbance[1] (miles)	Lek Counts (Maximum Number of Birds[2])		
			2014	*2015*	*2016*
Little Coyote Creek	Active	1.12	7	14	16
North Santa Renia	Unknown	2.40	0	0	0
Alkali Spring	Pending Active	3.14	3	0	0
Squaw Creek	Unknown	1.63	0	0	0

Source: Stantec 2015; HES 2016h.

[1] Existing and/or previously authorized.
[2] Both male and female birds reported.
[3] NDOW lek status is based on number of males observed at lek locations.

"-" indicates the lek was not surveyed.



Project Study Area

Greater Sage-grouse Cumulative Effects Study Area

Area within 1/2 Mile of Greater Sage-grouse Leks (Status)

- Active
- Inactive
- Pending
- Unknown

Greater Sage-grouse Management Categories (2014)

- Priority Habitat Management Area (PHMA)
- General Habitat Management Area (GHMA)
- Other Habitat Management Area (OHMA)

Source: BLM 2015a, BLM 2015g, SRK 2014a, Coates et al. 2014.

Rossi Mine Expansion Project EIS

Figure 3.18-2

Greater Sage-grouse Habitat in the Project Study Area

0 1 2 3 Miles

0 1 2 3 Kilometers

1:150,000

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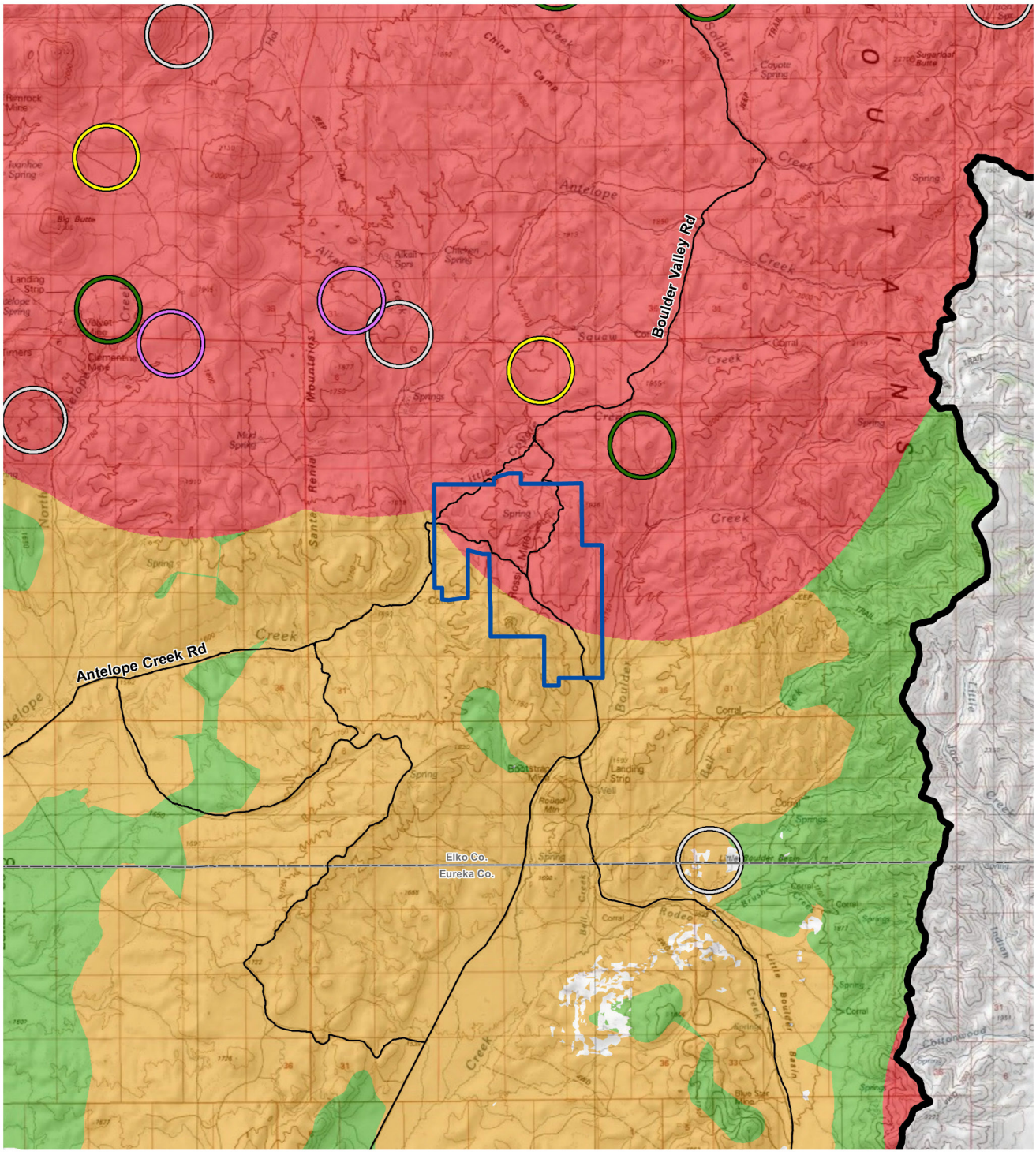

Project Study Area

Greater Sage-grouse Cumulative Effects Study Area

Area within 1/2 Mile of Greater Sage-grouse Leks (Status)

- Active
- Inactive
- Pending
- Unknown

Greater Sage-grouse Management Categories (2015)

- Priority Habitat Management Area (PHMA)
- General Habitat Management Area (GHMA)
- Other Habitat Management Area (OHMA)

Source: BLM 2015a, BLM 2015g, SRK 2014a, Coates et al. 2015.

Rossi Mine Expansion Project EIS

Figure 3.18-3

Greater Sage-grouse Habitat in the Project Study Area

0 1 2 3 Miles

0 1 2 3 Kilometers

1:150,000

N

10/12/2017

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The Little Coyote Creek lek was also the only lek site that was active during surveys in 2014, 2015, and 2016. Four males were observed on April 4, 2014, no females were observed (SRK 2014f). A total of 22 males, two females, and 14 unknown sex of GRSG were observed during the survey period in 2015 (Stantec 2015). A total of 54 males, 3 females, and one unknown sex of GRSG were observed during the survey period in 2016 (HES 2016h).

Greater Sage-grouse Seasonal Habitat

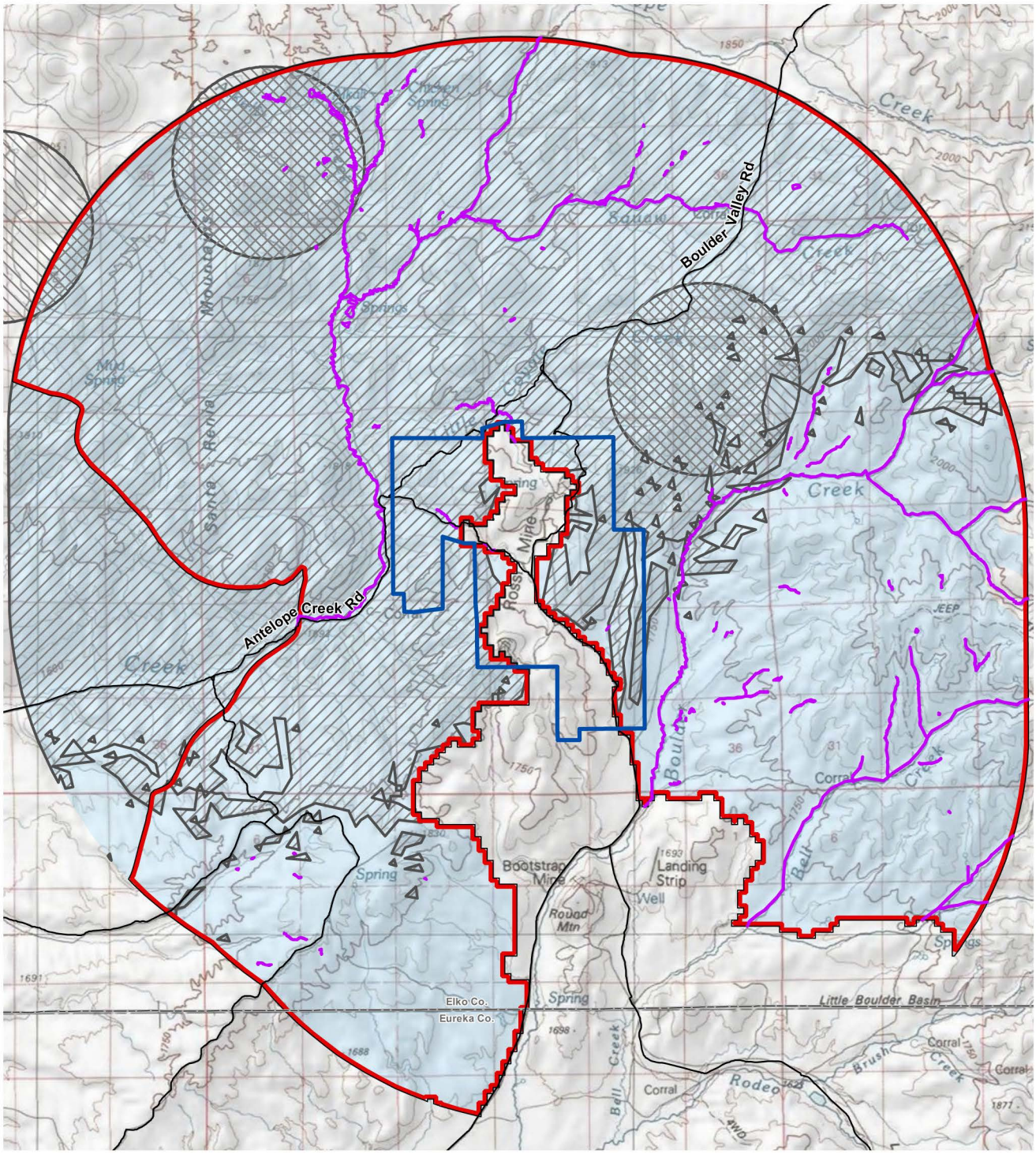
In addition to BLM Habitat Management Categories presented above, NDOW has recently delineated seasonal habitats for GRSG within the study area. The results of the seasonal habitat delineation are presented in **Figure 3.18-4**. Seasonal GRSG habitats include lekking/breeding habitat, nesting habitat, late-brood rearing habitat, and winter habitats. A total of 1,893 acres of nesting habitat, 2,516 acres of brood-rearing habitat, and 2,516 acres of winter habitat occur within the study area (**Figure 3.18-4**).

Greater Sage-grouse Response to Noise

Ambient sound plays a central role in GRSG breeding behavior. Male GRSG select leks that are highly visible and have good acoustic propagation characteristics (Braun et al. 2002, Dantzker et al. 1999), relatively free of tall vegetation or ground cover. The male mating display sequence consists of a cooing pattern with highly directional sound energy in the range of 300–600 Hertz (Hz), followed by popping and whistling sounds in the range of 600–3200 Hz. Sounds produced by a lekking male allow females to locate leks and select mating partners among displaying males (Blickley et al. 2012). Sound is normally defined as “vibrations that travel through the air or another medium and can be heard when they reach a person’s or animal’s ear” (Stevenson and Lindberg 2010). These vibrations have both a frequency and an amplitude, with frequency measured in Hertz and heard by humans across a range from about 20 to 20,000 Hertz (Ambrose and Florian 2014). Although the range of perceptible frequencies likely varies by species, most animals can perceive sound across a wide range of frequencies. Amplitude is perceived as the loudness of sound, and is commonly measured in decibels (dB), a logarithmic unit for quantifying the intensity of sound. Due to the fact that sound is measured on a logarithmic scale, it is difficult to interpret dB levels naturally because of the nonlinear relationship of the scale of measure. For example purposes, a sound measured at 20 dB above the ambient conditions observed at the edge of a GRSG lek produces a 10 fold increase in the sound pressure and a four-fold increase of the perceived loudness of the noise. A complete review of anthropogenic sound and the resulting impacts to GRSG in Nevada is provided in the NDOW publication *Acoustic Impacts and Sage-grouse: A Review of Current Science, Sound Measurement Protocols, and Management Recommendations* (Tull 2015).

Noise guidelines in the GRSG Amendment (BLM 2015a) limit noise from discretionary activities (e.g., during construction, operation, and maintenance) to not exceed 10 dB, on the A-weighted scale (dBA), above ambient sound levels at least 0.25 mile from active and pending leks, from two hours before to two hours after sunrise and sunset during the breeding season.

Ambient noise data was collected at the four leks described above between April 17 and 23, 2015. The L_{90} noise metric represents the sound level measured over each 1-hour measurement interval exceeded 90 percent of the time. One can think of L_{90} measures as a common or nearly persistent level of sound pressure for a given location, therefore measures at L_{90} are often used to determine “background noise,” or baseline sound (Tull 2015). Minimum L_{90} values for all monitoring sites between 5:00 am and 10:00 am were in the range of 16.3 to 20.2 dBA L_{90}, and maximum values were in the range of 20.2 to 24.2 dBA L_{90}. The average ambient noise levels are provided in **Table 3.18-4** below (Brennan and Associates 2015).



Project Study Area

Greater Sage-grouse Seasonal Habitat

- Lek Habitat
- Nesting Habitat
- Brood-rearing Habitat
- Riparian Habitat
- Winter Habitat

Source: NDOW 2016c, SRK 2014a.

Rossi Mine Expansion Project EIS

Figure 3.18-4

Greater Sage-grouse Seasonal Habitat within the Study Area

0 1 2 Miles

0 1 2 Kilometers

1:100,000

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Table 3.18-4. Summary of Ambient Noise during Lek Activity at 4 Leks near the Rossi Mine Study Area

Lek Name	Distance from Study Area (miles)	Average L_{90} Noise Levels
Alkali Springs Lek	3.1	18.9
North Santa Renia Lek	2.4	17.6
Squaw Creek 3 Lek	1.6	17.9
Little Coyote Creek 12 Lek	1.1	20.1
Overall Average		**18.6**

Source: Brennan and Associates 2015.

The overall average L_{90} at lek perimeter location between the hours of 5:00 am and 10:00 am is 18.6 dBA L_{90}. For the purposes of analysis, and consistent with the GRSG Amendment, an ambient noise level of 18.6 dBA is used to characterize ambient noise level at the perimeter of lek locations in the vicinity of the Rossi Mine proposed project.

Loggerhead Shrike

The loggerhead shrike is a resident in Nevada and is found in open country with scattered trees and shrubs, savanna, desert scrub, and occasionally in open woodland (Wildlife Action Plan Team 2012). Loggerhead shrikes prefer shrubs or small trees for nesting, but nesting can also occur in piñon-juniper woodlands (Neel 1999). This species can often be found perching on wire, fences, or poles and the breeding season occurs between April 15 and July 15. This species was observed in the study area during surveys in spring and summer 2012.

Sage Thrasher

Sage thrasher is a sagebrush obligate commonly found within intact stands of dense sagebrush but has also been observed to occur in greasewood or bitterbrush vegetation communities (Floyd et al. 2007). Sage thrashers commonly build nests on the ground or within patches of dense vegetation. Foraging sage thrashers focus upon insects but may also use berries as a food source when available. This species was observed in the study area during surveys in spring and summer 2012.

Swainson's Hawk

Within the Great Basin, Swainson's hawks occur within sagebrush, grassland, and pinyon-juniper woodland habitats but can also be found in agricultural areas (GBBO 2010). Swainson's hawks typically nest in large riparian trees or in isolated trees found near ranches. Foraging Swainson's hawks focus upon vertebrate mammals including ground squirrels and pocket gophers, but have been observed to opportunistically consume insects including crickets and grasshoppers when available. This species was not observed in the study area during surveys in spring and summer 2012.

Western Burrowing Owl

The western burrowing owl is a small ground-dwelling owl with long legs, white chin stripe, round head, and stubby tail (Wildlife Action Plan Team 2012). It often nests in burrows that have been abandoned by other burrowing mammals and usually in open areas with good surrounding visibility. Western burrowing owls are present in northern Nevada in the spring and summer months and winter in the southwestern states (GBBO 2010). Although this species was not observed during baseline surveys, suitable habitat occurs within the project area. No ground squirrel colonies were observed within the study area during baseline surveys. Burrowing owls often prey upon ground squirrels and active colonies are associated with burrowing owl activity.

3.18.2 Environmental Consequences

Issues related to special-status species would include the loss or alteration of native habitats, increased habitat fragmentation, animal displacement, and direct loss of wildlife. Potential impacts for the eleven special-status species identified as documented or potentially occurring within the study area are discussed below.

The potential impacts of the proposed project on special-status wildlife can be classified as short-term (temporary) and long-term in duration. Short-term impacts result from habitat disturbance and removal due to construction and from activities associated with mine operation and occur during the active life of the mine and until reclamation is successfully completed. Short term impacts would cease upon mine closure and completion of successful reclamation. Long-term impacts include permanent changes to habitats and the wildlife and aquatic populations that depend on those habitats, regardless of reclamation success. Permanent impact acreages are a result of those open pit areas that would not be backfilled or reclaimed as discussed in Section 2.3.5, Open Pits.

Impacts to habitat can further be categorized as direct and indirect. Direct habitat impact results when habitat is destroyed or converted to a form that is unusable by the affected species, and is typically long-term. The primary potential indirect impact of the proposed project is wildlife avoidance (displacement) of otherwise suitable habitat in the project area, even when the habitat is relatively undisturbed by the project. Indirect impacts are more difficult to quantify than direct impacts because for most wildlife species there is limited scientific data available describing thresholds. Habitat loss and/or displacement impacts also may result in the fragmentation of habitat in to smaller sized areas.

3.18.2.1 Proposed Action

Surface Disturbance

The proposed project would result in the short-term surface disturbance of 973 acres (approximately 26 percent of the project area) and long-term reduction of 194 acres (approximately 5 percent of the project area) of wildlife habitat. Of the 973 acres of short-term surface disturbance, approximately 67 acres would result from ongoing exploration activities within the project area. Permanent impacts would include approximately 53 acres of Mixed Mountain and Low Sagebrush, 23 acres of Mixed Black, Wyoming and Mountain Sagebrush, 6 acres of Mixed Wyoming and Mountain Sagebrush, 16 acres of annual grassland, and 95 acres of previously disturbed areas. Disturbance associated with the Proposed Action would be reclaimed, with the exception of 194 acres of expanding and new open pits which would not be back-filled or reclaimed. Both short-term and permanent loss of suitable habitat is a significant impact to special-status species within the project area.

Similar to impacts discussed in Section 3.17.2, Environmental Consequences, impacts to special-status species from mine-related surface disturbance would include the short-term (temporary) and long-term (permanent) reduction or loss of habitat. Habitat loss or alteration would result in direct losses of smaller, less mobile species of wildlife, such as pygmy rabbit, and the displacement of more mobile species (e.g., bats, birds) into adjacent habitats. Mine-related surface disturbance would result in an incremental increase in habitat fragmentation at the mine site until reclamation is concluded and vegetation has been re-established. Potential impacts to special-status species resulting from mine-related displacement and habitat fragmentation would be highest for sagebrush-obligate species.

All new power distribution lines under the Proposed Action would be buried underground within the disturbance footprint of existing or proposed access and secondary roads. Therefore impacts to wildlife from the power distribution system would remain the same as under the No Action Alternative with the exception of indirect impacts from human presence and noise during construction and maintenance activities.

Under the Proposed Action, exploration would continue throughout the project area as described in Section 2.3.10, Exploration. Direct impacts to special-status wildlife species from exploration would include short-term loss of approximately 67 acres of potentially suitable habitat. Indirect impacts resulting from exploration activities would include increased human presence and noise during road and pad construction and active drilling operations. Exploration activity would also result in increased fugitive dust

and short-term habitat fragmentation. Exploratory drilling may occur at any time within the PoO, including drilling and other activity during daylight and at night. Impacts to special-status species from exploration activity during low-light and after dark conditions could include displacement, disorientation, and disturbance of roosting or resting individuals resulting from the use of temporary lighting to illuminate drilling pads, exploration roads, and other work areas. Exploration vehicles and equipment working after dark may impact nocturnal wildlife through collisions on exploration roads or drilling pads potentially resulting in mortality of individuals.

Exploration activities located within 3.1 miles of active GRSG leks would be subject to timing and noise restrictions during the spring breeding and brood rearing season. These restrictions would affect the northeastern sections of the proposed PoO area, as shown in **Figure A-2** of **Appendix A**. Although exploration activities within the project area are subject to seasonal timing restrictions for GRSG breeding habitat, exploration activities would result in an increase of human presence and noise outside of these sensitive periods.

Reclamation of mining disturbance and removal of mining support and ancillary facilities would occur as presented in Section 2.3.12, Closure and Reclamation Plan. Impacts of reclamation and removal of mining facilities would be similar to impacts resulting from mine construction and operation, including the presence of vehicles, equipment, and reclamation staff within the PoO boundary. During reclamation, increased dust, vibration, and noise would result in increased temporary disturbance in the areas where reclamation is actively being implemented. Periodic monitoring of reclamation success would result in the presence of reclamation staff, vehicles, and equipment within the PoO boundary.

Proposed Communication Site

The installation of the proposed communications tower would result in temporary impacts from the presence of construction equipment and personnel at the communication site and the removal of approximately 0.009 acres of vegetation as discussed in Section 2.3.9.11, Communication Tower Site. During the life of the mine, the communications tower may result in adverse impacts to avian species that could collide with the tower. The communication tower would not include guy wires or night time lighting therefore the risk of collision to avian species is considered to be minimal. The communication tower would provide an elevated perching location for predatory raptor and corvid [common raven (*Corvus corax*) or common crow (*Corvus brachyrhynchos*) species and which could result in increased predation of terrestrial prey species, including GRSG, within the immediate area around the tower and the viewshed of a perching raptor or corvid.

Mammals

Bats

Of the fifteen bat species that could occur in the study area, five (Brazilian free-tailed bat, California myotis, little brown myotis, western small-footed myotis, and Yuma myotis) have been documented within the project area (SRK 2013a, Bradley et al. 2006). Implementation of the Proposed Action could result in direct and indirect impacts to local bat species and their habitat, especially when disturbance occurs in grasslands, riparian, wetland, and shrubland foraging habitats. Direct impacts would include loss of foraging and roosting habitat, mortalities due to vehicular traffic collisions, and potential for exposure to hazardous chemicals in the event of an accidental release.

Indirect impacts associated with mining operations include mining and exploration related noise, human presence, and the use of artificial lighting currently occurring at the mine site. These impacts would continue and are anticipated to increase under the proposed project. Some bat species are especially sensitive to disturbance during roosting and can abandon sites due to increased human presence. Project-related noise from construction, vehicle traffic, and increased human activity could adversely affect these species. The use of artificial lighting during night time operations could adversely impact foraging bats. Under the Proposed Action, HES would implement BMPs outlined in the HES Lighting Management Plan (HES 2016j) to avoid and minimize the potential impact of artificial lighting on foraging bats within the project area. These measures include the use of shielding and cages on all fixed and mobile light sources within the project area to reduce light pollution that could disorient foraging bats.

Potential roost sites for these bat species include cliff faces, rock outcrops, trees, and buildings, although no trees are present in the project area. Existing cliff faces, rock outcrops, and buildings that may provide roosting habitat within the project area are limited in abundance, and those that are present, likely would not be disturbed by mine-related construction under the Proposed Action; however, the level of development near these habitats may cause animal displacement or aversion to use of the habitats. Due to the limited availability of roosting habitats within the study area, project construction would not result in population-level impacts to sensitive bat species.

Pygmy Rabbit

Implementation of the proposed project would result in the short-term reduction of 788 acres of sagebrush dominated habitat and the long-term reduction of approximately 82 acres of potentially suitable sagebrush habitat (sagebrush-dominated habitats) for this species, until final reclamation is deemed complete and vegetation is re-established. No pygmy rabbits were observed during surveys conducted in the study area; however, potential suitable pygmy rabbit habitat is present in the study area. The Proposed Action could result in direct and indirect impacts similar to those described for mammals in Section 3.17.2.1, Proposed Action, including potential mortalities of pygmy rabbits. Project construction could result in several indirect impacts on pygmy rabbit and their habitat including decreased total amount of suitable habitat and decreased quality of habitat following reclamation due to the prolonged time required to establish high quality, mature sagebrush habitat with vertical and horizontal structural diversity and the increased likelihood for the establishment and spread of non-native invasive species and noxious weeds. Human activity and noise associated with construction of the Proposed Action and exploration could result in increased avoidance and displacement of animals or groups of individuals from areas with lighting, vibration, noise, dust, or human presence. These impacts would be moderate, considering the limited availability of high density sagebrush stands characteristic of quality pygmy rabbit habitat that is not currently impacted by existing disturbance. The loss of individual pygmy rabbits would not result in population-level impacts. Although no evidence of pygmy rabbits was observed during field surveys, suitable habitat does exist within the study area and those areas removed by mining activity would be a substantial impact. Proposed mitigation measure **SSS-1** presented in Section 3.18.4, Potential Monitoring and Mitigation Measures, would require HES to conduct clearance surveys of pygmy rabbit habitat prior to surface disturbing activities or removal of suitable habitat in order to ensure that potential impacts to the species are avoided and minimized to the extent practicable.

Birds

Implementation of the Proposed Action could result in direct and indirect impacts to avian species and their habitat, especially if disturbance occurs in grasslands, riparian, wetland, and shrubland foraging habitat. Potential direct impacts would include mortalities due to vehicular traffic collisions, exposure to hazardous chemicals, and loss of suitable habitat during the life of the mine. These direct adverse impacts to sensitive raptors and migratory bird species associated with the construction and operation of the proposed project would be minimized due to the implementation of Applicant Committed Environmental Protection Measures presented in **Table 2-16**. Additional species-specific impacts are discussed below.

Bald Eagle

Although no bald eagle nests or nesting substrate occurs within the study area and this species was not observed during baseline surveys, individuals could occur while opportunistically foraging for roadkill or passing through the study area. Direct impacts would include the short-term reduction of 973 acres of potential foraging habitat until final reclamation is completed and vegetation re-established and a long-term reduction of 194 acres. Indirect impacts associated with mine-related noise and human presence currently occur at the site and would increase under the proposed project.

Additional indirect impacts to bald eagles would be similar to those discussed for raptor species in Section 3.17.2.1, Proposed Action, sub-section, Migratory Birds and Raptors. Potential impacts to this species as a result of the proposed project are considered low due to the implementation of eagle-specific Applicant Committed Environmental Protection Measures, the lack of active nest sites within the study area, the current level of activity at the mine site, and low potential for impacts to the prey base in the study area.

Brewer's Sparrow

Direct impacts to Brewer's sparrow would include the short-term reduction of 788 acres of sagebrush dominated habitat and the long-term reduction of approximately 82 acres of big sagebrush dominated habitat which comprises potential breeding and foraging habitat for this species until reclamation was completed and vegetation was re-established. Indirect impacts associated with mine-related noise and human presence currently occur at the site and would increase under the proposed project. Additional indirect impacts would be similar to those discussed in Section 3.17.2.1, Proposed Action, sub-section, Migratory Birds and Raptors. Potential impacts to this species as a result of the proposed project are considered low due to the implementation of Applicant Committed Environmental Protection Measures, the overall availability of suitable habitat in the vicinity of the project, and the current level of activity at the mine site.

Ferruginous Hawk

Although no ferruginous hawk nests were identified within the study area and this species was not observed during baseline surveys, individuals could occur while foraging or passing through the study area. Direct impacts would include the short-term reduction of 973 acres of potential foraging habitat until final reclamation is completed and vegetation re-established and a long-term reduction of 194 acres. Indirect impacts associated with mine-related noise and human presence currently occur at the site and would increase under the proposed project.

Additional indirect impacts to ferruginous hawks would be similar to those discussed for raptor species in Section 3.17.2.1, Proposed Action, sub-section, Migratory Birds and Raptors. Potential impacts to this species as a result of the proposed project are considered low due to the implementation of eagle-specific Applicant Committed Environmental Protection Measures, the lack of active nest sites within the study area, the current level of activity at the mine site, and low potential for impacts to the prey base in the study area.

Golden Eagle

No active golden eagle nests have been identified within the study area; however, golden eagles were observed during surveys within the study area. Direct impacts would include the short-term reduction of 973 acres of potential foraging habitat until final reclamation is completed and vegetation re-established and a long-term reduction of 194 acres. Indirect impacts associated with mine-related noise and human presence currently occur at the site and would increase under the proposed project. There are two active golden eagle nests approximately one mile west of the study area; golden eagles occupying these nest sites would be most likely to experience indirect impacts as a result of noise and human activity associated with the proposed project; however, these impacts would be reduced as the nests are not in the direct line of sight of the study area due to existing topography.

Additional indirect impacts on golden eagle would be similar to those discussed for raptor species in Section 3.17.2.1, Proposed Action, sub-section, Migratory Birds and Raptors. Potential impacts to this species as a result of the proposed project are considered low due to the implementation of eagle-specific Applicant Committed Environmental Protection Measures, the lack of active nest sites within the study area, the current level of activity at the mine site, and low potential for impacts to the prey base in the study area.

Greater Sage-grouse

The nearest recently active lek, the Little Coyote Creek lek, occurs approximately one mile to the northeast of the study area. The Alkali Spring lek has a pending status and occurs approximately 3 miles north of the study area. These active and potentially active leks are within 4 miles of potential surface disturbance within the study area. As a result, direct impacts to breeding GRSG would not be anticipated from the proposed project; however, indirect impacts to nesting GRSG could occur. These indirect impacts would be reduced as the leks are not within the direct line of sight of the study area due to existing topography.

Impacts to GRSG habitat are anticipated to occur as a result of disturbance to sagebrush habitat within the study area in association with the development of the proposed project. **Table 3.18-5** presents the

acreage of surface disturbance that would occur under the Proposed Action to GRSG habitat management categories PHMA and GHMA. The anticipated impacts under the August 2014 and March 2015 GRSG habitat maps are included in **Table 3.18-5**.

Direct impacts would include the incremental removal of sagebrush habitat that may potentially provide nesting, early brood, late summer, and winter habitat. This habitat would be incrementally lost as a result of the development of the proposed project and is a significant impact to GRSG habitat within the project area.

Under the Proposed Action, 679 acres of PHMA and 294 acres of GHMA would be disturbed by the short term impacts of mine construction and operation using the 2014 habitat management categories. These acres of disturbance would be reclaimed at the completion of mining activity. In addition, 125 acres of PHMA and 69 acres of GHMA (2014 management categories) would be permanently removed under the Proposed Action as a result of the open pits that would not be backfilled or reclaimed.

Under the Proposed Action, 689 acres of PHMA and 284 acres of GHMA would be disturbed by the short term impacts of mine construction and operation using the 2015 habitat management categories. These acres of disturbance would be reclaimed at the completion of mining activity. In addition, 133 acres of PHMA and 61 acres of GHMA (2015 management categories) would be permanently removed under the Proposed Action as a result of the open pits that would not be backfilled or reclaimed.

Table 3.18-5. Summary of Greater Sage-grouse Habitat Proposed Action Impact Acreages

Habitat Category	Existing Acreage within Study Area[1]	Proposed Action Temporary Impact[1] (acres)	Proposed Action Permanent Impact[1] (acres)	Proposed Action Impact Total (acres)[1]
2014 Habitat Management Categories				
PHMA	2,712	679	125	804
GHMA	1,019	294	69	363
OHMA	-	-	-	-
2014 Habitat Total	**3,731**	**973**	**194**	**1,167**
2015 Habitat Management Categories				
PHMA	2,657	689	133	822
GHMA	1,074	284	61	345
OHMA	-	-	-	-
2015 Habitat Total	**3,731**	**973**	**194**	**1,167**

[1] Numbers have been rounded to the nearest integer, totals may vary due to rounding.

Indirect impacts associated with mine-related noise currently occur at the site and would increase under the proposed project. Heavy equipment associated with construction of the Proposed Action would generate noise above ambient levels in the surrounding area. There are no federal, State of Nevada, or Elko County noise regulations for mining activity; however, noise guidelines in the GRSG Amendment stipulate that noise during construction, operation, and maintenance should not exceed 10 dBA above ambient levels as a relative criterion, to evaluate project-related noise. All of the active leks within four miles of the project area are located to the north of the existing and proposed mine facilities. Locations of these leks are generally in the lower elevations of the Squaw Creek and Alkali Creek drainages where the topography is flat and open. Between the lek locations and the existing and proposed mining facilities are multiple unnamed ridges and small land forms that screen each lek location from mining activity. Due to this existing topography between active leks and mining activity it is likely that impacts from noise and light generated during operational periods is significantly reduced.

HES commissioned a noise modeling study to characterize the anticipated noise levels at the perimeter of the Little Coyote Creek 12 lek located approximately 1.1 miles from the existing Rossi Mine PoO boundary (AECOM 2017a). Although existing topography located between the northern end of the Rossi Mine and the lek obscures the direct line of sight, noise emitted from the Rossi Mine during mining operations could potentially impact individual birds on the lek during the active breeding season.

Complete results of noise modeling for the project are presented in **Appendix I** of this EIS. Noise modeling considered multiple scenarios which included various atmospheric conditions and mine activity levels representative of potential circumstances at the Rossi Mine under both the Proposed Action and the Reconfiguration Alternative. In summary, the results of project noise modeling concluded that under typical atmospheric conditions (temperature, relative humidity, wind direction and speed) and proposed mine activity levels, increases of noise levels experienced by GRSG at the Little Coyote Creek 12 lek would not exceed greater than 10 dBA during a majority of scenarios. Noise modeling did identify some limited scenarios where noise exceedances of 10 dBA could be experienced at the Little Coyote Creek 12 lek (**Appendix I, Table I-2**). In most of these scenarios, the Little Coyote Creek 12 lek is located downwind from the project area, allowing for sound emissions to travel farther before attenuating to ambient levels. As identified in the noise modeling final report, the probability for downwind conditions to exist during the period when GRSG are actively strutting at the Little Coyote Creek 12 lek (two hours before sunrise until two hours after sunrise between March 15 and May 31) and for noise emissions to exceed greater than 10 dBA is considered to be low (less than 5 percent). In addition, modeling results under these downwind conditions did not take into account the likelihood that the ambient noise levels experienced by GRSG at the Little Coyote Creek 12 lek would likely increase due to the noise created by wind moving across local topography and vegetation at the lek site. When this factor is included in noise emission scenarios, the potential for noise levels experienced by GRSG at the Little Coyote Creek 12 lek to exceed 10 dBA above ambient conditions is further reduced. Given that modeling of noise levels at the Rossi Mine are anticipated to result in a low probability of proposed project noise level exceedances of greater than 10 dBA above ambient conditions at the Little Coyote Creek 12 lek, no additional mitigation measures for noise emissions are proposed under the Reconfiguration Alternative.

Based on existing guidance and ambient noise monitoring at the leks, 28.6 dBA L_{90} is used as the noise threshold level where exceedances would result in an adverse impact on GRSG, the primary sensitive noise receptor in the project area. Noise levels exceeding 28.6 dBA L_{90} at nearby leks could result in increased disruption of life-history requirements including male GRSG avoidance of suitable leks during the breeding season (Blickley et al. 2002).

Additional indirect impacts could include increased avoidance by, displacement of, and disruption of life-history requirements of GRSG individuals or groups from suitable habitat proximate to development due to lighting, vibration, noise, dust, or human presence. The proposed project could also result in GRSG avoiding suitable habitat in the study area if they perceive that they are at risk from predation. Increased habitat fragmentation could result in barriers to movement by GRSG to preferred habitat areas which could lead to diminished health of this species. Surface disturbance associated with the proposed project could also result in decreased quantity of insect species which GRSG consume during spring and summer months.

Under the Proposed Action, the construction of new haul roads would disturb approximately 42 acres in the study area. GRSG may be more sensitive to traffic increases than other wildlife species. Male GRSG lek attendance was shown to decline within 1.9 miles of a haul road with traffic exceeding one vehicle per day (Johnson et al. 2011). Female hens that bred on leks within 1.9 miles of roads associated with oil and gas development traveled twice as far to nest as did hens that bred on leks greater than 1.9 miles from roads, resulting in indirect impacts on GRSG health and ultimately mating productivity.

Transmission line structures also can impact GRSG populations by enhancing local raptor and corvid populations. Common corvids species in northern Nevada that may prey upon GRSG nests include the common raven (*Corvus corax*) and the black-billed magpie (*Pica hudsonia*). Raptors and corvids nest and perch on transmission structures, which create vertical structure in generally treeless shrub-steppe habitats (Knight and Kawashima 1993; Steenhof et al. 1993). Raptors and corvids may then occur at higher densities than normal due to increased nesting locations and perches (Steenhof et al. 1993). GRSG and other prairie gallinaceous (ground feeding) birds have evolved in habitat largely devoid of tall

structures. Although it is unclear how these species react to different structure heights, pellet transects have reported declining habitat use by GRSG up to 600 meters from power lines (Braun 1998). Recent research in southern Wyoming has reported GRSG avoidance of brood–rearing habitats within 2.9 miles of transmission lines (LeBeau 2012). Knick et al. (2013) observed increased lek activity and persistence in areas of GRSG habitat characterized as having lower densities of transmission lines in comparison to GRSG habitats with increased densities of transmission lines and infrastructure. All new power distribution lines under the Proposed Action would be buried underground within the disturbance footprint of existing or proposed access and secondary roads. Therefore impacts to GRSG from the power distribution system would remain the same as under the No Action Alternative with the exception of indirect impacts from human presence and noise during construction and maintenance activities.

Potential impacts to this species as a result of the proposed project would be considered moderate due to the current level of activity at the mine site, and the absence of any active leks within the study area.

Loggerhead Shrike

Loggerhead shrike was detected during breeding bird surveys at the study area and there is suitable breeding habitat available for this species. Direct impacts to loggerhead shrike would include short-term reduction of 973 acres of potential breeding and foraging habitat until reclamation was completed and vegetation re-established and a long-term reduction of 194 acres as a result of the open pits that would not be backfilled or reclaimed. Indirect impacts associated with mine-related noise and human presence currently occur at the site and would increase under the proposed project. Additional indirect impacts would be similar to those discussed in Section 3.17.2.1, Proposed Action, sub-section, Migratory Birds and Raptors. Potential impacts to this species as a result of the proposed project are considered low due to the implementation of Applicant Committed Environmental Protection Measures, the overall availability of suitable habitat in the vicinity of the project, and the current level of activity at the mine site.

Sage Thrasher

Sage thrasher was not detected during breeding bird surveys at the study area and there is suitable breeding habitat available for this species. Direct impacts to sage thrasher would include short-term reduction of 973 acres of potential breeding and foraging habitat until reclamation was completed and vegetation re-established and a long-term reduction of 194 acres as a result of the open pits that would not be backfilled or reclaimed. Indirect impacts associated with mine-related noise and human presence currently occur at the site and would increase under the proposed project. Additional indirect impacts would be similar to those discussed in Section 3.17.2.1, Proposed Action, sub-section, Migratory Birds and Raptors. Potential impacts to this species as a result of the proposed project are considered low due to the implementation of Applicant Committed Environmental Protection Measures, the overall availability of suitable habitat in the vicinity of the project, and the current level of activity at the mine site.

Swainson's Hawk

Although no Swainson's hawk nests were identified within the study area and this species was not observed during baseline surveys, individuals could occur while foraging or passing through the study area. Direct impacts would include the short-term reduction of 973 acres of potential foraging habitat until final reclamation is completed and vegetation re-established and a long-term reduction of 194 acres as a result of the open pits that would not be backfilled or reclaimed. Indirect impacts associated with mine-related noise and human presence currently occur at the site and would increase under the proposed project.

Additional indirect impacts on Swainson's hawk would be similar to those discussed for raptor species in Section 3.17.2.1, Proposed Action, sub-section Migratory Birds and Raptors. Potential impacts to this species as a result of the proposed project are considered low due to the implementation of eagle-specific Applicant Committed Environmental Protection Measures, the lack of active nest sites within the study area, the current level of activity at the mine site, and low potential for impacts to the prey base in the study area.

Western Burrowing Owl

Although no burrowing owl nest locations or preferred foraging areas containing ground squirrel colonies were observed during baseline studies, this species may occur within the study area during the spring and summer months. Direct impacts to western burrowing owl would include short-term reduction of 973 acres of potential breeding and foraging habitat until reclamation was completed and vegetation re-established and a long-term reduction of 194 acres as a result of the open pits that would not be backfilled or reclaimed. Indirect impacts associated with mine-related noise and human presence currently occur at the site and would increase under the proposed project. Additional indirect impacts would be similar to those discussed in Section 3.17.2.1, Proposed Action, sub-section, Migratory Birds and Raptors. Potential impacts to this species as a result of the proposed project are considered low due to the implementation of Applicant Committed Environmental Protection Measures, the overall availability of suitable habitat in the vicinity of the project, and the current level of activity at the mine site.

Human Presence and Noise

Impacts to special-status species would parallel those discussed in Section 3.17.2.1, Proposed Action.

Water Quantity and Quality

As discussed in Section 3.4.2.1, Proposed Action, groundwater data suggest that there is a potential for groundwater to be intercepted in the proposed expansion of the King Pit and QLC Pit resulting in the formation of a pit lake. Based on the available data, and recognizing that the water levels in the area of the west lobe of the King Pit are uncertain, there may be potential for groundwater flow to be encountered in the west lobe of the King Pit. Depending on the inflow rates, groundwater inflows combined with runoff from pit walls and direct precipitation there may be potential to result in sufficient flow for development of pit lakes in the west lobe of the King Pit and the QLC Pit. If pit lakes were to develop as a result of mining activity under the Proposed Action, the potential for adverse effect to special-status wildlife may occur. Areas of open water occur infrequently in the project area and it is likely that special-status wildlife could attempt to utilize pit lake areas for drinking, thermal regulation, or other uses. Potential monitoring and mitigation measures for water resources discussed in Section 3.4.4, Potential Monitoring and Mitigation Measures, present a set of measures for monitoring of the potential for pit lakes to develop, evaluation of water quality of pit lakes that may occur, and mitigation measures to reduce or eliminate adverse effects to terrestrial and avian special-status wildlife species. Specific mitigation measures that could be implemented to eliminate or reduce the potential for special-status wildlife species to be adversely affected could include 1) reduction in the depth of open pit mining or partial pit backfilling to preclude pit lake development; 2) utilizing treatment options such as adding amendments to modify pit lake water quality concentrations; 3) measures designed to reduce exposure pathways or receptor access (wildlife fencing, avian deterrents, or other) and 4) other appropriate measures as approved by the BLM, NDOW, and NDEP.

Hazardous Materials Spill

Impacts to special-status species would parallel those discussed in Section 3.17.2.1, Proposed Action.

3.18.2.2 Reconfiguration Alternative

Surface Disturbance

Impacts to special-status species under the Reconfiguration Alternative would be the same as described for the Proposed Action, except that the sequencing of construction of the reconfigured Dawn WRDF would be phased to ensure the conservation of a minimum 2,000-foot-wide corridor for use by migrating mule deer. This would result in a reduced final footprint of the proposed Dawn WRDF which would reduce short-term surface disturbance of the Reconfiguration Alternative to 872 acres (approximately 10 percent less than the Proposed Action) and the amount of permanent surface disturbance in this portion of the project area to 144 acres (approximately 25 percent less than the Proposed Action) as a result of the open pits that would not be backfilled or reclaimed. Acreage of permanent disturbance includes

approximately 48 acres of Mixed Mountain and Low Sagebrush, 10 acres of Mixed Black, Wyoming and Mountain Sagebrush, 16 acres of annual grasslands, one acre of meadow habitat, and 69 acres of lands that have been previously disturbed. This alternative would result in less adverse impacts to special-status species that utilize habitat in this area.

Reclamation of mining disturbance and removal of mining support and ancillary facilities would occur as presented in Section 2.3.12, Closure and Reclamation Plan. Impacts of reclamation and removal of mining facilities would be similar to impacts resulting from mine construction and operation, including the presence of vehicles, equipment, and reclamation staff within the PoO boundary. During reclamation, increased dust, vibration, and noise would result in increased temporary disturbance in the areas where reclamation is actively being implemented. Periodic monitoring of reclamation success would result in the presence of reclamation staff, vehicles, and equipment within the PoO boundary.

Mammals

Bats

Potential impacts to bats species under the Reconfiguration Alternative would be the same as under the Proposed Action with the exception of a reduction of 151 acres of direct surface disturbance to suitable habitat.

Pygmy Rabbit

Potential impacts to this species under the Reconfiguration Alternative would be the same as under the Proposed Action with the exception of a reduction of 151 acres of direct surface disturbance to suitable habitat.

Although no evidence of pygmy rabbits was observed during field surveys, suitable habitat does exist within the study area. Proposed mitigation measure **SSS-1** presented in Section 3.18.4, Potential Monitoring and Mitigation Measures, would require HES to conduct clearance surveys of pygmy rabbit habitat prior to surface disturbing activities or removal of suitable habitat in order to ensure that potential impacts to the species are avoided and minimized to the extent practicable.

Birds

Potential impacts to avian species under the Reconfiguration Alternative would be the same as under the Proposed Action with the exception of a reduction of 151 acres of direct surface disturbance to suitable habitat. Potential impacts to this species as a result of the Reconfiguration Alternative are considered low due to the implementation of Applicant Committed Environmental Protection Measures, the overall availability of suitable habitat in the vicinity of the project, and the current level of activity at the mine site.

Additional species-specific impacts are discussed below.

Bald Eagle

Direct impacts to bald eagles under the Reconfiguration Alternative would include the long-term reduction of approximately 151 acres of foraging habitat for this species in comparison to the Proposed Action. Additional indirect impacts would be similar to those discussed in Section 3.18.2.1, Proposed Action.

Brewer's Sparrow

Direct impacts to Brewer's sparrow under the Reconfiguration Alternative would include the short-term reduction of 701 acres of sagebrush dominated habitat and the long-term reduction of approximately 57 acres of big sagebrush dominated habitat which comprises potential breeding and foraging habitat for this species until reclamation was completed and vegetation was re-established. Additional indirect impacts would be similar to those discussed in Section 3.18.2.1, Proposed Action.

Ferruginous Hawk

Direct impacts to ferruginous hawks under the Reconfiguration Alternative would include the long-term reduction of approximately 151 acres of foraging habitat for this species in comparison to the Proposed Action. Additional indirect impacts would be similar to those discussed in Section 3.18.2.1, Proposed Action.

Golden Eagle

Direct impacts to golden eagles under the Reconfiguration Alternative would include the long-term reduction of approximately 151 acres of foraging habitat for this species in comparison to the Proposed Action. Additional indirect impacts would be similar to those discussed in Section 3.18.2.1, Proposed Action.

Greater Sage-grouse

Potential impacts are anticipated to occur as a result of disturbance to sagebrush habitat within the study area under the Reconfiguration Alternative. Potential direct impacts would include the incremental reduction of approximately 57 acres of big sagebrush habitat in the long-term that may potentially provide nesting, early brood, late summer, and winter habitat.

Table 3.18-6 presents the acreage of surface disturbance that would occur under the Reconfiguration Alternative to GRSG habitat management categories PHMA and GHMA.

Under the Reconfiguration Alternative, 653 acres of PHMA and 219 acres of GHMA would be disturbed by the short term impacts of mine construction and operation using the 2014 habitat management categories. These acres of disturbance would be reclaimed at the completion of mining activity. In addition, 86 acres of PHMA and 58 acres of GHMA (2014 management categories) would be permanently removed under the Proposed Action as a result of the open pits that would not be backfilled or reclaimed.

Under the Reconfiguration Alternative, 662 acres of PHMA and 210 acres of GHMA would be disturbed by the short term impacts of mine construction and operation using the 2015 habitat management categories. These acres of disturbance would be reclaimed at the completion of mining activity. In addition, 91 acres of PHMA and 53 acres of GHMA (2015 management categories) would be permanently removed under the Proposed Action as a result of the open pits that would not be backfilled or reclaimed.

Table 3.18-6. Summary of Greater Sage-grouse Habitat Reconfiguration Alternative Impact Acreages

Habitat Category	Existing Acreage within Study Area[1]	Reconfiguration Alternative Temporary Impact[1] (acres)	Reconfiguration Alternative Permanent Impact[1] (acres)	Reconfiguration Alternative Impact Total[1] (acres)
2014 Habitat Management Categories				
PHMA	2,712	653	86	739
GHMA	1,019	219	58	277
OHMA	-	-	-	-
2014 Habitat Total	**3,731**	**872**	**144**	**1,016**
2015 Habitat Management Categories				
PHMA	2,657	662	91	753
GHMA	1,074	210	53	263
OHMA	-	-	-	-
2015 Habitat Total	**3,731**	**872**	**144**	**1,016**

[1] Numbers have been rounded to the nearest integer, totals may vary due to rounding.

Additional indirect impacts to GRSG would be similar to those discussed in Section 3.18.2.1, Proposed Action.

Potential impacts to this species under the Reconfiguration Alternative would be considered moderate due to the current level of activity at the mine site, and the absence of any active leks within the study area.

Loggerhead Shrike

Direct impacts to loggerhead shrike under the Reconfiguration Alternative would include the long-term reduction of approximately 151 acres of foraging habitat for this species in comparison to the Proposed Action. Additional indirect impacts would be similar to those discussed in Section 3.18.2.1, Proposed Action.

Sage Thrasher

Direct impacts to sage thrasher under the Reconfiguration Alternative would include the long-term reduction of approximately 151 acres of foraging habitat for this species in comparison to the Proposed Action. Additional indirect impacts would be similar to those discussed in Section 3.18.2.1, Proposed Action.

Swainson's Hawk

Direct impacts to Swainson's hawks under the Reconfiguration Alternative would include the long-term reduction of approximately 151 acres of foraging habitat for this species in comparison to the Proposed Action. Additional indirect impacts would be similar to those discussed in Section 3.18.2.1, Proposed Action.

Western Burrowing Owl

Direct impacts to western burrowing owls under the Reconfiguration Alternative would include the long-term reduction of approximately 151 acres of foraging habitat for this species in comparison to the Proposed Action. Additional indirect impacts would be similar to those discussed in Section 3.18.2.1, Proposed Action.

Human Presence and Noise

Impacts to special-status species would parallel those discussed in Section 3.17.2, Environmental Consequences.

Water Quantity and Quality

Impacts to special-status species would be the same as discussed in Section 3.18.2.1, Proposed Action.

Hazardous Materials Spill

Impacts to special-status species would parallel those discussed in Section 3.17.2, Environmental Consequences.

3.18.2.3 Livestock Fencing Alternative

The Livestock Fencing Alternative would be similar to the Proposed Action, except that a livestock exclusion fence would be installed around the perimeter of the PoO boundary as shown in **Figure 2-15** which would add 7 acres to the anticipated short-term surface disturbance in the project area. It is unlikely that the Fencing Alternative would impact special-status species because the fence is unlikely to exclude any of the special-status species discussed above in the Proposed Action. Under this alternative there is a potential for increased collision risk to avian species, including GRSG. As discussed in Section 2.4.3, Livestock Fencing Alternative, design specifications and installation of the fence would follow NDOW guidance and direction included in the BLM GRSG Amendment to reduce the potential for collisions by GRSG. The fence would be removed once the mine is reclaimed and revegetation is determined successful by the BLM and NDEP.

3.18.2.4 No Action Alternative

Under the No Action Alternative, the proposed project would not be developed, and impacts to special-status species would not occur. Under this alternative, 1,167 acres of wildlife habitat would not be disturbed or lost, as described under the Proposed Action. Additional habitat fragmentation and animal displacement would not occur, limiting the impacts to special-status species to existing conditions. Closure and reclamation of the existing and authorized mine disturbance and surface exploration activities within the project area would be conducted under the terms of current permits and approvals.

3.18.3 Cumulative Impacts

The CESA for special-status wildlife species is the same as that for general wildlife species and is defined in Section 3.18.1, Affected Environment, and is shown in **Figure 3.17-1**; the CESA for GRSG is presented in **Figure 3.18-1**. The past actions, present actions, and RFFAs are discussed in Section 3.2, Past, Present, and Reasonably Foreseeable Actions. RFFAs from mining and exploration activities are identified in **Table 3.2-1**; their locations are shown in **Figure 3.2-1** and **Figure 3.2-2**. **Figure 3.2-2** also illustrates some right-of-way actions.

3.18.3.1 Proposed Action

Potential cumulative impacts to special-status bat species, pygmy rabbit, Brewer's sparrow, golden eagle, and loggerhead shrike, would be similar to those described in Section 3.17.3, Cumulative Impacts. Cumulative impacts to these species would most likely occur where the project areas of RFFAs and the Proposed Action overlap the special-status species CESA. These impacts would occur over a larger

spatial area and a longer timeframe and would therefore be greater than the project-specific direct and indirect impacts.

Greater Sage-grouse

The types of cumulative impacts to GRSG resulting from the Proposed Action, when combined with ongoing projects and RFFAs, would be similar to those described under the Proposed Action in Section 3.18.2.1, Proposed Action, but to a greater degree and extent based on the increased development, disturbance, and project-related activity associated with ongoing projects and RFFAs.

The CESA for GRSG encompasses areas that are utilized by GRSG in relation to past, present, and RFFAs. **Table 3.18-7** presents the disturbance of GRSG habitat by wildfires (1980 to 2017) and mining operations. Past, present, and RFFAs from utility and energy development (North Elko Pipeline, Bell Creek Substation, Coyote Substation, and TS Power Plant) have resulted in approximately 420 acres of approved disturbance.

The GRSG CESA encompasses 700,701 acres of PHMA, 324,520 acres of GHMA, 342,675 acres of OHMA, and 118,546 acres of Non-Habitat. There are 17,115 acres of SFA within the GRSG CESA. The Proposed Action would contribute an estimated short-term disturbance of 679 acres in PHMA (0.1 percent of PHMA in the CESA) and an estimated long-term disturbance of 125 acres in PHMA (0.02 percent of PHMA in the CESA) as a result of the open pits that would not be backfilled or reclaimed. The cumulative area of disturbance to PHMA in the CESA would depend on the amount and location of disturbance approved during field-wide and site-specific approvals and development for the RFFAs. As shown in **Table 3.18-7**, approximately 59 percent of PHMA within the Tuscarora PMU has been previously disturbed by cumulative actions or impacts from wildfire. The acreages of disturbance from wildfire represent the majority of impacted acres (58%) of PHMA while disturbance from cumulative mining and other development actions represents approximately less than one percent of PHMA. Within GHMA, wildfire accounts for approximately 81 percent of disturbance acreages while cumulative mining or other actions have resulted in disturbance of approximately 5 percent of GHMA.

There are 94 leks that occur in the CESA; 84 inside of PHMA, 8 in GHMA, zero in OHMA, and 2 in non-habitat area. Of the 84 leks in PHMA, 28 of these are active leks, 39 are unoccupied, and 17 are pending. The cumulative density disturbance calculations for GRSG is calculated based on the BSU. BSUs are areas that represent local GRSG population use areas within the sub-region. Anthropogenic surface disturbance within each BSU is calculated once a year at the BLM National Operations Center (NOC), and is published on-line. The affected BSU for this project is the Owyhee BSU. The NOC calculated that in 2016, the percentage of PHMA within this BSU that is currently disturbed by development is approximately 0.54 percent.

Surface disturbance and human activities (e.g., noise) associated with RFFAs that overlap these leks have the potential to adversely affect these leks. Cumulative impacts could result in decreased lek attendance which would be affected by increased road development (Holloran 2005, Walker et al. 2007), intermittent cumulative noise increases, such as periodic heavy truck noise on roads (Blickley et al. 2002), and other project-related noise and activity during the construction and operation of the Proposed Action and the RFFAs. Male GRSG lek attendance was shown to decline within 1.9 miles of a haul road with traffic exceeding one vehicle per day (Holloran 2005), and female GRSG moved further away from breeding leks near development areas for nesting which resulted in lower nest initiation rates (Lyon and Anderson 2003).

Table 3.18-7. Cumulative Special-status Species Habitat Disturbance

CESA	Total Acres of Habitat	Acres or Habitat Disturbed by Fire	Acres Disturbed by the Proposed Action	Acres of Habitat Disturbed by Mining Operations (Past, Present, and RFFAs)	Acres of Habitat Disturbed by Utility and Energy Development (Past, Present, and RFFAs[1])	Total Acres of Habitat Disturbed by Cumulative Actions	Percent of Total Habitat Acres Disturbed
Special-status Species[2]	632,757	439,909	1,167	40,374	419	481,869	76
GRSG PHMA	700,701	413,315	804	1,205	92	415,416	59
GRSG GHMA	324,520	263,498	336	16,685	36	280,555	86
GRSG OHMA	324,675	262,932	0	5,226	17	268,175	83

Sources: Coates et al. 2014, BLM 2015g, BLM 2017b.

[1] See **Table 3.2-1** for a breakdown of mining projects.
[2] The special-status species CESA is identical to the wildlife CESA, excluding GRSG.

Habitat conditions within the GRSG CESA area most likely are not ideal because of fire history and the past, current, and future projected levels of human disturbance and noise levels from mining activities along the Carlin Trend. The potential loss of wetlands combined with mine groundwater pumping activities from other mining projects within the GRSG CESA could result in adverse impacts to important brooding habitat for GRSG and other special-status species (BLM 2010c). Loss of wetlands and reductions or eliminations of flows in springs and seeps could impact GRSG dependent on these sites and may impact the distribution and use of habitat during the spring, summer, and early fall. It is unlikely that the Proposed Action would contribute to the loss of wetlands as there are no naturally occurring wetlands within the study area. The Proposed Action may result in increased erosion and sedimentation of the Boulder Creek; however, as discussed in Section 3.14.1.2, Riparian Zones and Wetland Areas, the creek does not have any hydrologic connection with the Humboldt River and any upstream features that flow to Boulder Creek are isolated and lack a significant nexus with a traditional navigable water; therefore, impacts to water features in the study area as a result of the Proposed Action are unlikely to contribute to cumulative impacts throughout the GRSG CESA.

Climate Change

Potential changes to the project area resulting from the effects of climate change forecasted by the Central Basin and Range Rapid EcoRegional REA could include higher than normal growing season temperatures, contraction or expansion of some existing vegetation communities, the expansion of existing noxious weed populations, and the introduction of noxious weed species previously undocumented in the ecoregion and project area (Comer et al. 2013). Regarding temperature increases specifically, the Central Basin and Range REA forecasts an average increase in average summer maximum daytime temperatures of approximately 5°F within the project area by 2060 (Comer et al. 2013). These increases in average growing season temperatures are anticipated to result in low elevation basins throughout the Central Basin and Range ecoregion potentially transitioning from the existing cool semi-desert vegetation communities into very warm and sparsely-vegetated desert landscapes more typical of the Mojave Basin and Range. These potential shifts in vegetation communities could result in changes to wildlife species diversity and population densities. A number of studies have documented a decrease in biomass and productivity resulting from climate change in the Southwest. Anderson-Teixeira et al. (2011) found that the amount of above-ground plant biomass decreased as temperature increased and precipitation decreased in a central New Mexico study. With increasing atmospheric CO_2 levels, cheatgrass and other introduced annual grasses are expected to proliferate and continue to outcompete native species which can be expected to increase the frequency and size of wildfires in the area (Smith et al. 2000). An increase in wildfire frequency may result in the reduction of important seasonal habitats for GRSG and other special-status wildlife species within the project area and CESA. Ultimately, biodiversity in the CESA could be significantly reduced, which in turn might alter ecosystem processes such as primary production, nutrient dynamics and landscape water balance.

3.18.3.2 Reconfiguration Alternative

Cumulative effects under the Reconfiguration Alternative would be similar to impacts to special-status species discussed for the Proposed Action, except that 151 fewer acres of wildlife habitat would be disturbed in the long-term. Implementation of this alternative would result in less cumulative impacts to special-status species that utilize habitat near the proposed Dawn WRDF by reducing the final footprint of the proposed Dawn WRDF. Under the Reconfiguration Alternative, there would be long-term disturbance of 86 acres of GRSG PHMA, and 58 acres of GRSG GHMA; 31 percent and 16 percent respectively less than under the Proposed Action. As a result, long-term cumulative impacts to GRSG would be less pronounced under this alternative.

3.18.3.3 Livestock Fencing Alternative

Cumulative effects under the Livestock Fencing Alternative would be the same as those discussed under the Proposed Action, except that an additional 7 acres would be temporarily disturbed.

3.18.3.4 No Action Alternative

Cumulative impacts to special-status species for the No Action Alternative would be the same as those described for the Proposed Action except that there would be 1,167 fewer acres of habitat disturbance and reduced habitat fragmentation within the CESA.

3.18.4 Potential Monitoring and Mitigation Measures

Issue: Potential direct impacts to pygmy rabbits from mine construction.

Mitigation Measure SSS-1: Pre-construction clearance surveys for pygmy rabbits would occur prior to any surface disturbance. Pygmy rabbits are known to be active above ground throughout the year; therefore, clearance surveys would be required to be conducted regardless of the season. If occupied pygmy rabbit habitat is identified during pre-construction clearance surveys and occupied (especially natal) burrows are found, then new disturbance would not occur within 200 feet of those areas. If disturbance of these areas is determined to be unavoidable, consultation with the appropriate BLM and NDOW wildlife biologists would occur to develop avoidance strategies and mitigation techniques.

Effectiveness: By implementing mitigation measure **SSS-1**, potential direct impacts to pygmy rabbits and their habitat would be reduced.

Issue: Mortality resulting from GRSG striking fencing could impact GRSG populations within the project area.

Mitigation Measure SSS-2: For the proposed project alternatives, the installation of fencing located within greater sage-grouse PHMA, GHMA, and OHMA (based upon lek proximity and topography) should be minimized to the extent possible. In areas where the installation of fencing is unavoidable, in coordination with the BLM and NDOW, fencing would be modified or marked in a manner that results in increased visibility to greater sage-grouse. NDOW currently recommends using the NRCS Fence Collision Risk Tool to determine the need for fence marker placement.

Effectiveness: By implementing mitigation measure SSS-2, HES would be able to minimize mortalities of greater sage-grouse resulting from collisions with mine operations fencing.

Issue: The loss of GRSG PHMA and GHMA resulting from mine expansion.

Mitigation Measure SSS-3: Off-site compensatory mitigation for GRSG is a voluntary action under the 43 CFR 3809 Regulations and BLM IM 2018-093. HES is considering whether to voluntarily conduct the proposed potential mitigation measures for GRSG. Accordingly, the voluntary mitigation measures are presented in full in **Appendix A** of this EIS. These mitigation measures have been included in the analysis in the event that HES volunteers to participate in conducting off-site and/or compensatory mitigation for GRSG. HES is required to complete reclamation of the surface disturbance associated with the Rossi Mine for both mining operations and exploration activities, as outlined in this document at section 2.3.12. Even if HES does not volunteer to conduct any or parts of the potential mitigation measures described in **Appendix A**, reclamation would restore sage grouse habitat within the project area that is disturbed by the mining operation and exploration activities. Reclamation activities would be completed either concurrently when facilities are no longer needed or at the end of the mine life, except for approximately 194 acres of open pit for the Proposed Action or 144 acres of open pit for the Reconfiguration Alternative that would remain at the end of the mine life.

3.18.5 Residual Impacts

Assuming successful reclamation of all project components, residual impacts to special-status species habitat would include the permanent loss of approximately 194 acres and 144 acres for the Proposed Action and Reconfiguration Alternative, respectively. These residual impacts would be associated with open pits, which would not be revegetated. Residual impacts to GRSG habitat could be offset through HES's voluntary participation in funding and implementation of habitat enhancement projects adjacent to the Rossi Mine or through participation in the State of Nevada CCS as discussed in **Appendix A** of this EIS.

Depending on the success of final reclamation, fragmentation and the loss of shrub dominated communities would represent a long-term change in wildlife habitat composition (i.e., shrub-dominated communities to grass/forb-dominated communities). No residual impacts for special-status plant species are anticipated.

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3.19 Land Use and Access

The study area for land use encompasses the area within two miles of the proposed PoO boundary. The CESA for land use includes the Carlin Trend north of I-80. The study area for access includes the main roads within the proposed PoO boundary (the area within the proposed PoO boundary is defined as the project area), the Boulder Valley Road (the primary access road from the Dunphy Plant to the Rossi Mine), and I-80 between Battle Mountain and Elko. The CESA for access is the same as the study area (**Figure 3.19-1**).

3.19.1 Affected Environment

3.19.1.1 Land Use

The proposed project is located in Elko County, Nevada; the fourth largest county in the lower 48 states encompassing 10,995,840 acres (Elko County 2010). The majority of the land area in the county is managed by the BLM and other federal agencies, as shown in **Table 3.19-1**.

Table 3.19-1. Surface Ownership in Elko County, Nevada

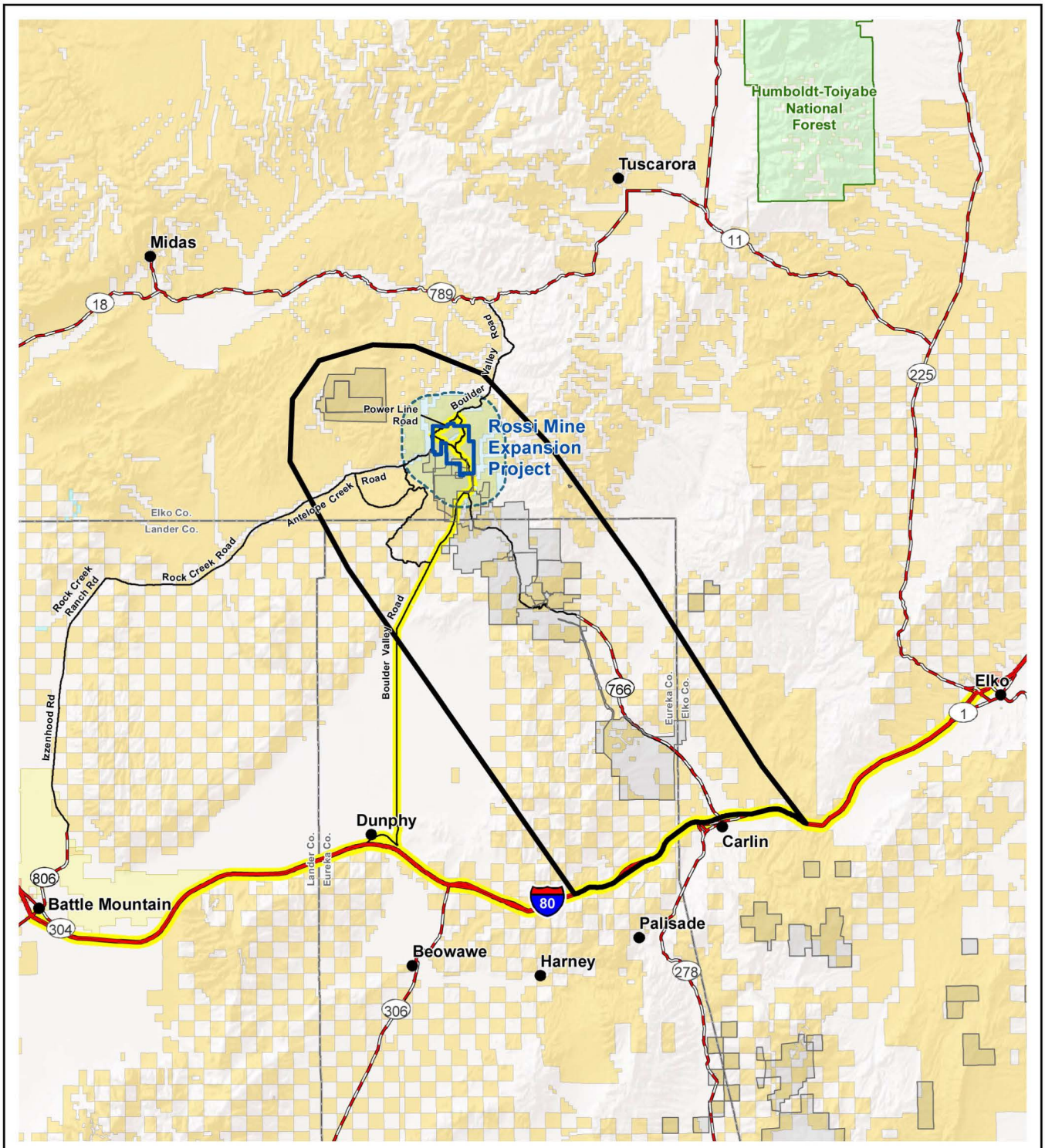
Agency	Acres	Percent of Total Surface Acres
Bureau of Land Management	6,882,161	62.6
U.S. Forest Service	1,073,143	9.8
U.S. Fish and Wildlife Service	26,872	0.2
U.S. Department of Defense	15,163	0.1
Tribal	160,823	1.5
State	15,241	0.1
Private /Local Government	2,822,437	25.7
Total	**10,995,840**	**100.0**

Source: Elko County 2010.

Public lands in the study area are managed under the 1987 BLM Elko Resource Area RMP. The RMP has designated the study area lands as open to locatable mineral entry (BLM 1986b, 1987a). Elko County manages lands according to the 2010 Elko County Public Land Use and Natural Resources Management Plan. The plan encourages continued mining under Policy 14-1, which states, “Retain existing mining areas and promote the expansion of mining operations and areas not specifically withdrawn” (Elko County 2010).

The study area includes approximately 25,521 acres, including 20,513 acres of BLM-administered land and 5,030 acres of private land controlled by BGMI and leased to HES. HES is currently authorized up to 912 acres for mining- and exploration- associated disturbance (SRK 2014g).

Land uses in the study area consist primarily of mining, mineral exploration, utility ROWs, livestock grazing, wildlife habitat, and dispersed recreation. The Proposed Action would allow exploration activities to occur anywhere within the project area. Barite has been mined from the Rossi Mine using open pit methods since 1947. The Rossi Mine is located on the northwest end of the Carlin Trend with large gold mines operated by BGMI and Newmont Mining Corporation to the south. The Arturo Mine, operated by BGMI, is adjacent to and overlaps the study area. The Hollister Underground Mine is located approximately 7.5 air miles northwest of the Rossi Mine and can be accessed by the Antelope Creek Road (SRK 2014g).



Mine Boundary (Proposed)
Access Direct and Cumulative Effects Study Area
Land Use Direct Effects Study Area
Land Use Cumulative Effects Study Area
Interstate Highway
U.S. Highway
State Highway
Other Road
Source: BLM 2015g, SRK 2014a, USCB 2014d.

Mine Plan Boundaries

Land Status

Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
Forest Service
State
Private

Rossi Mine Expansion Project EIS

Figure 3.19-1

Land Use and Access Cumulative Effects Study Area

0 1 2 3 4 5 10 Miles
0 1 2 3 4 5 10 Kilometers
1:600,000

N

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Livestock grazing is also a major land use in the vicinity. The Rossi Mine is located within the Twenty-Five Allotment, the only allotment in the area. The project area is currently not fenced, allowing the free movement of livestock and wildlife. There is no hay production or irrigated croplands within the study area. Hay is grown on irrigated private lands in Boulder Valley. Additionally, seasonal dispersed recreation activities in the area of the Rossi Mine include hunting, camping, limited off-road vehicle use, sightseeing, photography, hiking, rock climbing, and visiting old mining camps (BLM 2012a).

The nearest town is Battle Mountain, located about 50 road miles from the Rossi Mine. The nearest residence to the Rossi Mine is the St. John's Ranch, located about 5 air miles to the north. The St. John's Ranch is a seasonally used cowcamp owned by the 25 Ranch. The nearest year-round permanent residence is the TS Ranch headquarters located more than 20 air miles southwest of the Rossi Mine in Boulder Valley. The closest recreation area is the Willow Creek Reservoir, approximately 11 air miles to the north.

There are 25 land use authorizations and ROWs on BLM-administered land in the study area, as shown in **Table 3.19-2**.

Table 3.19-2. Land Use Authorizations and Rights-of-Way in the Study Area

Serial Number	Holder	Description/Use	Authorization Size[1] (Acres)
Authorized			
NVN-007639B	Sierra Pacific Power Company	Power transmission line	640
NVN-038874	Sierra Pacific Power Company	Power transmission line	9
NVN-047775	Sierra Pacific Power Company	Power transmission line	202
NVN-053160	Sierra Pacific Power Company	Power transmission line	128
NVN-055780	Barrick Gold of North America	Mineral Patent-Gold	316
NVN-058227	Newmont Gold Company	Mineral Patent-Gold	124
NVN-070250	Marigold Mining Company	Surface Management Plan-Gold	802
NVN-070547	Halliburton Energy Services	Surface Management Plan-Barite	912
NVN-070708	Barrick Goldstrike Mines	Surface Management Plan-Gold	9,062
NVN-070874	Barrick Gold Exploration	Surface Management Plan-Gold	51
NVN-071087	Newmont Mining Corporation	Surface Management Plan-Gold	1,271
NVN-071212	Trio Gold Corporation	Surface Management Plan-Gold	41
NVN-071213	Barrick Gold Exploration	Surface Management Plan-Gold	60
NVN-071216	Barrick Gold Exploration	Surface Management Plan-Gold	84
NVN-071234	Barrick Goldstrike Mines	Surface Management Plan-Gold	213
NVN-071238	Barrick Gold Exploration	Surface Management Plan-Gold	9
NVN-079647	Barrick Gold of North America	Geothermal Lease	1,703
NVN-087946	Barrick Goldstrike Mines	Surface Management Plan-Gold	2,774
NVN-089776	Sierra Pacific Power Company	Power transmission line	<1
NVN-090441	Sierra Pacific Power Company	Communication Site Coyote Creek Reflector	<1
NVN-090665	Energy Operations Management Inc., Prospector Pipeline Company	Natural gas pipeline connecting the Ruby Pipeline to the Barrick Goldstrike Mine	85
NVN-091284	Sierra Pacific Power Company	Power transmission line	14
NVN-091724	Sierra Pacific Power Company	Power transmission line	59

Table 3.19-2. Land Use Authorizations and Rights-of-Way in the Study Area

Serial Number	Holder	Description/Use	Authorization Size[1] (Acres)
Authorized			
NVN-092787	Barrick Goldstrike Mines	Road ROW	106
NVN-092976	Sierra Pacific Power Company	Power transmission line	22

Source: BLM 2015b.

[1] Acres have been rounded to the nearest integer.

3.19.1.2 Access

Access to the study area is from I-80 at the exit for Dunphy (exit 254) 32 miles north on the Boulder Valley Road. From the Rossi Mine, the Boulder Valley Road extends north and eventually connects to the Midas-Tuscarora Road (County Road 724), located north of the study area. Two additional roads cross the study area and connect to the Boulder Valley Road, the Antelope-Boulder Connector Road, which is a public road that connects the Boulder Valley Road to the Antelope Creek Road, and NV Energy's Powerline Road, which is a ROW 2-track road for the power line (**Figure 2-3** and **Figure 3.19-1**). All three roads are public access roads.

The Boulder Valley Road is an improved gravel road maintained by HES from the Dunphy Plant to the Rossi Mine under a road maintenance agreement with Elko County (HES 2014a). A short portion of the road immediately north of the PoO boundary near the Coyote Substation is also maintained by HES; however, north of this area the road is not maintained by HES. Authorized exploration roads and various secondary roads providing access to drill sites, ponds, and wells are located throughout the study area (SRK 2014a). HES maintains roads on a minimum basis within the PoO boundary. Ore concentrate is trucked from the mine to the Dunphy Plant via the Boulder Valley Road with up to 20 truck trips per day, 4 days per week, although the number of trips varies based on mining activity, jig plant processing rates, and the barite content of mined ore deposits (HES 2014a). The Boulder Valley Road is also used by other mining operators, utility companies, ranchers, and recreationists. North of the study area, this road is used to access the Willow Creek Reservoir by hunters and recreationists including anglers and campers (SRK 2014g).

The Antelope Creek Road is not maintained by HES and is used by mining operators to reach the Hollister Underground Mine (7.5 air miles to the northwest), the Tuscarora Midas road, and private property in the area (SRK 2014a). Powerline Road branches off the Antelope-Boulder Connector Road in the northwestern corner of the PoO boundary and connects to the Boulder Valley Road at the Coyote Substation, just north of the PoO boundary. Rossi Mine employees and contractor personnel commute from Battle Mountain, Carlin, Elko, and Spring Creek via I-80 to the Dunphy Plant and from there are shuttled to the mine in buses or vans. Several employees car pool to the plant and employees occasionally drive to the mine along with some vendors and contractors (SRK 2014a).

Traffic on I-80 includes local (residential, recreational, business, etc.) and regional traffic (for example, Battle Mountain or Elko to Carlin) and interstate through-traffic. Traffic in the study area is generated by mining activities, ranchers, hunters, and recreationists. As shown in **Table 3.19-3** the percentage difference between 2010 and 2014 traffic volumes on the three sections of 1-80 ranged from a 3 percent decrease to a 10 percent increase. The annual average volume on the 1.3-mile stretch of Boulder Valley Road in 2014 was 50 percent higher than the 2010 annual average volume. **Table 3.19-3** Annual Average Daily Traffic Volumes, 2010 and 2014 presents the annual average daily traffic recorded by NDOT in 2010 and 2014 on three sections of 1-80 and one section of Boulder Valley Road (a 1.3-mile stretch north of the frontage road) located within the CESA for access.

Table 3.19-3. Annual Average Daily Traffic Volumes, 2010 and 2014

Location	Annual Average Daily Traffic/Year		Change in Daily Traffic (%)
	2010	*2014*	
I-80, east of Battle Mountain	6,700	7,100	6
I-80, east of Dunphy	7,200	7,000	-3
Boulder Valley Road (1.3 miles north of frontage road)	60	90	50
I-80, east of Carlin	10,000	11,000	10

Source: DOT 2015a.

As shown in **Table 3.19-3**, traffic volumes increased from 6 to 50 percent at each location between 2010 and 2014, except for traffic on I-80 east of Dunphy which decreased by 3 percent.

In another study (SRK 2015c), traffic counts were also recorded on the Boulder Valley Road and the Antelope Creek Road over a period of 22 months, from October 2013 through June 2015. During that time the Antelope Creek Road experienced 2.6 times more traffic than the Boulder Valley Road, or 165 percent more traffic. The maximum vehicles per day on Antelope Creek Road occurred in June and July, with 33 and 27 vehicles recorded. On the Boulder Valley Road the maximum number of vehicles recorded were 14 and 10 vehicles per day in October and November, respectively. During the remaining months traffic counts were similar with an average count of six vehicles on the Antelope Creek Road and three vehicles on the Boulder Valley Road (SRK 2015c). The difference in traffic counts between the two roads is likely attributable to seasonal recreational traffic and mining operators on the Antelope Creek Road and also because mining employees are typically shuttled to and from Dunphy and the mine. The Antelope-Boulder Connector Road, the Antelope Creek Road, and the Boulder Valley Road are not maintained or kept open in the winter months. These roads are only open on a seasonal basis during the spring to fall when ground conditions are dry.

3.19.2 Environmental Consequences

Direct impacts could occur if there were a conflict with existing land uses or ROWs, or restrictions in public access, such as locked gates or blocked access as a result of the mine operations. Indirect impacts may result from a shift in land use patterns to other areas adjacent to or near the mine. Indirect impacts would also occur if the project resulted in development of land uses not presently anticipated or prohibited other planned or proposed uses.

3.19.2.1 Proposed Action

Land Use

Approximately 3,731 acres are within the proposed PoO boundary, including 3,520 acres (94 percent) of BLM-administered land and 211 acres (6 percent) of private lands. A total of approximately 2,063 acres of surface disturbance is planned under the Proposed Action or previously existing or authorized, of which 1,854 acres would be on public lands. This would add approximately 1,167 acres of new surface disturbance to the current authorization of 896 acres of surface disturbance, an increase of approximately 30 percent (**Table 2-10**). Disturbance on public lands would increase 52 percent, from 694 acres to 1,161 acres (**Table 2-10**). Proposed activities on private lands include expansion of the Queen Lode Pit and QLC pit (approximately 4 acres) and the growth media stockpile (approximately 2 acres) and support facilities (approximately 1 acre) (**Table 2-10**).

Under the Proposed Action, surface disturbance for exploration and mining activities would increase by approximately 1,167 acres within the proposed PoO boundary and the Twenty-Five Allotment, reducing the area available for dispersed recreation and livestock grazing. Compared to the total public lands available for these activities in the project vicinity, loss of this area would be considered minor.

Section 3.11, Recreation and Wilderness, and Section 3.16, Range Resources, address the effects on these activities in more detail. Once reclamation is completed and vegetation re-established, grazing could resume on approximately 973 acres.

Existing ROW authorizations within the proposed project boundary would not be affected or require relocation. New ROW authorizations would not be required for construction of a new communications tower and the power distribution line extensions as these facilities are located within the proposed PoO boundary. The communications site would be located near the Coyote Creek reflector site near the eastern expansion boundary (**Figure 2-4**).

The existing power distribution lines would be extended from the stepdown converter east of the jig plant to provide power to the jig plant area, potable water system, production wells, ready line, maintenance areas, and office buildings. Approximately 7,920 feet of new 24.9 kV distribution line is proposed including approximately 313 feet within the existing jig plant area (**Figure 2-4**). All new power distribution lines would be buried. Construction of the new communications site and the power distribution line extensions would not adversely affect land use or power availability in the area.

Under the Proposed Action, exploration would continue throughout the project area as described in Section 2.3.10, Exploration. Direct impacts to land uses and public access from exploration would include short-term loss of approximately 67 acres. Locations of future exploration activity depend upon the results of drilling activity; therefore, specific land use types that would be impacted cannot be identified. Exploration activities would not block access to public lands within the project area as temporary roads and drilling pads would not be permanently fenced. During exploration, HES may install temporary signage and fencing to notify the public of active drilling pads and equipment. Indirect impacts resulting from exploration activities would include increased fugitive dust, vibration, and localized soil compaction during road and pad construction and active drilling operations. Exploration would also result in an increase of fragmentation of the existing vegetation communities within the project area. This localized fragmentation may result in a small increase of OHV travel along temporary exploration roads within the project area.

Following reclamation of disturbed lands and reestablishment of vegetation, land uses would resume in the majority of the project area, consistent with BLM land use plans and guidelines. Approximately 194 acres of new open pit areas (public and private lands) would not be backfilled or reclaimed, remaining permanently unavailable for pre-mining land uses. Berms would be placed around the open pits along with signs for public safety.

Access

The existing infrastructure necessary to support mining operations already exists and construction of new facilities such as extended power lines, communications site, and ancillary support facilities would be gradually installed as needed over the 8-year expansion period. The majority of mining-related traffic would be associated with expansion of the open pits and WRDFs within the project area. The types of traffic generated by the proposed activities would be similar to the types of activities already occurring, but the volumes would fluctuate over the 8-year expansion period.

Workers would continue to commute via I-80 to the Dunphy Plant from Battle Mountain, Carlin, Elko, and Spring Creek. The number of workers commuting on I-80 could increase to a maximum of 360 at one time, including up to 60 HES employees and 300 mining contractor employees. The HES employees work 5 days per week, while mining contractor employees work three shifts per day. The resulting increase in traffic volumes along I-80 from commuters at the locations identified in **Table 3.19-3** would be minimal and vary throughout the day.

Traffic on the Boulder Valley Road would consist of vans and buses transporting workers to and from the mine to the Dunphy Plant. At maximum employment, HES employees would be transported in up to four vans per day over a 5-day work week. The mining contractor employees would require two buses per shift or six buses per day over the 5-day work week. Trucks haul ore from the mine to the plant over two 12-hour shifts per day for 4 days per week, with up to 20 truck trips per day. This equates to a maximum of 30 vehicle trips per day over 4 days (HES 2015f). During the day, the public traveling along the Boulder Valley Road could encounter up to 16 vehicles per day. Specific construction activities and material deliveries could periodically increase the number and type of vehicles traveling on the roads, but these

increases would be minimal and over short periods of time. HES would continue to maintain the Boulder Valley Road as needed to maintain the safety of workers and traveling public. Overall, effects of mine expansion on traffic, road conditions, and traveler safety are anticipated to be minor.

Sections of the Boulder Valley Road and the Antelope-Boulder Connector Road would be realigned to maintain public access through the mine area. Approximately 2,890 feet of the Boulder Valley Road would be realigned to the east to allow expansion of the proposed QLC Pit and approximately 2,879 feet of the Antelope Creek Road would be realigned to the west for expansion of the King Pit (**Figure 2-3**). The realigned sections would be constructed prior to expansion of the pit so public access would be maintained at all times through the area with one exception. Public access through the mine site would be temporarily restricted when HES conducts blasting in the pits. The Boulder Valley and Antelope-Boulder Connector Roads within the project area would be temporarily closed to the public during blasting of the pits, moving equipment throughout the mine site, and when conducting road maintenance. These road segments within the project area would be closed on average once a day for 15 minutes each day during pit blasting for public safety. These activities usually cause temporary delays that last a few minutes. Occasionally, delays may last for longer periods of time. The public road segments within the project area would be closed by locking gates or road barriers to prevent public access into the mine site during blasting activities. Although the temporary road closures would be an inconvenience to the public traveling through the mine site to other destinations, the short duration of the road closures would not prevent or unduly delay the public from traveling to their ultimate destination.

3.19.2.2 Reconfiguration Alternative

Impacts on land use and access under the Reconfiguration Alternative would be the same as those described for the Proposed Action, with the exception that the acres of surface disturbance on public lands would be 151 acres less, for a total of 1,016 acres. This equals an 8 percent reduction in disturbance compared to the Proposed Action. The final footprint of the Dawn WRDF would be reduced to maintain a minimum 2,000 foot wide undisturbed corridor for mule deer migration as shown in **Figure 2-8**. In addition, approximately 50 acres of the QLC Pit and 10 acres of the Dawn Pit would be backfilled. Reclamation of the backfilled areas would begin as soon as possible to reduce the duration of surface disturbance. The area of open pits on public lands would be correspondingly reduced by 50 acres, with a total of 144 acres of new open pit areas remaining that would not be reclaimed.

3.19.2.3 Livestock Fencing Alternative

Impacts on land use and access would be the same as those described for the Proposed Action, with the exception that a fence would be installed around the mine facilities to exclude livestock from the area as shown on **Figure 2-15**. The fence would encompass approximately 2,967 acres and slightly increase surface disturbance on public lands by approximately 7 acres more than the Proposed Action. Although the fence would reduce the area of public lands available for grazing within the Twenty-Five Allotment, this alternative would also reduce the risk of vehicular collisions with livestock and/or exposure to expanded mining activities. Loss of this area to livestock grazing would be minor given the size of the allotment (524,083 acres) and the potential benefit of increased safety for livestock. See Section 3.16, Range Resources, which addresses the effects on livestock grazing in detail.

After reclamation is completed, vegetation re-established, and the fence removed, grazing could resume on approximately 1,543 acres of proposed and existing/authorized disturbance that would be reclaimed. Acres permanently lost in the Twenty-Five Allotment from open pit expansion would be the same as the Proposed Action.

3.19.2.4 No Action Alternative

Under the No Action Alternative, the BLM would not approve expansion of the Rossi Mine and authorized mining and exploration operations would continue at current production rates. Portions of the King and Queen pits may continue to be partially backfilled under current authorizations. No surface disturbance would occur that has not been previously approved. Once mining operations have ended, reclamation would begin consistent with the existing approved reclamation plan, permits, and applicable federal and state closure and reclamation requirements.

Land Use

Current authorization for mining-related surface disturbance is 908 acres (**Table 2-3**), of which approximately 707 acres (78 percent) is on public lands and approximately 201 acres (22 percent) is on private lands. As of 2014, approximately 464 acres of surface disturbance existed within the mine boundary (SRK 2014a), approximately 52 percent of the approved surface disturbance. Exploration activities would continue as approved within the plan of operations boundary.

Mining and exploration operations would continue under the terms of current permits and approvals authorized by the BLM and the State of Nevada.

Land uses would continue to be mineral exploration and mining operations (including reclamation) livestock grazing, dispersed recreation and wildlife habitat. These activities would continue as they currently occur.

Access

Traffic generated by mine operations would continue to use the Boulder Valley Road and employees would continue commuting via I-80 to the Dunphy Plant before being shuttled or bussed to the mine site. HES maintains the Boulder Valley Road from Dunphy to the mine boundary on a year-round basis, as needed. The traffic associated with the mine is relatively light (up to 20 vehicles per day) and primarily related to ore hauling and vehicles transporting workers to and from the mine. Volumes fluctuate depending on the specific activities underway such as excavation or road maintenance. However, traffic is still well below the volume the road can accommodate. Commuter traffic on I-80 is already reflected in existing counts.

Access to public lands would remain unrestricted with signs posted throughout the mine site warning the public of potential hazards and active mining areas.

3.19.3 Cumulative Impacts

The CESA for land use includes the Carlin Trend north of I-80 as shown in **Figure 3.19-1**. The CESA for access is the same as the study area for access (**Figure 3.19-1**). Past, Present, and RFFAs are discussed in Section 3.2, Past, Present, and Reasonably Foreseeable Future Actions. RFFAs for mining and exploration activities are identified in **Table 3.2-1**; their locations are shown in **Figure 3.2-1** and **Figure 3.2-2**. **Figure 3.2-2** also illustrates some ROW actions.

3.19.3.1 Proposed Action

Land Use

A total of 37,182 acres of surface disturbance has occurred from past and present actions on the Carlin Trend north of I-80 related to mining, exploration, and pipeline and transmission line development. RFFAs would disturb an additional 4,467 acres, for a total of 41,649 acres from the same development activities. The Proposed Action would increase surface disturbance by 1,167 acres, for a total of approximately 42,816 acres. This equates to an incremental increase of 2.8 percent over past, present, and RFFAs.

Access

The amount of traffic generated by the past and present mining operations occurring in the Carlin Trend is unknown. The traffic created by the past and present mining operations in the Carlin Trend is already occurring on the Boulder Valley Road and I-80. Predicting the amount of traffic that would result from the RFFAs is also unknown, but would probably be proportional to the current mining operations. The effects of the amount of traffic on I-80 and the Boulder Valley Road due to the RFFAs would be dependent upon the time of implementation and its relationship to the current operations as well as the extent and type of RFFA activity. It is anticipated that the cumulative effects of the Rossi Mine Expansion Project traffic and safety would be minor.

3.19.3.2 No Action Alternative

Under the No Action Alternative, there would be no additional surface disturbance beyond the approved 912 acres. Traffic generated by past, present, and RFFAs is already occurring on I-80 and the Boulder Valley Road. Traffic would decrease when mining operations cease and cumulative effects under the No Action Alternative would be minimal.

3.19.3.3 Reconfiguration Alternative

Under the Reconfiguration Alternative, cumulative effects from surface disturbance would be similar to those described for the Proposed Action, except that 151 acres less would be disturbed than under the Proposed Action, for a total of 42,665 acres, an incremental increase of 2.8 percent. Effects on access would be the same as the Proposed Action.

3.19.3.4 Livestock Fencing Alternative

Under this alternative, cumulative effects from surface disturbance would be similar to those described for the Proposed Action, except that surface disturbance would increase by 7 acres for a total of approximately 42,823 acres (an incremental increase of 2.8 percent over past, present, and RFFAs). Effects on access would be the same as the Proposed Action. Upon successful reclamation and revegetation as determined by BLM and NDEP, the livestock fence would be removed.

3.19.4 Potential Monitoring and Mitigation Measures

No monitoring or mitigation measures are proposed for land use or access.

3.19.5 Residual Impacts

All surface disturbance would be reclaimed after the mine closes, with the exception of approximately 194 acres of proposed and existing/authorized open pits (public and private lands) that would not be backfilled or reclaimed; the land would be returned to pre-project land uses. Berms would be placed around the pit perimeters and signs posted warning the public of the open pits. After mine closure and completion of reclamation, there would be no project-related traffic or road maintenance and no residual access impacts from the proposed project.

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3.20 Noise

The proposed PoO boundary for noise effects encompasses an area within a 5-mile radius of the proposed PoO boundary. The CESA includes an area within approximately 10 miles of the study area as shown in **Figure 3.20-1**. The 5-mile direct noise effects study area is based on the estimation, derived from previous comparable projects, that mine noise would not exceed acceptable levels beyond that distance. The CESA is based on a doubling of the direct noise effects study area, assuming a comparable source, or sources, would have a similar direct effects radius.

This section discusses potential noise effects from the proposed project to humans. For a summary of project-related noise impacts to wildlife, refer to Section 3.17, Wildlife and Aquatic Biological Resources, and Section 3.18, Special Status Species.

3.20.1 Affected Environment

Describing the environment potentially affected by noise from the proposed project involves identifying noise-sensitive receptors and existing noise sources in the study area, characterizing terrain features that may affect noise transmission, and determining existing noise levels.

The proposed project is located in a remote area of western Elko County, just north of the Eureka County line, where the only signs of development are existing mines and a few remnants of historic mining projects. There are no occupied ranches within 5 miles of the proposed PoO boundary. The nearest residence to the Rossi Mine is the St. John's Ranch, located about 5 air miles to the north. The St. John's Ranch is a seasonally used cowcamp owned by the 25 Ranch. The nearest year-round permanent residence is the TS Ranch headquarters located more than 20 air miles southwest of the Rossi Mine in Boulder Valley. In effect, no human noise sensitive receptors have been identified within the area reasonably expected to be susceptible to project-related noise.

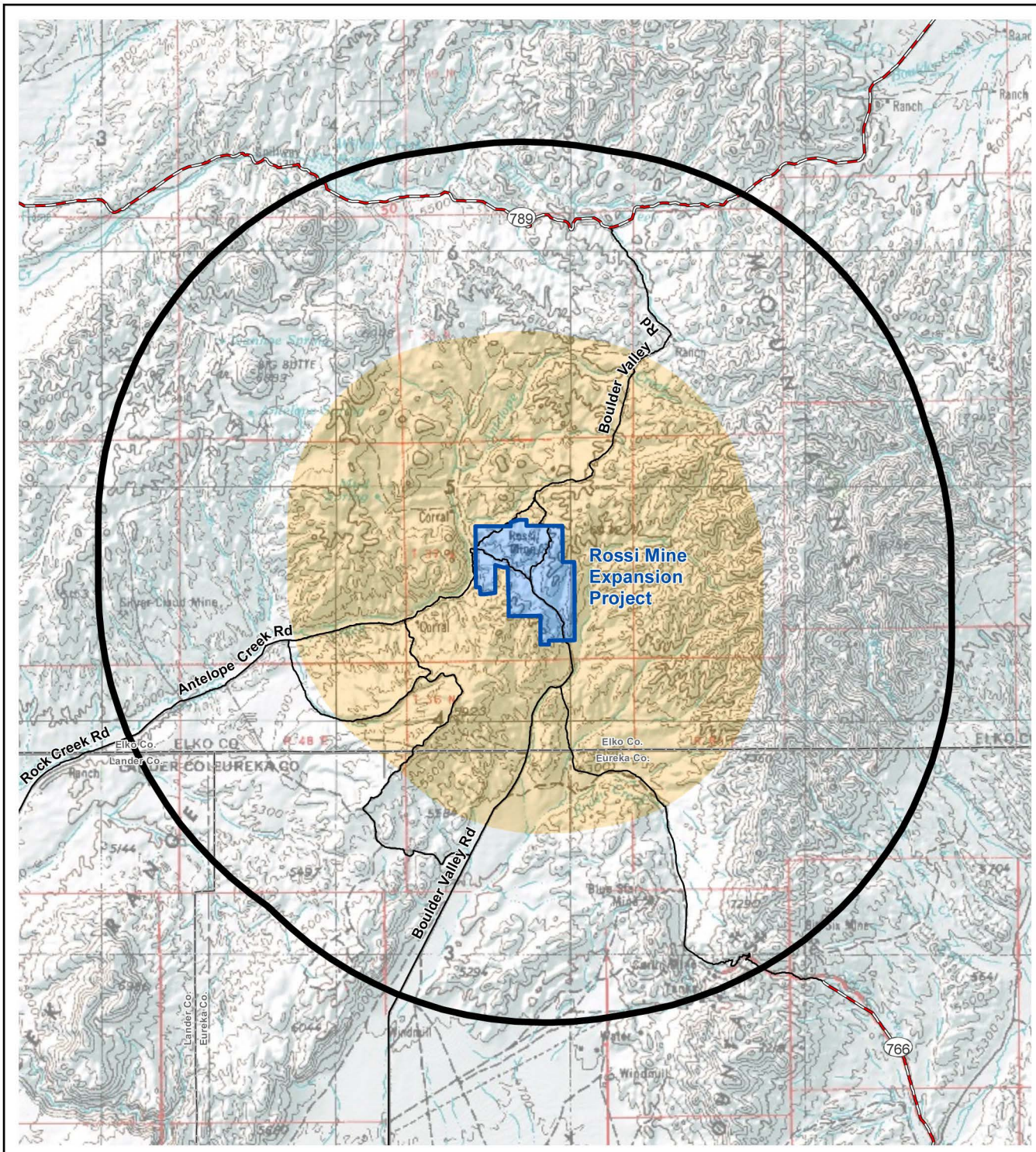
Man-made sources of noise in the study area include:

1. Arturo Mine located directly south of the proposed PoO boundary
2. Bootstrap Mine (inactive) located approximately 2 air miles south of the Rossi Mine
3. Goldstrike Mine located approximately five air miles southeast of the Rossi Mine.

Wind, insects, and birds are the principal natural contributors to ambient noise in the study area. Variations in wind speeds can have a dramatic effect on noise levels in the area. Mine traffic on the Boulder Valley Road, particularly from the Rossi Mine, generates periodic vehicular noise, although the traffic is generally light. There also may be a small amount of dispersed recreation-related traffic in the area on an occasional basis.

The study area is located along the western flank of the Tuscarora Mountains within the Boulder Flat and Rock Creek Valley Hydrographic Basins. The topography at the mine site area varies considerably with elevations ranging from approximately 5,200 feet amsl in the valley to 6,100 feet amsl along hilltops and ridgelines.

Because there are no occupied ranches or residences within 5 miles of the proposed PoO boundary no field noise measurements were taken for the purposes of characterizing existing noise levels near noise sensitive human uses. Refer to **Table 3.18-4** in Section 3.18, Special Status Species, for a summary of the noise data obtained at greater sage-grouse leks located within 3 miles of the northern PoO boundary.



Project Study Area

Noise Cumulative Effects Study Area
(Area within 10 miles of the Project)

Noise Study Area Boundary
(Area within 5 miles of the Project)

Source: BLM 2015g, SRK 2014a.

Rossi Mine Expansion Project EIS

Figure 3.20-1

Noise Study Area and Cumulative Effects Study Area

0 1 2 3 4 5 Miles

0 1 2 3 4 5 Kilometers

1:250,000

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Table 3.20-1 provides brief definitions of terms and noise metrics used to describe measured sound levels.

Table 3.20-1. Definition of Sound Measurements

Sound Measurements	Definition
Decibel (dB)	A unit-less measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
Equivalent Sound Level (L_{eq})	The equivalent steady state sound level that in a stated period of time would contain the same acoustical energy.
Percentile-Exceeded Sound Level (L_{xx})	The sound level exceeded "x" percent of a specific time period. L_{50} is the sound level exceeded 50% of the time and is called the median sound level. L_{90} is the sound level exceed 90% of the time and is called the residual or ambient sound level.
Day-Night Level (L_{dn})	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

As discussed in the noise effects analyses in Section 3.18, Special Status Species, ambient sound levels (L_{90}) are very low and averaged 18.6 dBA (**Table 3.18-4**).

Noise levels within 0.25 to 0.5 mile of existing mining activities likely are somewhat higher. In general, noise levels near active mining vary with the particular activity and with proximity of the activity to the observer. Measurements at other mine sites suggest noise levels commonly range between 45 dBA and 55 dBA at project boundaries (BLM 2012a). These levels typically result from equipment moving waste rock or ore and from drilling equipment. Blasting is likely to be noticeable at distances of 1 mile or more, but it is typically a minor consideration since it generally occurs once per day at the same time every day (at noon or time designated by mine such as during a shift change), because modern blasting techniques employ a series of small charges rather than a single large charge, and because the duration of a blast sequence is very short, on the order of less than 5 seconds. Because of these characteristics, blasting has very little effect on day-night average sound levels (Ldn).

For comparison purposes, **Table 3.20-2** illustrates noise levels associated with several common indoor and outdoor activities, which would help to understand noise emission levels from the proposed project.

Table 3.20-2. Typical Values of Sound Level of Common Noise Sources

Sound Pressure Level (dBA)	Common Indoor Noise Levels	Common Outdoor Noise Levels
110	Rock concert	
100		On platform by passing subway train
90		On sidewalk by passing heavy truck
80	Garbage disposal at 3 feet	On sidewalk by typical highway
70	Vacuum cleaner at 10 feet	On sidewalk by passing automobiles
60	Typical busy office	Typical urban area background
50	Dishwasher in adjacent room	Typical suburban area background
40	Theatre (background)	Quite suburban area at night
30	Voice – very soft whisper	Typical rural area at night
20	Isolated broadcast studio	
10		
0	Threshold of hearing	

Sources: Cowan 1994; Davis 1987; Caltrans 2013.

3.20.2 Environmental Consequences

Noise from project-related activities has the potential to affect noise sensitive human receptors. Noise impacts are commonly judged according to two general criteria: the extent to which a project would exceed federal, state, or local noise regulations, and the estimated degree of disturbance to people. Noise impacts to wildlife and special status species from the proposed project are discussed in sections 3.17 and 3.18, respectively. There are no specific federal, state, or local noise regulations that would govern at the proposed Rossi Mine project. Neither the State of Nevada nor Elko County has noise regulations governing mining and mineral exploration operations.

Without legislative guidance, the estimated degree of disturbance becomes the key factor in evaluating noise effects. The concept of human disturbance is known to vary with a number of interrelated factors, including not only changes in noise levels, but the presence of other, non-project related noise sources in the study area; peoples' attitudes toward the proposed project; the number of people exposed; and the type of human activity affected (e.g., sleep, quiet conversation or religious rituals as compared to physical work or active recreation).

In the absence of applicable noise regulations or specific standards, the noise analysis used 65 dBA L_{dn} as an absolute level criterion, and a 10 dBA increase above existing levels as a relative criterion, to evaluate projected project-related noise. L_{dn} is the average day sound level for a 24-hour, midnight to midnight period with 10 dBA added to the sound levels from 10:00 p.m. to 7:00 a.m. The 65 dBA L_{dn} criterion is based on the U.S. Department of Housing and Urban Development noise guidelines, which identify levels in excess of 65 dBA L_{dn} as “normally unacceptable” for exterior noise for residential areas (HUD 2009). A 10 dBA increase is perceived as a doubling of sound and is considered a likely indicator of community annoyance. The 10 dBA figure is based on USEPA studies showing that an increase of 10 dBA over existing background noise levels has commonly caused nearby residents to vigorously complain (USEPA 1974).

The study area has no residences or other gathering places, such as schools or churches that are commonly identified as noise sensitive areas. Because of this, it was necessary to conduct the noise analysis to identify anticipated distances to the threshold standards rather than potential noise levels at specific noise sensitive human receptors.

3.20.2.1 Proposed Action

The proposed Rossi Mine Expansion Project includes:

- Expansion of the PoO boundary;
- Expansion of the existing King Pit;
- Expansion of the existing Queen Lode and QLEE pits into the QLC Pit;
- Development of the Dawn Pit;
- Expansion of the existing King North WRDF;
- Construction of three new WRDFs (QLC North, QLC East, Dawn);
- Expansion or improvement of existing ponds for water storage and supply;
- Expansion and development of roads;
- Installation of buried power distribution lines within the PoO boundary only;
- Installation of a helicopter landing pad;
- Exploration throughout the project area; and
- Expansion or modification of ancillary support facilities.

The Proposed Action study area would encompass an area of 87,467 acres, or approximately 5.8 square miles. The main noise generating activity centers under the Proposed Action would include the expanded existing pits, the new Dawn Pit, the WRDFs, and the jig plant processing area. Ore crushing under the Proposed Action would continue as currently conducted under existing authorizations so the noise from the processing site is not expected to increase relative to existing operations.

Under the Proposed Action, exploration would continue throughout the project area as described in Section 2.3.10, Exploration. Direct impacts to visual resources from exploration would include short-term loss of approximately 67 acres. Locations of future exploration activity depend upon the results of drilling activity; therefore, specific locations that would be impacted cannot be identified. Indirect impacts resulting from exploration activities would include increased fugitive dust, noise, vibration, and localized soil compaction during road and pad construction and active drilling operations. Noise emissions from surface exploration activities would be generated by heavy equipment constructing drill sites, operating drill rigs, and drilling support equipment. Mine traffic traveling on on-site haul roads and the Boulder Valley Road would be an additional source of noise as well.

Barite mining commonly generates noise from two primary sources: operations of both stationary and mobile heavy equipment, and blasting to loosen waste rock and ore from the bedrock for removal by truck and shovel operations. Major sources of noise from mining and processing operations of the proposed project would include rock drilling, blasting, loading of rock and ore, ore and waste rock hauling, ore crushing, and crushed ore handling and distribution. Construction activity associated with development of new or expanded facilities and roads would be a source of noise as well. **Table 3.20-3** summarizes mobile equipment that is anticipated to operate under the Proposed Action.

Table 3.20-3. Rossi Mine Proposed Mobile Equipment and Associated Noise Emissions

Proposed Equipment[1]	Units	Sound Level at 50 feet (dBA)[2]
Front-end Loaders	13	90
Articulated Trucks	6	90
Haul Trucks	30	90
Over-the-Road Trucks	10	83
Track-mounted Drills	5	86
Bulldozers	12	85
Excavator/Track Hoes	4	85
Scrapers	3	84
Skid Steers	4	84
Graders	5	85
RC Drill Rigs	4	86
Core Drill Rigs	2	86
Backhoe	2	85
Water Trucks	8	83
Forklift	3	75
Service Vehicles	5	75
Mobile Generators	12	81
Truck Tractor and Lowboy	2	87
Light Vehicles	30	75
Cranes	2	85
Explosives Trucks	2	83
Portable light plants	12	78

[1] SRK 2014a
[2] Sound level reference data compiled from BLM 2012a and FHWA 2006

This equipment would be operated at various locations across the facility site. Because specific details on how and where equipment would operate across the project site are not available all equipment was conservatively assumed to operate concurrently with an acoustic center at the center of the project site.

Because there are no human noise sensitive receptors in the project area, no prediction of noise levels at specific human receptors was made. However, a general assessment was made of project-related noise relative to the 65 L_{dn} criteria described above. A number of factors determine how noise propagates over distance. The following are attenuation factors that were considered in this analysis (Hoover and Keith 2000):

1. Geometric attenuation – All sources were assumed to be point sources with an attenuation rate of 6 dB per doubling of distance
2. Atmospheric molecular absorption of 0.4 dB per 1000 feet
3. Shielding from topography based on site geometry and topography

To assess the potential distance to the 65 L_{dn} contour only geometric and atmospheric attenuation was considered because shielding from topography can vary substantially around the project site. This provides a very conservative estimate of project-related noise relative to 65 L_{dn}. Assuming concurrent

operation of all equipment listed in **Table 3.20-3**, the distance to the 65 L_{dn} contour is predicted to be about 9,200 feet or 1.74 miles. At a distance of 4.75 miles, project generated noise levels would drop below 10 dBA over background noise levels, conservatively assuming background noise levels at 40 dBA. There are no human noise sensitive uses within this distance.

Noise from project operation is predicted to be less than daytime L_{eq} noise levels. At night noise from project operation is either less than the existing L_{eq} noise level or no more than 10 dB above the existing L_{eq} noise level.

The Tosawihi Quarries are located approximately 9 air miles to the northwest from the proposed PoO boundary. Native American visitation or use of the Tosawihi Quarries would not be affected by noise generated from mining and mineral exploration activities based on the analysis presented above. Project related noise effects would be similar to existing authorized mining and exploration activities. Noise effects from the proposed project to recreational users and hunters and would be similar to noise impacts from existing authorized operations, and would not be affected based on the analyses presented above. Noise impacts from blasting are discussed below.

Blasting noise is not included in the noise level estimates noted above, mainly because mine blasting is typically an extremely brief event occurring an average of once per day at noon, depending on the operations plan for the pit. With this very brief and consistent type of noise emission, neither of the criteria noted for other mine-related noise is relevant to blasting noise. Although blasts are sometimes perceived by the layman to be a single explosion, mining blasts are actually a series of smaller, single-hole explosions. Each hole is sequentially delayed and detonated independently of the other holes. Less noise and ground vibrations are generated because several small blasts (delays) are detonated in sequence rather than as one large, instantaneous blast. Blasting can be further controlled by varying the amount of explosive, the type of delay, the delay sequence, the type of explosives, and the type of detonator used. Blasting for the proposed project would take place only during daylight hours typically at noon and would be conducted under strict MSHA safety procedures.

Table 3.20-4 shows typical peak air overpressure levels from blasting associated with a range of charge sizes and receiver distances (Caltrans 2013). Atmospheric and shielding effects are not included in this table.

Table 3.20-4. Typical Air Blast Levels from Blasting Operations

Distance (feet)	Charge Size (lbs)				
	10	20	40	80	160
	Air Blast Level (dB)				
100	128	131	133	135	138
250	119	121	124	126	128
500	111	114	116	119	121
1000	104	107	109	111	114
2000	97	99	102	104	107
4000	90	92	95	97	99
8000	83	85	87	90	92
16000	75	78	80	83	85
32000	68	71	73	75	78

Source: Caltrans 2013.

As discussed above there are no human noise sensitive uses in the project area so blasting would not affect human uses.

Blasting noise from the pits would likely be heard by Native Americans visiting the Tosawihi Quarries located approximately 9 air miles northwest from the proposed PoO boundary. Based on the data presented in **Table 3.20-4**, air blast noise levels could be in the range of 68 to 85 dB at the eastern portion of the Tosawihi Quarries. If topographic shielding (e.g., pit walls, landforms) and atmospheric attenuation are considered, these noise levels could be 15 to 20 dB less. An observer at the Tosawihi Quarries would likely hear blasting noise that could detract from the user experience; however, blasting noise would be lessened due to distance and topographic shielding, it would occur for a very short duration (less than 5 seconds), and occur once per day typically at noon that would alleviate much of the impact.

Blasting noise would have a negligible impact on recreationists and hunters due to the short duration of the blast, topographic shielding provided by pit walls, and frequency of blasting (once per day).

In summary, there are no human noise sensitive uses in the study area. Accordingly, the Proposed Action would not result in adverse effects to human uses. The analysis indicates that noise from project operation would not be more than 10 dB above existing L_{eq} sound levels.

3.20.2.2 Reconfiguration Alternative

Under the Reconfiguration Alternative, facility designs, operations schedules, anticipated workforce and employment, and Applicant Committed Environmental Protection Measures would be the same as the Proposed Action with the exception that sequencing of construction of the modified Dawn WRDF would be phased to ensure the conservation of a minimum 2,000 foot wide corridor for use by migrating mule deer, the final foot print of the proposed Dawn WRDF would be reduced to maintain a minimum 2,000 foot wide undisturbed corridor to allow for continued mule deer migration, the sequencing of the construction of the Dawn Pit would be modified, and construction of the QLC Pit and associated WRDFs would be modified (Sacrison Engineering 2015).

Noise emissions from this alternative are not expected to be measurably different from those anticipated from the Proposed Action. As a result, noise impacts associated with this alternative would be the same as the Proposed Action.

3.20.2.3 Livestock Fencing Alternative

Under the Livestock Fencing Alternative, a three or four strand, wildlife friendly livestock exclusion fence would be installed around the perimeter of the PoO boundary. All other aspects of the Proposed Action and Reconfiguration Alternative would remain the same if the Fencing Alternative is determined to be implemented with the project approval. Noise impacts associated with this alternative would be the same as the Proposed Action. The fence would be removed once the mine is reclaimed and revegetation is determined successful by the BLM and NDEP.

3.20.2.4 No Action Alternative

Under the No Action Alternative mining and processing operations at the existing Rossi Mine would continue under the terms of current permits and approvals as authorized by the BLM and the State of Nevada. The No Action Alternative would include completion of the closure and reclamation of the existing mine disturbance and reclamation of the surface exploration activities within the project area under the terms of current permits and approvals. Under the No Action Alternative, the proposed project would not be developed and subsequent noise impacts would not occur.

3.20.3 Cumulative Impacts

The CESA for noise is described in the introduction to Section 3.20 and is shown in **Figure 3.20-1**. The past, present, and RFFAs are discussed in Section 3.2, Past, Present, and Reasonably Foreseeable Future Actions. RFFAs for mining and exploration activities are identified in **Table 3.2-1**; their locations are shown in **Figure 3.2-1** and **Figure 3.2-2**. **Figure 3.2-2** also illustrates some ROW actions.

Past actions would have no effect on noise in the study area because noise emissions terminate at the completion of a project or activity. Any potential cumulative noise effects from present actions is included in the estimated background levels for the proposed project.

3.20.3.1 Proposed Action

Noise from RFFAs would not be expected to cause cumulative effects with noise from the proposed project because noise is localized to the area within 2 to 5 miles of an activity and there are no identified human noise sensitive receptors with the potential to be affected by project-generated noise.

3.20.3.2 Reconfiguration Alternative

Noise effects from the Reconfiguration Alternative would be the same as for the proposed project. No cumulative noise effects would be expected from this alternative.

3.20.3.3 Livestock Fencing Alternative

Noise effects under the Livestock Fencing Alternative would be the same as for the proposed project. No cumulative noise effects would be expected from this alternative. Upon successful reclamation and revegetation as determined by BLM and NDEP, the fence would be removed.

3.20.3.4 No Action Alternative

Under the No Action Alternative, noise levels from the proposed project area would decline after completion of subsequent reclamation activities and exploration activities. Noise from identified RFFAs also would decline over time as those projects are completed and reclaimed. Any cumulative noise effects in the study area would be minimal.

3.20.4 Potential Monitoring and Mitigation Measures

No impacts have been identified for human noise sensitive uses. Accordingly, no additional monitoring or mitigation measures are recommended for mine-related noise effects on humans.

3.20.5 Residual Impacts

Upon completion of the reclamation activities associated with previously approved projects and the proposed project, noise emissions would cease and there would be no residual noise impacts.

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3.21 Environmental Justice

The study area and CESA for environmental justice is the same as identified in Section 3.10, Social and Economic Values, and includes Elko, Eureka, and Lander counties, and the communities in these counties within commuting distance of the project and where the project related labor force may reside (**Figure 3.10-1**).These include the communities of Elko, Spring Creek, and Carlin in Elko County, Battle Mountain in Lander County, and Dunphy and Crescent Valley in Eureka County.

Executive Order 12898 requires federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. CEQ prepared *Environmental Justice Guidance under the National Environmental Policy Act* (CEQ 1997b) to assist federal agencies in meeting their environmental justice commitments under NEPA. This section assesses whether there are minority or low-income populations in the study area, and whether there is disproportionately high and adverse human health or environmental effects.

3.21.1 Affected Environment

3.21.1.1 Minority Population

CEQ (1997b) provides the following definition of the term “minority”: American Indian or Alaska Native, Asian or Pacific Islander, Black, and Hispanic. The guidance also instructs agencies to consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. In addition, impacts should also be assessed on Indian tribes.

CEQ guidance instructs the identification of minority populations where either:

a) the minority population of the affected area exceeds 50 percent, or

b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Table 3.21-1 provides summary information on the presence of racial and ethnic minorities in the study area. In all counties and communities the percentage presence of racial and ethnic minorities is less than in the state of Nevada as a whole.

Table 3.21-1. Racial and Ethnic Minorities in the Study Area and Nevada, 2014

County and Community	Total Population	White and Not Hispanic or Latino Individuals	Racial and Ethnic Minority Individuals	Racial and Ethnic Minority Percent
Nevada	**2,761,584**	**1,455,192**	**1,306,392**	**47.31%**
Elko County	**50,991**	**34,654**	**16,337**	**32.04%**
Carlin	2,409	2,141	268	11.12%
Elko	19,308	12,163	7,145	37%
Spring Creek	14,012	12,318	1,694	12.09%
Lander County	**5,930**	**4,169**	**1,761**	**29.70%**
Battle Mountain	3,253	2,211	1,042	32.03%
Eureka County	**1,761**	**1,665**	**96**	**5.45%**
Dunphy	N/A[1]	N/A[1]	N/A[1]	N/A[1]
Crescent Valley	388	388	0	0%

Source: USCB 2014b.

[1] The resident population is below the threshold of a distinct community as defined by the U.S. Census Bureau (USCB 2014b) and is therefore not reported as a separate community.

The racial and ethnic composition within Elko, Eureka, and Lander Counties and the state of Nevada is presented in **Table 3.21-2**. Whites are the largest ethnic group in all three counties and the state. Hispanics make up the next largest ethnic group in each county and the state. American Indians represent 4.9 percent of the population in Elko County, in part attributable to the presence of the Elko Band Colony, one of four colonies that comprise the Te-Moak Tribe of the Western Shoshone. American Indian population in Elko County is more than five times greater than the state as a whole on a percentage basis and would be considered meaningfully greater than the minority population in the general population. Therefore, for purposes of identifying environmental justice concerns, a minority population, as defined by the guidance, exists in the study area.

There are three Indian Reservations in Elko County. The Duck Valley Indian Reservation, home of the Northern Paiute and Western Shoshone, straddles the Nevada/Idaho border, more than 100 road miles from the project area. The South Fork or Lee Indian Reservation is home to the South Fork Band of the Te-Moak Tribe of the Western Shoshone. The reservation is located southeast of the City of Elko at the western base of the Ruby Mountains, approximately 85 highway miles from the project. The Indian Reservation in the town of Elko is home to the Te-moak Tribe of the Western Shoshone and the Elko Band. In addition to these three reservations in Elko County, the Battle Mountain Reservation, home to the Battle Mountain Band of the Te-Moak Tribe of the Western Shoshone, is located on the west side of the town of Battle Mountain. This reservation is located approximately 59 miles from the Rossi Mine.

Table 3.21-2. Race and Ethnicity Percentages by County

	Elko County (%)	Eureka County (%)	Lander County (%)	State of Nevada (%)
White	68	94.5	70.3	52.7
Black	1.0	0.5	0.1	8.0
American Indian, Eskimo, Aleut	4.9	1.5	2.6	0.9
Asian or Pacific Islander	1.2	0.5	0.6	8.0
Other and Two or More Races	1.3	0	3.0	3.2
Hispanic Origin of Any Race	23.6	3.0	23.3	27.2

Source: USCB 2014b.

3.21.1.2 Low-Income Population

The CEQ environmental justice guidance instructs agencies to consider low-income populations to be those below the poverty thresholds from the USCB. Similar to the identification of minority populations, the guidance also instructs agencies to consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect (CEQ 1997b).

For the purposes of this analysis, similar criteria were used for the identification of low-income populations as was used for the identification of minority populations. Low-income populations were identified whenever either of the following criteria was met:

a) The low-income population of a community in the analysis area exceeds 50 percent.

b) The low-income population percentage of a community in the analysis area is meaningfully greater than that in the geographic area of comparison (the state of Nevada as a whole).

Table 3.21-3. Poverty and Median Household Income in Study Area and Nevada, 2014

County and Community	Persons with Income Below Poverty Level	Proportion of Population Below Poverty Level	Median Household Income
Nevada	**423,578**	**15.60%**	**$52,205**
Elko County	**4,966**	**9.90%**	**$72,280**
Carlin	142	6.40%	$74,044
Elko	1,489	7.90%	$74,433
Spring Creek	542	3.90%	$94,513
Lander County	**707**	**12.10%**	**$76,558**
Battle Mountain	303	9.50%	$84,861
Eureka County	**285**	**16.30%**	**$68,403**
Dunphy	N/A[1]	N/A[1]	N/A[1]
Crescent Valley	6	1.50%	$103,977

Source: USCB 2014c.

[1]The resident population is below the threshold of a distinct community as defined by the USCB (USCB 2014b) and is therefore not reported as a separate community.

Table 3.21-3 shows that poverty rates in all communities in the study area are lower than in the state of Nevada as a whole, with the exception of Eureka County. Because the difference in poverty rates for Eureka County and for Nevada is less than 1 percentage point, Eureka County's poverty rate is not considered to be meaningfully greater than that for the state of Nevada. Based on these data, none of the counties and communities within the study area would be considered to have low-income populations under EO 12898. In conclusion, the demographic and economic data reviewed indicate no minority or impoverished populations in the proximity of the Rossi Mine.

3.21.2 Environmental Consequences

3.21.2.1 Proposed Action

The existence of disproportionately high and adverse human health or environmental effects associated with the Proposed Action depends on the existence of minority and low income populations in the study area, and on the existence of adverse impacts that may disproportionately affect those populations. The analysis indicates that the potential effects of surface exploration activities and mine expansion under the proposed project would not be expected to disproportionally affect any particular population. The area in the immediate vicinity of the proposed project has no resident population. The nearest residence is more than five miles distant from the proposed project, and away from the primary transportation and expected worker commuting routes. The absence of a nearby resident population of any economic or demographic characteristic greatly reduces the potential for environmental justice concerns. The nearest residential areas are the communities of Dunphy and Carlin, located 32 and 35 air miles, respectively, away from the proposed project. In the larger surrounding communities, racial and ethnic minorities do account for relatively high shares of the overall population, particularly in Elko and Lander counties; however, in those communities the overall incidence of poverty has been and remains below the statewide average.

CEQ guidance also requires consideration of "impacts that may affect a cultural, historical, or protected resource of value to an Indian tribe or a minority population, even when the population is not concentrated in the vicinity." The analyses in Section 3.5, Cultural Resources, and Section 3.6, Native American Traditional Values, determined that of the fourteen areas identified through tribal consultation efforts as important to the Western Shoshone within proximity to the Rossi Mine, three areas are located within the proposed PoO boundary and one area is located adjacent to the proposed PoO boundary under the Rossi Mine expansion. The remaining 10 locations are located near or within 20 miles of the project area and several additional areas of importance are located 20 miles or more from the project area. These areas of importance to the Western Shoshone people consist of a combination of prayer places, ceremonial gathering places for plants and medicine, hunting areas for wildlife, ceremonial trails, potential burial sites and spiritual sites. Details regarding the potential for these areas to be impacted by the Proposed Action are presented in Section 3.6, Native American Traditional Values.

Executive Order 12898 and CEQ regulations (CEQ 1997b) require that subsistence consumption of wildlife be taken into consideration when addressing potential disproportionately high and adverse human health and environmental effects to minority populations, low-income populations and Indian tribes. In scoping comments to this EIS, the Te-Moak Tribe stated that the tribe relies on wildlife resources for cultural, religious and subsistence purposes. The Rossi Mine is located within Area 6 Management Unit where hunting is common, particularly that of mule deer. There are no data readily available on subsistence hunting of mule deer by the Te-Moak Tribe or other tribes or subsistence hunting of mule deer by other neighboring communities to compare reliance on mule deer hunting for subsistence among communities. This analysis considered whether the Rossi Mine expansion could affect the availability of mule deer for subsistence hunting by the tribes. Based on the analysis conducted in Section 3.17, Wildlife and Aquatic Biological Resources, and Section 3.11, Recreation and Wilderness, this analysis concluded subsistence hunting of mule deer would remain available to the Te-Moak Tribe and not be impacted in any meaningful way as the Area 6 Management Unit remains open and accessible to hunting.

A potential environmental justice concern is "whether communities have been sufficiently involved in the decision making process". The BLM held scoping meetings in Battle Mountain and Elko, distributed information to the public about the proposed project through mailings and notices in area newspapers, and published a formal notice regarding the proposed project in the Federal Register. The BLM has been

involved in an extensive consultation effort to involve the Native American tribes on the proposed project as described in Section 3.6, Native American Traditional Values. Details regarding specific Native American consultation and coordination efforts are presented in **Table 3.6-1**.

Although the potential for adverse impacts to biological and cultural resources identified as important to Native American tribes residing (historically and currently) within the general area of the Proposed Action does exist, based on this analysis, no disproportionate, adverse environmental justice effects would be anticipated from the development of the Proposed Action.

3.21.2.2 Reconfiguration Alternative

The Reconfiguration Alternative would have the similar or reduced environmental justice effects as described for the Proposed Action. Consequently, no disproportionately adverse environmental justice effects would be expected from the Reconfiguration Alternative.

3.21.2.3 Livestock Fencing Alternative

The installation of a livestock fence around mine facilities as described in Chapter 2.0 would not result in disproportionately adverse environmental justice effects under this alternative. The fence would be removed once the mine is reclaimed and revegetation is determined successful by the BLM and NDEP.

3.21.2.4 No Action Alternative

Under the No Action Alternative, the proposed project would not be developed, and associated environmental justice impacts would not occur. Any potential adverse effects on environmental justice were previously addressed in the permitting process for the existing facilities.

3.21.3 Cumulative Impacts

The CESA for environmental justice includes Elko, Eureka, and Lander counties. The past, present, and RFFAs for mining and exploration activities are identified in **Table 3.2-1** and their locations are shown on **Figure 3.2-1** and **Figure 3.2-2**. **Figure 3.2-2** also illustrates some ROW actions.

The environmental justice analysis did not identify any disproportionate effects from the Proposed Action Reconfiguration Alternative, or Livestock Fencing Alternative. Consequently, no cumulative environmental justice effects are anticipated as result of the Proposed Action or alternatives.

3.21.4 Potential Monitoring and Mitigation Measures

No monitoring or mitigation measures for environmental justice impacts are proposed.

3.21.5 Residual Impacts

There would be no disproportionate adverse environmental justice effects on minority or low-income populations; therefore, no residual environmental justice impacts are expected.

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3.22 Energy and Climate Change

3.22.1 Affected Environment

3.22.1.1 Energy

Electricity is supplied to the Rossi Mine by NV Energy's overhead transmission lines from the Coyote substation. Diesel fuel, gasoline, and kerosene are delivered by truck to storage tanks on site and used to fuel on-site vehicles and engine-powered equipment. The Rossi Mine does not use natural gas or other fuels.

3.22.1.2 Climate Change

The Department of Interior's Secretarial Order 3349, entitled "American Energy Independence and Economic Growth", was issued on March 28, 2017, and among other provisions, directs the CEQ to rescind their guidance requiring agencies to consider greenhouse gas emissions and effects of climate change in NEPA documents (CEQ 2016). GHG emissions and climate change analyses were already completed for the proposed project for this EIS by the time the Secretarial Order 3349 was issued; therefore, BLM decided to disclose the results of the analyses in the EIS.

Earth absorbs heat energy from the sun and returns most of this heat to space as terrestrial infrared radiation. GHGs consist of compounds in the earth's atmosphere that absorb long-wave infrared radiation (heat) emitted from the earth's surface and lower atmosphere (the portion of the atmosphere extending from Earth's surface to approximately 4 to 12 miles above the surface), and radiate much of it back to Earth's surface thereby causing warming. This process, known as the greenhouse effect, is responsible for maintaining surface temperatures that are warm enough to sustain life. Most GHGs, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), water vapor, and ozone, occur naturally. Human activities, particularly fossil-fuel combustion, as well as the use of several industrial gases that are GHGs, lead to increased concentrations of GHGs in the atmosphere, thereby intensifying the warming associated with Earth's greenhouse effect. Of the GHGs emitted due to human activity, the greatest contribution to warming comes from CO_2 emissions.

Since the industrial revolution, when fossil fuels began to be burned in large quantities, concentrations of GHGs in the atmosphere have increased. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and the burning of fossil carbon fuel sources have caused CO_2 concentrations to increase by more than 40 percent, from approximately 280 parts per million (ppm) in 1750 to over 400 ppm as of July 2015 (NOAA 2015b). The concentration of CH_4 is now 150 percent above pre-industrial levels (USEPA 2015e). The rate of change has also been increasing as more industrialization and population growth is occurring around the globe. Data from the Mauna Loa CO_2 monitor (NOAA 2015b) in Hawaii document atmospheric concentrations of CO_2 going back to 1960, at which time the average annual CO_2 concentration was recorded at approximately 317 ppm. This record shows that approximately 70 percent of the increases in atmospheric CO_2 concentration since pre-industrial times occurred within the last 54 years. The Intergovernmental Panel on Climate Change (IPCC 2013) has predicted that the average global temperature rise between 1990 and 2100 could be as great as 4.8 degrees Celsius [°C] (8.6 °F), which could have substantial adverse impacts on the natural environment. Many scientists believe this buildup of GHGs in the atmosphere is changing Earth's energy balance and causing the planet to warm, which in turn affects sea levels, precipitation patterns, cloud cover, ocean temperatures and currents, ocean acidification, polar snow and ice accumulation, and other climatic conditions. Scientists refer to this phenomenon as "global climate change."

Climate change is occurring in the U.S. including in Nevada. The National Climate Assessment report "Assessment of Climate Change in the Southwest United States" (Garfin et al. 2013) defined the Southwest as Arizona, California, Colorado, Nevada, New Mexico, and Utah. The report made the following observations, which are consistent with human-caused emissions of GHGs:

- The Southwest is warming. Average daily temperatures for the 2001-2010 decade were the highest since 1901.
- Recent drought has been unusually severe relative to droughts of the last century, but some droughts in the paleoclimate record were much more severe.
- Recent flows in the four major drainage basins of the Southwest have been lower than their twentieth century averages. Streamflow totals in the Sacramento-San Joaquin Rivers, Upper Colorado, Rio Grande, and Great Basin were 5 percent to 37 percent lower during 2001-2010 than their twentieth century average flows.

Climate scientists have high confidence that the climate of the Southwest would continue to change through the twenty-first century and beyond in response to human-generated greenhouse gas emissions (Garfin et al. 2013):

- Warming would continue, with longer and hotter heat waves in summer.
- Average precipitation would decrease in the southern Southwest and perhaps increase in northern Southwest (e.g., Nevada).
- Precipitation extremes in winter would become more frequent and more intense (i.e., more precipitation per hour).
- Late-season snowpack would continue to decrease.
- Declines in river flow and soil moisture would continue.
- Flooding would become more frequent and intense in some seasons and some parts of the Southwest, and less frequent and intense in other seasons and locations.
- Droughts in parts of the Southwest would become hotter, more severe, and more frequent.

These changes in the climate of the Southwest are expected to affect a number of resources (Garfin et al. 2013):

- Terrestrial and freshwater ecosystems
    - The distributions of plant and animal species would be affected by climate change.
    - Ecosystem function and the functional roles of resident species would be affected.
    - Changes in land cover would be substantial. Observed changes in climate are affecting vegetation and ecosystem disturbance. Among those disturbances are increases in wildfire and outbreak of forest pests and disease.
- Water
    - Climate change could further limit water availability in much of the Southwest.
    - Water availability could be decreased even more by unusually warm, decades-long periods of drought.
    - The past would no longer provide an adequate guide to project the future.
    - Surface water quality would be affected by climate change.
- Human health
    - Climate change would drive a wide range of changes in illness and mortality.
    - Allergies and asthma would increase in some areas.
    - Disadvantaged populations would probably suffer most.

- Agriculture, infrastructure, and communities
  - Agriculture would be affected by climate change.
  - Energy supplies would become less reliable as climate changes and climate change would drive increasing energy demand in some areas.
  - Climate change would affect urban areas in differing ways depending on their locations and on their response or adaptive capacities.
  - Reliability of transportation systems would decrease.
  - Native American lands, people, and culture are likely to be disproportionately affected by climate change.

The potential impacts of climate change on the affected resources in the project area and CESAs is further described in the cumulative impacts sub-section for the following resources:

- Section 3.4, Water Resources
- Section 3.14, Vegetation, including Riparian Zones and Wetland Areas
- Section 3.15, Noxious Weeds and Nonnative Invasive Species
- Section 3.16, Range Resources
- Section 3.17, Wildlife and Aquatic Biological Resources
- Section 3.18, Special Status Species

Annual emissions of GHGs in the United States were approximately 6,673 million metric tons (MMT) in 2013 (USEPA 2015f), estimated in carbon dioxide equivalents (CO_2(e)).[1] In Nevada, the total projected CO_2 emissions for 2015 were 42.2 MMT CO_2(e), of which an estimated 33.7 MMT CO_2(e) (80 percent) were from electrical power generation and transportation (NDEP 2012).

Regulatory agencies have not established specific thresholds for assessment of GHG emissions under NEPA. CEQ guidance on considering climate change under NEPA (CEQ 2014) suggests 25,000 MT per year as a reference level above which quantification of GHG emissions from a federal action should be considered.

At present, there is no regulatory program which requires reductions in GHG emissions from barite mines. The USEPA Mandatory Reporting of Greenhouse Gases Rule (40 CFR Part 98) requires monitoring, reporting, and recordkeeping of GHG emissions from suppliers of fossil fuels and facilities that emit greater than or equal to 25,000 metric tons (about 27,600 U.S. tons) of GHG per year and greater than 30 million British thermal units per hour.

3.22.2 Environmental Consequences

3.22.2.1 Proposed Action

The estimated annual direct GHG emissions from fuel consumption for the Rossi Mine Proposed Action are summarized in **Table 3.22-1**. **Table 3.22-2** adds the estimated annual indirect GHG emissions from electricity consumption from power generated by NV Energy to the direct GHG emissions to provide a summary of the estimated total annual GHG emissions from the Proposed Action.

[1] CO_2(e) represents the quantity of CO_2 that would be required to produce the same global warming potential (GWP) as any given GHG. Typically, this value is presented over a 100-year period where a given quantity (i.e., 1 pound) of CO_2 is assigned a GWP of 1 and the same quantity of CH_4 has a GWP of 25. The GWP of N_2O is 298. Therefore, given the same mass quantities, CH_4 has an impact 25 times greater than CO_2, and N_2O has an impact 298 times greater than CO_2. (USEPA 2015e citing IPCC 2007b).

Table 3.22-1. Total Annual Direct GHG Emissions (tons) for the Proposed Action

Activity/Source	CO_2	CH_4	N_2O	$CO_2(e)$[1]
Equipment Exhaust	22,545	1.27	5.64E-01	22,745
Off-road Vehicle Exhaust	2,282	1.10E-01	5.05E-03	2,287
On-road Vehicle Exhaust	812	1.90E-02	2.92E-03	813
Well Drilling	21.6	2.10E-05	1.74E-04	21.6
Exploration Drilling	5,753	5.61E-03	4.63E-02	5,767
Operational Drilling (Blasting)	5,750	3.24E-01	1.44E-01	5,801
Other Generators	734	4.13E-02	1.84E-02	741
Pond Generator	197	1.11E-02	4.93E-03	199
Well Pump Generator	776	4.37E-02	1.94E-02	783
Other Generators	734	4.13E-02	1.84E-02	741
Total Direct GHG Emissions	**39,604.6**	**1.9**	**0.8**	**39,898.6**

Source: ICF 2016.

Table 3.22-2. Total Annual Direct and Indirect GHG Emissions (tons) for the Proposed Action

Power Consumption kilowatt-hours/year	Indirect GHG tons $CO_2(e)$/year	Direct GHG tons per $CO_2(e)$/year	Total GHG tons $CO_2(e)$/year
2,000,000	836.8	39,898.6	40,735.4

Source: ICF 2016.

HES implements several practices to reduce GHG emissions from the mine. HES provides company vehicles for select employees to carpool to and from the Dunphy offices during business days. HES also provides company vehicles to carpool and transport mine employees from the Dunphy offices to the Rossi Mine (includes jig plant and all Halliburton mine staff) and back. HES's mine contractor, N.A. Degerstrom, also provides buses and trucks to transport its employees from the Dunphy offices to the Rossi Mine in an effort to reduce the amount of vehicle emissions, including GHGs.

HES uses compact fluorescent light (CFL) bulbs in most mine buildings as an energy efficiency measure that reduces GHG emissions, and CFL bulbs are recycled by a contractor. The mine also employs waste minimization and recycling practices, thereby conserving raw materials. HES heats the mine maintenance building with a used oil heater that uses recycled oil from the mine operations. All batteries and aerosol cans used at the Rossi Mine are also recycled. HES plans to continue to implement these GHG emission reduction practices for the proposed project.

Under the Proposed Action, exploration would continue throughout the project area as described in Section 2.3.10, Exploration. Direct impacts to energy and climate change resources from exploration would include the emission of GHGs as presented in **Table 3.22-1** and the short term removal of approximately 67 acres of existing vegetation communities. Locations of future exploration activity depend upon the results of drilling activity; therefore, specific locations that would be impacted cannot be identified. Indirect impacts resulting from exploration activities would include increased fugitive dust, vibration, and localized soil compaction during road and pad construction and active drilling operations.

3.22.2.2 Reconfiguration Alternative

The Reconfiguration Alternative would have similar annual GHG emissions to the Proposed Action, but would be slightly less due to fewer haul truck trips needed per day and hence, less diesel fuel consumption.

3.22.2.3 Livestock Fencing Alternative

The Livestock Fencing Alternative would generate a negligible amount of GHG emissions relative to the Proposed Action and Reconfiguration Alternative.

3.22.2.4 No Action Alternative

Under the No Action Alternative, mining and processing operations would continue at the Rossi Mine under previous the terms of current permits and approvals as authorized by the BLM and State of Nevada. GHG emissions under the No Action Alternative would be reduced in comparison to the Proposed Action and other alternatives as the mine facilities would not be expanded and the existing mining operations would cease. Under the No Action Alternative, the GHG emissions anticipated to occur under the Proposed Action would not occur. This represents approximately 325,883 tons of direct and indirect GHG emissions that would not occur.

3.22.3 Cumulative Impacts

The Rossi Mine Expansion Project would emit CO_2(e) emissions that would incrementally add to the GHGs in the region from other sources as identified in Section 3.2, Past, Present, and Reasonably Foreseeable Future Actions. The proposed project represents <1 percent of the GHGs from all sources in the region, approximately 0.086 percent of the total projected emissions for Nevada in 2015.

3.22.4 Potential Monitoring and Mitigation

As noted above in Section 3.22.2.1, Proposed Action, HES currently implements several practices to conserve energy and reduce GHG emissions, and these practices would continue for the proposed project. No additional mitigation is proposed.

3.22.5 Residual Impacts

Residual impacts would include the emission of greenhouse gases after the application of HES Applicant Committed Environmental Protection Measures (**Table 2-16**).

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3.23 Relationship between Short-term Uses of the Human Environment and the Maintenance and Enhancement of Long-term Productivity

As described in Section 3.1, Introduction, short-term is defined as the 8-year mine life of the project and a 5-year reclamation period; long-term is defined as the future following reclamation (i.e., beyond 13 years). This section identifies the tradeoffs between the short-term impacts to environmental resources during operation and reclamation versus the long-term impacts to resource productivity that would extend beyond the end of reclamation.

The short-term use of resources during the expansion, operation, and reclamation of the proposed project would result in beneficial impacts in the form of an extension of local employment and the generation of revenue. The Applicant Committed Environmental Protection Measures that would be implemented for the proposed project would help to reduce impacts to the resources during operation of the mine.

The proposed project would result in various short-term impacts, including but not limited to:

- Temporary loss of soil;
- Loss of vegetation productivity;
- Loss of wildlife habitat;
- Potential wildlife avoidance and displacement of the project area;
- A reduction in dispersed recreation opportunities;
- Temporary increases in fugitive dust; and
- Increased noise levels.

These impacts are expected to end upon completion of operations and would be minimized through implementation of the reclamation plan as described in Section 2.3.12, Closure and Reclamation Plan.

The short-term visual impacts would last a few years beyond mine closure and gradually would be reduced as vegetation becomes more established at reclamation sites. The scale and extent of the facilities would continue to alter the local landscape and views in the long term.

Impacts to long-term productivity (i.e., following project reclamation) primarily would depend on the effectiveness of the proposed reclamation of the disturbance areas. Successful reclamation would provide for post-mining wildlife habitat and self-sustaining plant communities. Revegetation also is expected to stabilize disturbed surfaces and control erosion.

There would be a long-term loss in soil and vegetation productivity and associated terrestrial wildlife habitat, a reduction in livestock grazing areas, and public lands used for dispersed recreation resulting from mining facilities that would not be reclaimed (e.g., open pits).

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3.24 Irreversible and Irretrievable Commitment of Resources

The proposed project could result in the irreversible commitment of resources (e.g., the loss of future options for resource development or management, especially of nonrenewable resources such as minerals or cultural resources) or the irretrievable commitment of resources (e.g., the lost production or use of renewable natural resources during the life of the operations). Irreversible and irretrievable impacts of the proposed project are summarized for each resource in **Table 3.24-1**.

Table 3.24-1. Irreversible and Irretrievable Commitment of Resources under the Proposed Action

Resource	Irreversible Impacts	Irretrievable Impacts	Explanation
Geology and Minerals	Yes	Yes	Barite ore would be mined during operations. This would result in the irreversible and irretrievable commitment of this resource.
Water Quality and Quantity	Yes	Yes	If a pit lake develops in either the King or QLC pit, the evaporation for the pit lake would result in an irreversible and irretrievable impact to surface water within the pit lake.
Cultural Resources	Yes	Yes	National Register of Historic Places–eligible sites could be irreversibly and irretrievably lost if inventory, avoidance, and/or mitigation efforts are not sufficient to identify and protect these sites.
Native American Traditional Values	No	No	Adverse effects to religious, spiritual, or sacred values cannot be monitored or mitigated.
Hazardous Materials and Solid Waste	No	No	No irreversible or irretrievable commitment of resources or impact is anticipated. However, if a spill were to affect a sensitive resource, an irretrievable impact could occur pending the recovery of the resource.
Air Quality	No	No	Project emissions would not exceed federal or state Ambient Air Quality Standards. Air quality would return to existing conditions after completion of the project.
Paleontological Resources	Yes	Yes	There would be an irretrievable and irreversible loss of any paleontological resources in Carlin Formation areas buried by the WRDFs.
Social and Economic Values	Yes	Yes	Labor and some capital resources, once committed and expended, would not be retrievable.
Recreation and Wilderness	Yes	Yes	There would be an irretrievable loss of public land available for dispersed recreational opportunities during operations and reclamation. An irreversible loss would occur on approximately 194 acres (192 acres of public land and 2 acres of private land) associated with the expansion of the existing open pits (King and QLC), which would not be reclaimed. No irreversible or irretrievable commitment or impact of wilderness resources is anticipated.
Visual Resources	Yes	No	Impacts to visual resources would be reduced through successful reclamation procedures and implementation of the environmental protection measures. However, permanent changes would result from the expansion of existing open pits, which would not be reclaimed.
Soils	Yes	Yes	Suitable growth media would be salvaged from the mine disturbance areas for use in reclamation. There would be a loss of soil productivity during operations on approximately 1,167 previously undisturbed acres, for a total of 2,063 acres. There would be an irreversible commitment of the resource on approximately 194 acres associated with the expansion of the open pits (King and QLC), which would not be reclaimed.
Vegetation, including Riparian and Wetland areas	Yes	Yes	There would be an irretrievable commitment of vegetation resources on approximately 1,167 previously undisturbed acres during operations, for a total of 2,063 acres. There would be an irreversible commitment of the resource on approximately 194 acres associated with the expansion of the open pits (King and QLC), which would not be reclaimed. An irreversible and irretrievable impact to <1 acre of riparian zones and wetland resources (wetlands W-1 and W-7) is anticipated.

Table 3.24-1. Irreversible and Irretrievable Commitment of Resources under the Proposed Action

Resource	Irreversible Impacts	Irretrievable Impacts	Explanation
Noxious Weeds and Invasive Species	No	No	Disturbance areas within the proposed project area would be monitored to identify any noxious weeds and invasive species. If populations were observed within the proposed project area during operations, they would be treated and/or removed. Successful reclamation of disturbance areas also would minimize the potential for establishment of noxious weeds and invasive species within the proposed disturbance area.
Range Resources	Yes	Yes	There would be an irretrievable commitment of range resources on approximately 1,167 acres with a suspension of approximately 107 animal unit months (AUMs) during operations. In total, approximately 2,063 acres of surface disturbance would occur. An irretrievable loss of 18 AUMs would occur within the Twenty-Five Allotment from the expansion of the open pits (King and QLC), which would not be reclaimed.
Wildlife and Aquatic Biological Resources	Yes	Yes	There would be an irretrievable commitment of sagebrush shrubland, grassland, and riparian zone and wetland area wildlife habitat on approximately 1,167 acres during operations for a total of 2,063 acres. There would be an additional irreversible commitment of the resource on approximately 194 acres of mixed sagebrush shrubland, grassland, and riparian habitat associated with the expansion of the existing open pits (King and QLC), which would not be reclaimed.
Special Status Species	Yes	Yes	Same as described above for Wildlife and Aquatic Biological Resources.
Access and Land Use	Yes	No	There would be no irreversible or irretrievable impacts to access; public access patterns would be maintained. An irreversible loss would occur on approximately 194 acres of public land associated with the expansion of the existing open pits (King and QLC), which would not be reclaimed.
Noise	No	No	Noise is not considered irreversible because it would cease following the completion of mine operations.
Environmental Justice	No	No	The proposed project would not disproportionately affect minority or low-income populations.
Energy Requirements and Climate Change	No	Yes	There would be irretrievable energy consumption during the operations and reclamation. The proposed project would be expected to have a negligible effect on climate.

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