

January 16, 2024

Brock Bowles  
Colorado Division of Reclamation, Mining and Safety  
1313 Sherman Street, Room 215  
Denver, CO 80203  
303-866-3567

Delivered Via Email and CDRMS ePermitting

**RE: Young Ranch Resource, LLC; Young Ranch Resource Quarry, M-2021-009  
Technical Revision 2 – Wildlife Management Plan Update**

Mr. Bowles:

On behalf of the Young Ranch Resource, LLC and their Young Ranch Resource Quarry ("YRR"), please allow this letter to serve as a request for revision of their 112c Reclamation Permit as Technical Revision 2. This revision incorporates the updated wildlife management plan into the permit via Appendix 2 and the updated report date on page H-1. No other changes have been made. Please see the attached wildlife management plan and revised Exhibit H.

Regards



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Robert Young, Jr., YRR  
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# Attachments

Exhibit H

Wildlife Management plan

## EXHIBIT H

## WILDLIFE INFORMATION

### 6.4.8(1)

Ecological Resources Consultants, Inc. (ERC) prepared a Wildlife Mitigation Plan dated January 4, 2024, included as Appendix 2. Included in ERC's report are pre-mining pertinent wildlife current conditions such as: vegetation, Federally listed threatened and endangered species, Colorado State-listed species, Colorado Parks and Wildlife (CPW) activity mapping, site-specific wildlife use of the project area; during mining and post-mining impacts to vegetation, species activity mapping (SAM), migratory birds, Federal and State threatened and endangered species, and general wildlife; and actions to avoid, minimize, and mitigate wildlife impacts.

Detailed in ERC's report and in addition to the recommendations included therein, the property owner, Young Ranch Resource, LLC, has committed to creating a Wildlife Corridor that extends along the southern reaches of the site from west to east which effectively maintains an undisturbed migration and wildlife access corridor through the site and along the CCP. Details of specific wildlife mitigation structure (fencing, wildlife crossing overpasses, and wildlife exit ramps) locations and relative installation time are included in ERC's report as Appendix 2.

### 6.4.8(1)(a)

Bighorn sheep, mule deer, wild turkey, and elk are the most critical game resource in the area and are known to traverse the site. The current landscape offers mixed moderate to heavy ground cover that is useful forage for deer and other small mammals. Refer to Appendix 2 – Wildlife Mitigation Plan for additional information.

Black bear, lynx, moose, and mountain lion have overall ranges that include the Young Ranch Resource but are not known to frequent the site. Fox, coyote, rabbit, and various nongame birds and rodents are the most critical non-game resource in the area. Due to the moderate to heavy ground cover, the value of the site for birds and mammals is high despite a lack of constant running water. There are no known raptor nests on the permit area or in the vicinity. Refer to Appendix 2 – Wildlife Mitigation Plan for additional information.

#### **6.4.8(1)(b)**

Elk are known to use the site in the winter months and are generally absent during the warmer months. Bighorn sheep and deer are found at the Young Ranch Resource throughout the year. Refer to Appendix 2 – Wildlife Mitigation Plan for additional information.

#### **6.4.8(1)(c)**

Threatened and endangered species are detailed in Appendix 2 – Wildlife Mitigation Plan. While the ranges of federally or state listed threatened and endangered species overlap across Clear Creek and Gilpin Counties, their required habitats are not found within the site. Only the Canada Lynx, Mexican Spotted Owl, and Western Prairie Fringed Orchid have ranges and habitats which include the quarry site; however, none of the above listed species are likely to be adversely affected by mining.

#### **6.4.8(1)(d)**

No adverse effects to wildlife are anticipated based on the adoption of a wildlife mitigation plan, see Appendix 2. Resident wildlife quickly become habituated to these activities, as is observed in other similar operations in rangeland communities throughout Colorado. Similar quarrying efforts ~ 0.5 miles southeast of the Young Ranch Resource have existed since 1984 and regularly encounter native animal species who are unbothered by daily mining efforts. Migrating animals will likely avoid the site and the proposed operation does not block any known migratory routes.

Wildlife should be able to move through the area unimpeded. Due to the possibility for animal/vehicle collisions, hauling activities will pose the biggest threat to wildlife. Haul trucks should keep to posted speeds and drivers need to remain aware of the potential for collisions. See the Wildlife Mitigation Plan in Appendix 2 for details on how wildlife will be allowed to traverse the site safely.



**Ecological Resource Consultants, LLC**

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# WILDLIFE MITIGATION PLAN

**YOUNG RANCH RESOURCE**

**CLEAR CREEK AND GILPIN COUNTIES, COLORADO**

**January 4, 2024**



**Submitted to:**

Bob Young

Young Ranch, LLC

ERC Project #1290-2001

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## 1.0 INTRODUCTION

### 1.1 PURPOSE AND NEED

Ecological Resource Consultants, LLC (ERC) provides the following Wildlife Mitigation Plan (plan) for the proposed Young Ranch Resource (Project). The Project, which is slated to have an approximate 100-year lifespan, will be used to supply the Denver metro area and surrounding Colorado and regional markets with crushed stone and other aggregate products. With the current anticipated upward trend in economic activity and increasing population of Colorado, the Project will be a necessary resource to supply the region with a variety of aggregate products that are in high demand now and in the future.

The purpose of this plan is to identify potential wildlife impacts resulting from construction and operation of the Project and provide a proactive framework to avoid, minimize, and mitigate potential adverse impacts. Additionally, this plan provides an assessment of current conditions, including a description of vegetation communities and an evaluation of wildlife habitat and use within the footprint of the proposed Project. This evaluation is based on local knowledge of Young Ranch and associated landscapes, interviews with the ranch owner and Central City staff, as well as on-line information about existing vegetation communities, species activity mapping provided by Colorado Parks and Wildlife (CPW), and potential federal and state listed threatened or endangered species and/or habitat that could exist on or immediately surrounding the proposed Project. Additionally, this report contains an evaluation of potential impacts to wildlife along the Central City Parkway (CCP) corridor which is located immediately adjacent to the Project. This plan provides a variety of conceptual mitigation recommendations for preservation and enhancement of wildlife resource at the proposed Project.

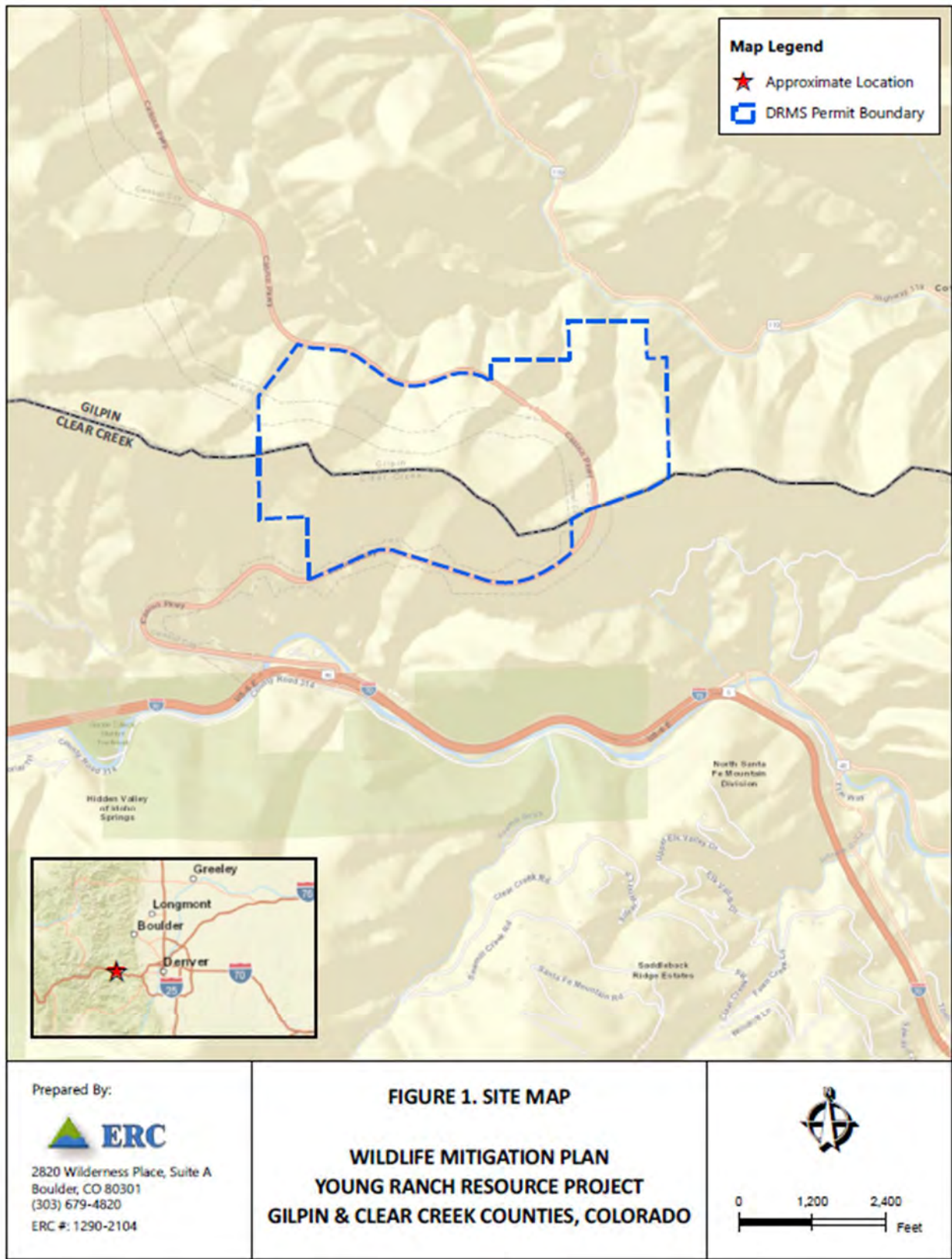
Requisite with this plan is the desire by the owners of Young Ranch to allow this Project and associated development phases to progress with minimal impact to wildlife and natural resources. Additionally, mitigation measures are proposed for areas north of the Project along the CCP. Currently, there are no wildlife mitigation measures in place along any portion of the CCP. As such, this plan has been written to help ensure that long-term Project operations progress in a manner that are ecologically responsible and consistent with the vision and stewardship goals that Young Ranch has emplaced upon future generations.

### 1.2 DESCRIPTION OF YOUNG RANCH PROPOSED MINING ACTIVITIES

The proposed aggregate mining operation is situated along the eastern boundary of the approximately 4,500-acre Young Ranch property. The proposed Project location and Colorado Division of Reclamation, Mining, and Safety (DRMS) permit boundary are shown on **Figure 1**. Additional information about the Project is provided in Section 2.0.

Mining operations will be conducted over five phases starting in approximately 2022 and lasting through approximately 2120, and as dictated by market conditions. Mining phases are shown on **Figure 2**. During the pre-mining phase (~1 yr), access roads will be constructed from the CCP for the processing area and waste rock landform areas. The drainage area to the east of the CCP will be partially filled in to create a staging area for crushing/screening, offices (portable trailer), and scales. Existing culverts will be enhanced to allow for stormwater to pass under the waste rock landform areas. Stormwater for the processing area pad as well as Phase I mining stormwater will be collected, and suspended sediments will be allowed to settle prior to clean water entering the drainages to the east of the CCP.







Phase 1 mining is expected to last 6 years (~2022-2028). An access road will be developed up to the top of Phase I. Mining will occur from the top of the Phase I area (~8,300 ft in elevation) down to the Project entrance (~8,050 ft). A road constructed to the top of the Phase 1 area will be completed along with entrance and exit ramps into the mine, and roads on the east side of CCP will be constructed that lead to the Westside Waste Rock Landform with a finished elevation of 7,880 ft. Drilling and blasting will occur with Phase 1, and coarse material will be stockpiled in the northern portion of the Phase 1 area. Up to two benches will be worked at any given time during Phase I using a 2:1 slope wall angle. The northern most slopes immediately adjacent to the CCP will remain undisturbed providing a buffer between the highway and the Project. **Figure 2** depicts the mining phase and affected areas.

Phase 2 mining is expected last 7 years up to approximately 2035 and will consist of permanent processing facilities installed into the Phase I area. Mining will occur from the top of Phase 2 (~8475 ft in elevation) down to a finished elevation of 8,275 feet. The east side of CCP will continue to be developed and the Eastside Waste Rock Landform will be complete to an elevation of 7,775 feet. **Figure 2** depicts the mining phase and affected areas.

Phase 3 mining will last approximately 30 years up to approximately 2065 and will consist of the continued mining and expansion of the Phase 2 footprint. During Phase 3, all stormwater will be directed to the perimeter of the quarry where it will enter either the northern or southern sumps. The northern sump may be pumped through the site access underpass and down the waste rock landform drainage as shown on **Figure 2**. The Eastside Waste Rock Landform will continue to expand with waste rock with a finished elevation of 7,880 feet. The majority of the southernmost face adjacent to the CCP will remain undisturbed to create a visual and sound buffer to Interstate 70 (I-70) and to maintain a deed restricted wildlife migration corridor along the south side of the Project. For all five phases, interim reclamation will occur following completion of each bench using 2:1 reclaimed slopes with a dry rangeland vegetation seed mix. **Figure 2** depicts the mining phase and affected area.

Phase 4 mining is expected last 9 years up to approximately 2074 and will consist of mining the area west of the internal gravel access road. This internal access gravel road will be available for use following the completion of Phase 4. A new access road will be constructed to the top of Phase 5. Mining will occur from the bottom of Phase 3 (8,050 ft in elevation) down to a finished elevation of 7,925 feet. The Eastside Waste Rock Landform will continue to expand further south to an elevation of 8,050 ft.

Phase 5 mining will last approximately 43 years up to approximately 2117 when the Project will be permanently closed. Phase 5 mining have a finished elevation of 7,850 feet with reclaimed slopes as forest areas using a 2:1 slope. The majority of the southernmost face adjacent to the CCP will maintain the deed restricted wildlife migration corridor along the south side of the Project. The Eastside Waste Rock Landform will be revegetated using a dry rangeland seed mix.

As shown on **Figure 2**, the two drainages to the east of the CCP will be used as waste rock landform areas for non-marketable material. Waste rock landform materials will be initially hauled from the processing area to the landform areas by truck. If feasible, an underpass or large box culvert will be installed for conveyor access to the waste rock landform areas. The western portion of the waste rock landforms (areas closest to the CCP) will be developed first and the eastern portion will be developed during Phases 2 and 3.

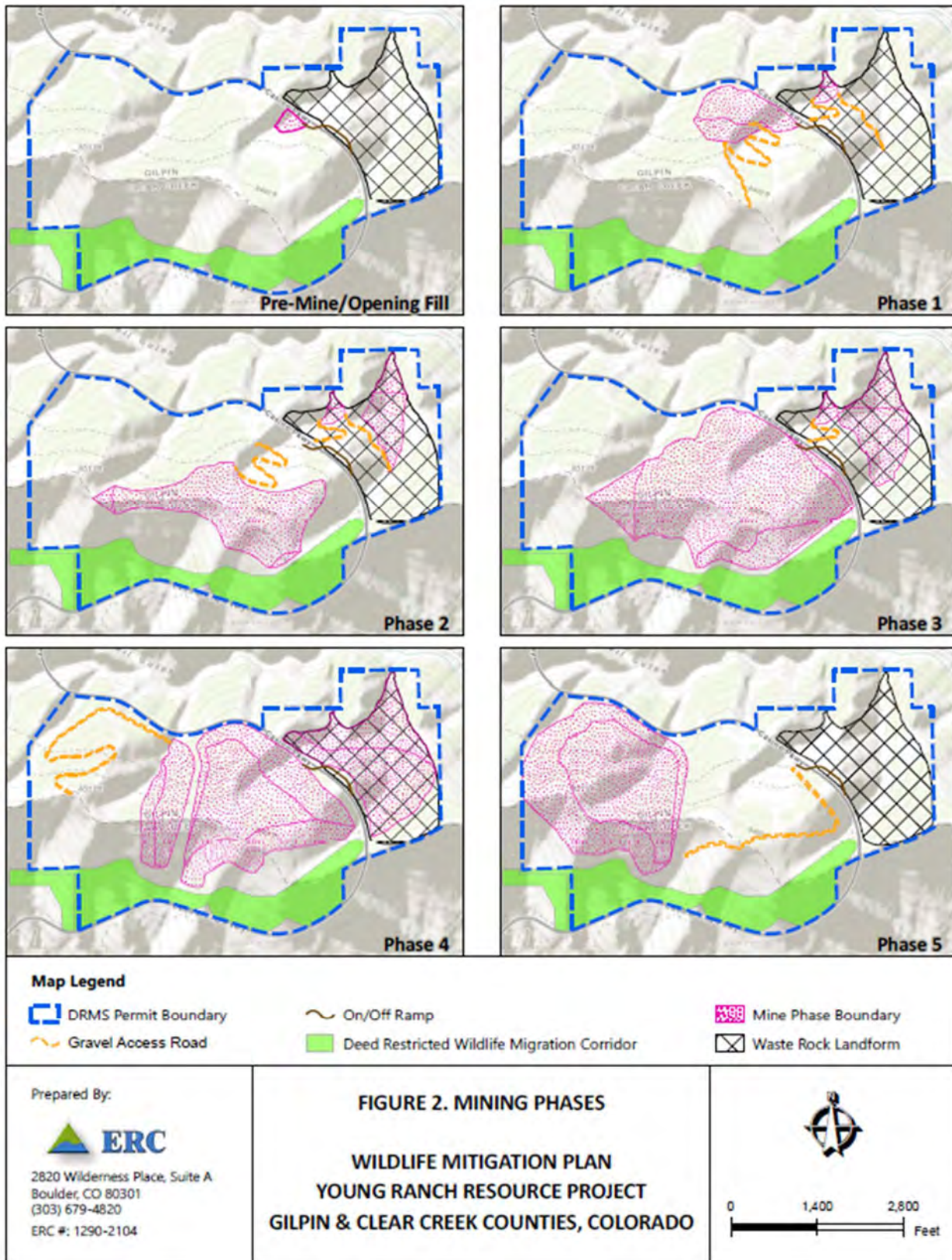
### 1.3 DEED RESTRICTED WILDLIFE CORRIDOR

Prior to the mining phases, a deed restricted wildlife corridor will be implemented along the southern extents of the Project (**Figure 2**). This corridor will facilitate the continued movement of wildlife between the Project and Clear Creek to the south and the forested woodland and shrubland habitat to the west. During an initial site visit with ERC, the ranch owner and CPW personnel in June 2022, CPW provided on-site recommendations in regard to the overall Project. During this site visit, CPW personnel recommended expanding a proposed designated deed restricted wildlife corridor further west to ensure the minimization of wildlife impacts. This corridor represents a commitment between the mine and ranch owner to ensure long-term protection of wildlife. The corridor will be established through legal agreements between the ranch owner and the DRMS. The land designated as a wildlife corridor will;

- limit development to minimize the disturbance of wildlife,
- offer overall habitat protection by maintaining and/enhancing the natural vegetation communities within,
- allow the continued connectivity between the project area and immediate vicinity, and
- contribute to the overall well-being of local wildlife populations.

### 1.4 RECLAMATION

Reclamation will occur throughout all mining phases to ensure that vegetation within previously developed portions of the Project become re-established to provide forage for wildlife. Trees will be planted on the wetter north and east facing slopes and a dry rangeland seed mix will be used for the south and west facing slopes. Post-Project topography will include bedrock outcrops and sporadic cliff faces to mimic the natural landscape. Plant growth medium will be generated on-site using partially decomposed plant material, sandy loam, and site derived tree mulch paired with crusher fines, as needed. Hydroseeding will occur on each dump lift once the next dump lift is initiated as well as on steeper slopes where drill seeding is not feasible. Flat pads (i.e., processing area) will be revegetated using drill seeding methods during final site reclamation. Certified weed-free mulch/wood straw will be used to stabilize the soil surface and retain moisture during germination. Following all five mining phases on-site access roads (per landowner request) and wildlife crossings will remain as permanent features.





## 2.0 SITE INFORMATION

### 2.1 LOCAL VICINITY AND YOUNG RANCH

The proposed Project (as defined by the DRMS Permit Boundary) is located on the north side of I-70 and east of Idaho Springs in the counties of Clear Creek and Gilpin, Colorado. More specifically, the Project is located in **Section 27, 28, and 29, in Gilpin County, and Sections 32, 33 and 34 in Clear Creek County, Township 3 South, Range 72 West (latitude 39.75500° north, longitude 105.45222° west)**. The Project is bordered to the west by undeveloped forest, CCP to the North, State Highway 119 and undeveloped forest to the east, and CCP to the South. From I-70, the Project can be accessed by heading west and taking Exit 243 to Hidden Valley, Central City for approximately 2.5 miles until reaching right-of-way pull out on the west side of Central City Parkway. The Project is best accessed by parking along the pullouts to the CCP and hiking into the Project. The Project is predominantly forestland with herbaceous understory. Refer to **Figure 1** for a location map of the Project.

The Project comprises approximately 469.7 acres and has an average elevation of 8,100 feet above mean sea level. Topography across the Project consists of steep, rocky slopes that slope downward toward the north/south. CCP borders the southern and northern edges of the Project and bisects the eastern portion of the Project. Two stormwater drainages exist on the northern and eastern portions of the Project (these will be the site of the waste rock landform areas, described in **Section 1.2**). Upper portions of these drainages have been historically disturbed due to the construction of the CCP and contain numerous quantities of riprap and fill material associated with the parkway. Existing culverts underneath the CCP will be closed during Phase 1 mining and stormwater will instead be directed via a pipe through the underpass and down the eastern waste rock landform drainage. North Clear Creek is located east of the Project and flows from the north to the southeast. Numerous natural drainages exist within the Project with two stormwater drainages that divert precipitation and surface runoff from the CCP to offsite locations to the north, and to the drainages east of the CCP. All drainages located within the footprint of the proposed Project are intermittent/ephemeral and do not flow year-round. Fountain Gulch, a perennial stream, is located immediately to the north of the Project and provides a year-round source of water for wildlife. Overall, the Project is confined and bound by heavily traveled roadways (CCP) and the vicinity of the Project is largely comprised of fragmented forestlands.

### 2.2 CENTRAL CITY PARKWAY CORRIDOR

Since opening in 2004, the CCP is a heavily used four-lane highway that provides vehicular access between Idaho Springs along I-70 and the historic mining town and gambling area of Central City. The CCP is operated and maintained by Central City. The total length of the CCP is 8.4 miles. The CCP begins near the junction of U.S. Hwy 6 and U.S. Hwy 40 along I-70, and heads north through a series of steep U-shaped bends through and around the proposed Project. Most of the route is heavily forested; however, the CCP enters a small valley immediately before Mile Marker 5 where the topography opens and is less vegetated at that location and north to Central City. Wildlife-vehicle collisions are more common in the vicinity of Mile Markers 1 and 2, as well as within the valley in the vicinity of Mile Markers 4 and 5. Barbed wire fences are located along the entire stretch of the CCP that traverses through the Project. Further to the north in the vicinity of Mile Marker 5, the barbed wire fence has been modified slightly to include a small diameter pipe (~4") as a top rail, which helps to minimize wildlife entanglement.

## 2.3 VEGETATION

According to the United States Geological Survey (USGS) Gap Analysis Project (GAP) land cover data set, three primary vegetation communities exist within the Project that can be characterized as Southern Rocky Mountain Montane Shrubland, Western North American Temperate Cliff, Scree & Rock Vegetation, and Central Rocky Mountain Dry Lower Montane-Foothill (Faber-Langendoen et al. 2015). The vegetation communities are summarized in **Table 1** as follows:

**Table 1. Vegetation Community Distribution Within the Project**

Vegetation Community	Total (Acres)	Percentage
Central Rocky Mountain Dry Lower Montane-Foothill	270.1	57.4
Southern Rocky Mountain Montane Shrubland	154.6	33.0
Western North American Temperate Cliff, Scree & Rock Vegetation	45.0	9.6
<b>Total</b>	<b>469.7*</b>	<b>100%</b>

\*Total acreage of Project within DRMS permit boundary

### Central Rocky Mountain Dry Lower Montane-Foothill Forest

This vegetation community generally includes conifer forests, woodlands found in the lower montane to foothill zones. It is generally dominated by ponderosa pine, Douglas fir (*Pseudotsuga menziesii*), and limber pine (*Pinus flexilis*). Shrub and herbaceous components are widely variable, ranging from taxa found in the Great Plains mixed grass region to those found across the Northern Rockies region into the eastern Cascades. Generally, these communities occur in lower montane to foothill settings, or on rock outcrops in the mixed grass region of the Great Plains. Occurrences are found on all slopes and aspects; however moderately steep to very steep slopes or ridgetops and plateaus are most common. Within the Project, lodgepole pine, gamble oak, alderleaf mountain mahogany, mountain parsley, western wallflower (*Erysimum capitatum*), and quaking aspen (*populus tremuloides*) are the common species within this plant community type.

### Southern Rocky Mountain Montane Shrubland

The Southern Rocky Mountain Montane Shrubland is characterized by an open-to-dense shrub layer typically dominated by Alderleaf mountain mahogany (*Cercocarpus montanus*), antelope bitterbrush (*Purshia tridentata*), and/or gambel oak (*Quercus gambelii*) and several other characteristic shrubs. The Southern Rocky Mountain Montane Shrubland is dominant on the southern portion of the Project. The Southern Rocky Mountain Montane Shrubland is intermixed with wooly cinquefoil (*Potentilla hippiana*), cheatgrass (*Bromus tectorum*), mountain parsley (*Cymopterus lemmonii*), Indian paintbrush (*Castilleja coccinea*), and yucca (*Yucca glauca*). Tree species within this community include pinion pine (*Pinus edulis*) and ponderosa pine (*Pinus ponderosa*). This vegetative community is found on the lower slope positions in montane zones ranging from 4,900 feet to 10,000 feet in elevation. The herbaceous layer is sparse to moderately dense and dominated by perennial graminoids. Stands may occur on level to steep slopes, cliffs, escarpments, rimrock slopes, rocky outcrops, and scree slopes. Within the Project, this community generally includes the southern slopes in the southern portion. This community also encompasses a small parcel within the Project to the north and northeastern portions.

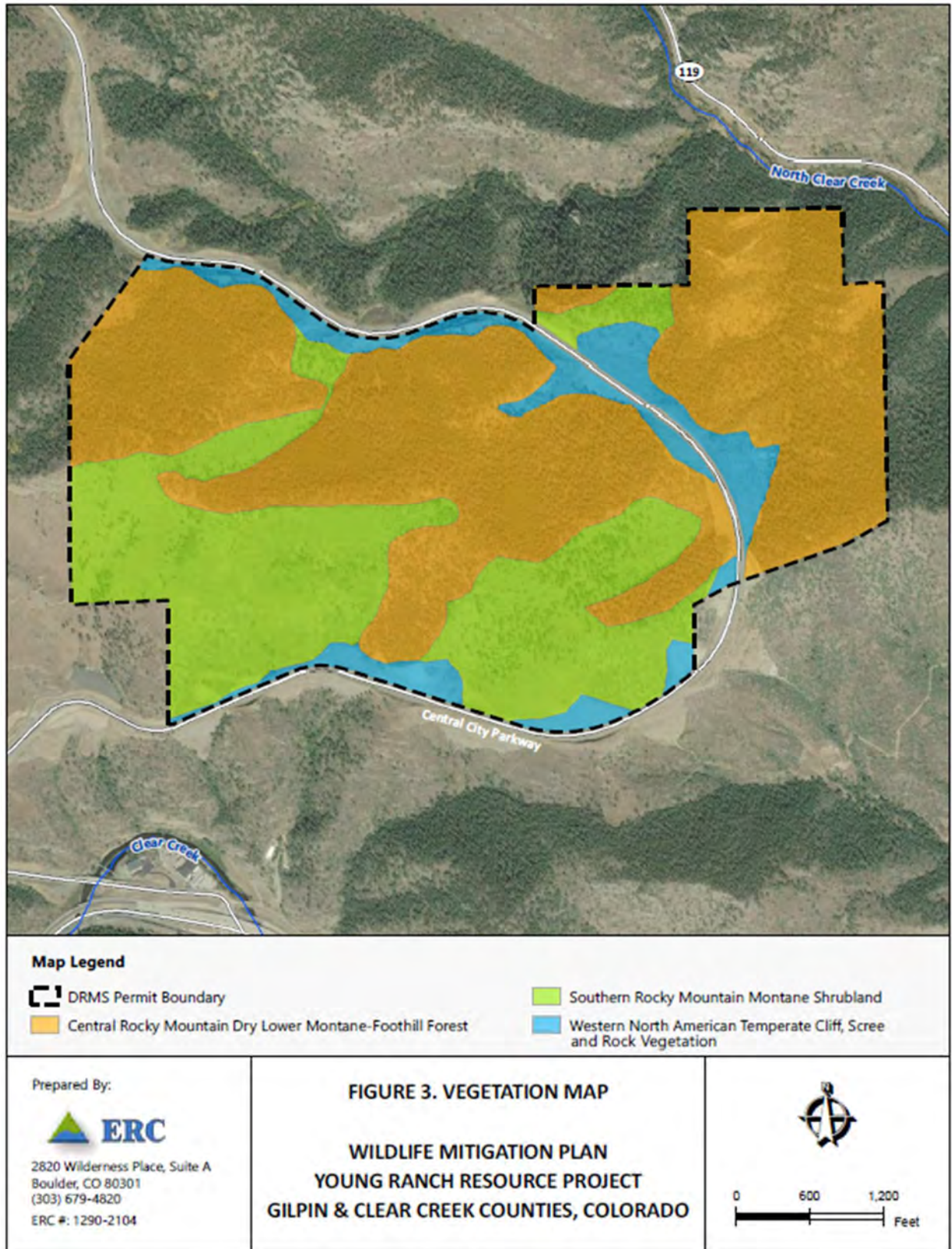
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Western North American Temperate Cliff, Scree & Rock Vegetation

The Western North American Temperate Cliff, Scree, & Rock vegetation community occurs typically within the right-of-way of the CCP and the unnamed drainages associated with the Parkway. These communities were likely formed with the construction of the parkway and are characterized by bedrock outcrops, including cliffs, talus, or scree. The vegetation is highly variable within this plant community type and consists of a sparse cover of vascular/herbaceous species with a limited cover of lichens, mosses, ferns or fern allies. Characteristic nonvascular species include lichens of the genera rock tripe (*Umbilicaria esculenta*), map lichens (*Rhizocarpon ramond*), snow lichen (*Stereocaulon hoffm*), cup lichen (*Cladonia P. Browne*), tortula moss (*Tortula Hedw.*), and racomitrium moss (*Racomitrium canescens*). Generally, these areas within the Project are bare of any woody plants, but some shrubs and trees were present and consisted of lodgepole pine (*Pinus contorta*), ponderosa pine, and pinion pine.

A map showing vegetation within the Project is provided as **Figure 3. Appendix A** to this report provides representative photographs of the vegetation communities and associated habitats within the Project.





## 2.4 WILDLIFE

Wildlife utilizes the general landscape of the Project in a multitude of ways and occupy habitats within the Project as areas of permanent inhabitation, seasonal inhabitation, breeding grounds, migratory routes, foraging, and temporary shelter. Potential wildlife habitat includes the entire Project and adjacent undeveloped areas.

Historic and current land use associated with the CCP have fragmented the north, east, and south portions of the Project. However, the west portion is undeveloped and is part of Young Ranch. As discussed in **Section 2.3**, three habitat types were observed within the Project and include: Central Rocky Mountain Dry Lower Montane-Foothill Forest, Southern Rocky Mountain Montane Shrubland, and Western North American Temperate Cliff, Scree and Rock vegetation communities. The Central Rocky Mountain Dry Lower Montane-Foothill Forest (57.4%), Southern Rocky Mountain Montane Shrubland (33%), and Western North American Temperate Cliff, Scree and Rock (9.6%) vegetation types are dominated by native species. Such lands are altered due to fire regime, fragmentation from roads, development near urban areas, mining, invasive species, livestock grazing, and other human disturbances (CNHP 2010). Montane foothill and shrubland can also support large mammals including deer, elk, and black bear. The components of these vegetation communities provide unique, high-quality nesting, foraging, and hunting habitat in the Project. The Western North American Temperate Cliff, Scree and Rock vegetation land, which is present across the northern portion of the Project has replaced the native montane shrubland habitat which would have been historically present in this region. This vegetation community has altered the structure, function, community composition, and habitat value of land within a minor portion of the Project. Within the Project, limitations for wildlife use exist due to land use activities such as habitat fragmentation from fences, and noise disturbances from the CCP.

Local wildlife species that may use this habitat within the Project include moose (*Alces alces*), hawks (*Buteo sp.*), elk (*Cervus canadensis*), turkey (*Meleagris gallopavo*), meadow vole (*Microtus pennsylvanicus*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), bighorn sheep (*Ovis canadensis*), deer mouse (*Peromyscus maniculatus*), mountain lion (*Puma concolor*), western meadowlark (*Sturnella neglecta*), garter snake (*Thamnophis sp.*), barn owl (*Tyto alba*), and black bear (*Ursus americanus*).

### 2.4.1 FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES

The purpose of this section is to evaluate potential impacts to federally listed Threatened and Endangered (T&E) as a result of proposed activities associated with the Project. The Endangered Species (ESA) of 1973 was enacted by the United States to conserve T&E species and the ecosystems that they depend on. Under the ESA, species may be listed as either “endangered” or “threatened”; both designations are protected by law. The ESA is administered by the U.S. Fish and Wildlife Service (USFWS). The USFWS has developed Project-specific species lists, available online by request, identifying threatened, endangered, and proposed species, designated critical habitat, and candidate species protected under the ESA that may occur within the boundary of a proposed Project and/or may be affected by a proposed Project (USFWS 2023: 2024-0025206). The species list for Clear Creek and Gilpin Counties, Colorado has identified the potential for ten (10) T&E species to be located within the Project.

### Species Not Present

**Table 2** below lists federal T&E species that are identified to occur within Clear Creek and Gilpin Counties. However, these species are not known to exist within or in the vicinity of the Project and/or have specific habitat requirements (i.e., elevation range, vegetation communities) that are not common in the vicinity of the Project.

**Table 2. Federally Listed Threatened and Endangered Species**

Clear Creek and Gilpin County			
Common Name	Scientific Name	Status*	Determination
Preble's Meadow Jumping Mouse	<i>Zapus hudsonius preblei</i>	FT	NOT LIKELY TO ADVERSELY AFFECT
Piping Plover**	<i>Charadrius melodus</i>	FT	NOT LIKELY TO ADVERSELY AFFECT
Whooping Crane**	<i>Grus americana</i>	FE	NOT LIKELY TO ADVERSELY AFFECT
Greenback Cutthroat Trout**	<i>Oncorhynchus clarkia stomias</i>	FT	NOT LIKELY TO ADVERSELY AFFECT
Pallid Sturgeon**	<i>Scaphirhynchus albus</i>	FE	NOT LIKELY TO ADVERSELY AFFECT

\*Status key:

FE – Federally listed as endangered

FT – Federally listed as threatened

\*\*Represents water depletion species. Project is assumed to not constitute a water depletion.

The Project does not contain the specific habitat characteristics necessary to support the species listed above; therefore, these species and/or critical habitat are not present within the Project. As such, the proposed Project should not adversely affect the species, their habitats, or proposed or designated critical habitats.

The Project is located within the potential known range for the following (**Table 3**) federally listed T&E species: Canada lynx, Gray wolf, Mexican spotted owl, western prairie fringed orchid and the monarch butterfly. Further analysis was conducted to determine if the species or habitat has the potential to exist within the Project considering site-specific conditions and characteristics. A brief explanation is provided as to the species life cycle, habitat requirements and potential occurrence within the Project. The Project is not within designated critical habitat of any federally listed species.

**Table 3. Federally Listed Species Potentially Occurring Within the Project**

Common Name	Scientific Name	Status*	Determination
Canada Lynx	<i>Lynx canadensis</i>	FT	NOT LIKELY TO ADVERSELY AFFECT
Gray Wolf	<i>Canis lupus</i>	FE	NOT LIKELY TO ADVERSELY AFFECT
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	FT	NOT LIKELY TO ADVERSELY AFFECT
Western Prairie Fringed Orchid	<i>Platanthera praeclara</i>	FT	NOT LIKELY TO ADVERSELY AFFECT
Monarch Butterfly	<i>Danaus plexippus</i>	C	NOT LIKELY TO ADVERSELY AFFECT

\*Status key:

FE – Federally listed as endangered

FT – Federally listed as threatened

C – Candidate species

#### **Canada Lynx (*Lynx canadensis*)**

On March 24, 2000 the USFWS issued a final rule to list the Canada lynx as a federally threatened species under the ESA. The Canada lynx range extends from most of Canada and Alaska, which combined, encompass about 98% of the species breeding range. The contiguous U.S. distinct population segment (DPS) accounts for the other 2% and includes resident breeding populations in Northern Main, northeastern Minnesota, northwestern Montana, northern Idaho, and north-central Washington. An introduced population also occurs in western Colorado, and several other areas may have historically supported small resident populations (e.g. northern New Hampshire, Isle Royale, Michigan, northeastern Washington, and the Greater Yellowstone area of southwestern Montana and northwestern Wyoming) (USFWS 2020). In Colorado, a resident Canada lynx has been introduced in the Southern Rocky Mountains in areas within subalpine and upper montane forest zones, generally above 9,500 feet in elevation (Shenk 2009). In the upper elevations of the subalpine zone, forests are typically dominated by subalpine fir and Engelmann spruce. Canada lynx bears one litter per year, between one and four lynx kittens are born in each litter in May or June. Habitat for the Canada lynx is generally considered to be at higher elevations than the Project; and not commonly found utilizing the lower, more open, montane forests and shrublands within the Project Area. Therefore, activities within the Project are not likely to adversely affect this species.

#### **Gray Wolf (*Canis lupus*)**

The Gray Wolf, being a keystone predator, is an integral component of the ecosystems to which it typically belongs. The wide range of habitats in which wolves can thrive reflects their adaptability as a species, and includes temperate forests, mountains, tundra, taiga, and grasslands. Gray wolf adults range in weight from 40 to 175 pounds depending on sex and geographic locale. Gray wolves are highly territorial, social animals that live and hunt in packs. They are well adapted to traveling fast and far in search of food, and to catching and eating large mammals. In North America, they are primarily predators of medium to large mammals, including deer, elk, and other species, and are efficient at shifting their diet to take advantage



of available food resources. In 1978, the gray wolf was reclassified as an endangered population at the species level (*C. lupus*) throughout the contiguous United States (USFW 2023). In Colorado, the CPW has ongoing efforts to reestablish the gray wolf population as part of the Colorado Wolf Restoration and Management Plan. Colorado State Statute Section 33-2-105.8 reintroduces gray wolves on designated lands west of the continental divide. In January of 2020, CPW personnel confirmed at least six wolves traveling together in Moffatt County in northwestern Colorado (USFWS 2020, p. 9). Later that year, CPW personnel documented only one wolf in that area, and, at present, there is no indication that any wolf or wolves remain in that part of Colorado. As of the date of this report, CPW has released five gray wolves onto public lands in an undisclosed location in Grand County in an effort to create a permanent and self-sustaining wolf population (CPW 2023d). However, no individual wolf species have been observed within the Project area. Additionally, the Project area is fragmented to the south, east and north by CCP. Therefore, activities within the Project area are not likely to adversely affect this species.

#### **Mexican Spotted Owl (*Strix occidentalis lucida*)**

On March 16, 1993 the U.S. Fish and Wildlife Service issued a final rule to list the Mexican spotted owl as a federally threatened species under the ESA. The Mexican spotted owl range extends from Utah, Colorado, Arizona, New Mexico, and the western portions of Texas south into several States of Mexico. However, within this range, the Mexican spotted owl occurs in local areas that contain isolated forested mountain systems, forested canyons, and steep, rocky canyon lands (USFWS 2013). These areas typically included parallel-walled canyons up to 1.2 miles in width and include side canyons. An owl site is used by a pair of adults and used for nesting, roosting, and foraging. Habitat for this species is not present within the footprint of the proposed Project; therefore, activities within the Project are not likely to adversely affect this species.

#### **Western Prairie Fringed Orchid (*Platanthera praeclara*)**

On September 28, 1989 the U.S. Fish and Wildlife Service issued a final rule to list the western prairie fringed orchid as a federally threatened species under the ESA. The western prairie fringed orchid historic range extends throughout the tallgrass regions of North America. This includes the Dakotas, Nebraska, Kansas, Oklahoma, Missouri, Iowa, Minnesota, and Manitoba. The Mississippi River is the eastern limit of its range. The western prairie fringed orchid occurs in moist, tallgrass prairies and sedge meadows. In Colorado, the species relies heavily on the Platte River system. Western prairie fringed orchids begin to emerge in late May. Plants flower from mid-June in the southern portion of their range to late-July in the more northerly portions. Plants will display flowers for three weeks with individual flowers lasting for approximately 10 days. Recruitment is accomplished primarily through sexual reproduction. Plants require nocturnal fertilization provided by a specific group of moths adapted to harvesting nectar from the long spur of the orchid (USFWS 1996). Habitat for this species is not present within the footprint of the proposed Project; therefore, activities within the Project are not likely to adversely affect this species.

### Monarch Butterfly (*Danaus plexippus*)

The monarch butterfly is listed as candidate species under the ESA. Adult monarch butterflies are large and conspicuous, with bright orange wings surrounded by a black border and covered with black veins. The black border has a double row of white spots, present on the upper side of the wings. Adult monarchs are sexually dimorphic, with males having narrower wing venation and scent patches. The bright coloring of a monarch serves as a warning to predators that eating them can be toxic.

As a candidate species, the monarch butterfly has no statutory protection under the ESA, however the USFWS encourages cooperative conservation efforts because they are species that may warrant future protection under the ESA (USFWS 2017).

- No monarch butterflies or milkweed species were observed within or surrounding the Project area. The Project area is located above 8,000 feet in elevation in steep, mountainous terrain that is dominated by woodland forest and shrubland. However, future land use changes should consider and describe any planned conservation measures for the monarch butterfly. Conservation measures can include habitat management such as the inclusion of native milkweed plant species in restoration efforts, reducing herbicide and pesticide use within the Project area, and/or creating a conservation easement for habitat protection. Such best management practices will aid in maintaining and/or enhancing the future survival of the monarch butterfly survival. However, these are not regulatory requirements.

#### 2.4.2 COLORADO STATE-LISTED SPECIES

The purpose of this section is to evaluate potential impacts to state-listed species as a result of proposed activities at the Project. Species identified as state threatened or endangered are protected by the CPW under Colorado Statute Title 33. State regulations prohibit “*any person to take, possess, transport, export, process, sell or offer for sale, or ship and for any common or contract carrier to knowingly transport or receive for shipment*” any species or subspecies listed as state endangered or threatened. The CPW also has identified State Species of Special Concern, which are species or subspecies of native wildlife that are currently vulnerable in their Colorado range and have the potential to become threatened or endangered. Species of Special Concern are not protected under State regulations but the ‘take’ of individuals and disturbance of their habitat is strongly discouraged.

All state listed species were screened as potential inhabitants of the Project based on general habitat requirements and CPW Species Profiles (CPW 2023). ERC evaluated the species listed by CPW as threatened or endangered that could potentially exist within the Project. All animal species listed above as threatened or endangered by the USFWS are also listed by the CPW as threatened or endangered, respectively, therefore were not duplicated below.

#### Species Potentially within Range

The following State listed threatened and endangered species are identified to occur within the State (CPW 2023a) and may be present within Clear Creek and Gilpin Counties. However, of the state-listed species below in **Table 4**, none are listed as either State Endangered or State Threatened and are not statutorily protected.



**Table 4. State-Listed Species Potentially Occurring on the Project**

	Scientific Name	Common Name	Status*	Determination
Birds	<i>Falco peregrinus anatum</i>	American Peregrine Falcon	SC	NOT LIKELY TO ADVERSELY AFFECT
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	SC	NOT LIKELY TO ADVERSELY AFFECT
	<i>Tympanuchus phasianellus columbianus</i>	Columbian Sharp-tailed Grouse	SC	NOT LIKELY TO ADVERSELY AFFECT
	<i>Buteo regalis</i>	Ferruginous Hawk	SC	NOT LIKELY TO ADVERSELY AFFECT
Mammals	<i>Thomomys talpoides macrotis</i>	Northern Pocket Gopher	SC	NOT LIKELY TO ADVERSELY AFFECT
	<i>Vulpes velox</i>	Swift Fox	SC	NOT LIKELY TO ADVERSELY AFFECT
	<i>Corynorhinus townsendii</i>	Townsend's Big-Eared Bat	SC	NOT LIKELY TO ADVERSELY AFFECT
Reptiles	<i>Cnemidophorus neotesselatus</i>	Triploid Checkered Whiptail	SC	NOT LIKELY TO ADVERSELY AFFECT
	<i>Fambelia wislizenii</i>	Longnose Leopard Lizard	SC	NOT LIKELY TO ADVERSELY AFFECT
	<i>Lampropeltis getula</i>	Common King Snake	SC	NOT LIKELY TO ADVERSELY AFFECT
	<i>Leptotyphlops dulcis</i>	Texas Blind Snake	SC	NOT LIKELY TO ADVERSELY AFFECT
	<i>Phrynosoma modestum</i>	Texas Horned Lizard	SC	NOT LIKELY TO ADVERSELY AFFECT

\*Status Key

SE = State Endangered

ST = State Threatened

SC = State Special Concern (not a statutory category)

#### 2.4.3 COLORADO PARKS AND WILDLIFE SPECIES ACTIVITY MAPPING

The CPW has developed Species Activity Mapping (SAM) which identifies buffer zones and other distribution data for general wildlife species which is available in Geographic Information Source (GIS) format (CPW 2023b). This mapping provides information on wildlife distributions to public and private agencies and individuals, for environmental assessment, land management resource planning, and general scientific research. This mapping provides a broad overview of CPW wildlife species and habitats within Clear Creek and Gilpin Counties, Colorado. This data was used to broadly identify wildlife species, movement patterns and habitat use within the generally vicinity of the Site. Some wildlife use areas which are part of the SAM program do fall within the Project Area.

Literature review and publicly available SAM data from CPW depict overall range for a variety of species. These include bighorn sheep, black bear, elk, Canada lynx, moose, mountain lion, mule deer, plains gartersnake, prairie lizard, plateau fence lizard, prairie rattlesnake, western rattlesnake, smooth greensnake, terrestrial gartersnake, and wild turkey.

Habitat does exist for larger big game species. Signs of elk, bighorn sheep, mule deer, coyote are present throughout the Project area. Migratory birds such as a golden eagle (*Aquila chrysaetos*), black-capped chickadees (*Parus atricapillus*), and hairy woodpecker (*Dryobates villosus*) were directly observed within the Project area, though no nests were observed.

The specific CPW-mapped wildlife use areas or ranges for these species within and around the Project are summarized as follows in **Table 5**. Refer to **Appendix B** for the CPW maps within the vicinity of the Project.

**Table 5. CPW SAM Mapping Summary (see Appendix B for maps)**

CPW SAM Layer <sup>1</sup>	Definition <sup>1</sup>	Distribution On/Near Project
<b>BIGHORN SHEEP</b>		
OVERALL RANGE	The area which encompasses all known seasonal activity areas within the observed range of a population of bighorn sheep.	Overall range mapped across large portions of Clear Creek and Gilpin Counties, north of I-70
SUMMER RANGE	That part of the range of a species where 90% of the individuals are located between spring green-up and the first heavy snowfall, or during a site-specific period of summer as defined for each Data Analysis Unit. Summer range is not necessarily exclusive of winter range; in some areas winter range and summer range may overlap.	Summer range mapped as being the same as overall range within the vicinity of the Project. Migration corridors generally follow an east/west or west/east direction.
WINTER RANGE**	That part of the winter range of a species where densities are at least 200% greater than the surrounding winter range density during the same period used to define winter range in the average five winters out of ten.	Slightly smaller areas than overall/summer range, and generally restricted to south-facing slopes during winter.
<b>BLACK BEAR</b>		
OVERALL RANGE	The area which encompasses all known seasonal activity areas within the observed range of a population of black bear.	Overall range mapped across majority of the Colorado front range. Black bear may use portions of the Project area and general surrounding area.
<b>ELK</b>		
OVERALL RANGE	The area which encompasses all known seasonal activity areas within the observed range of an elk population.	Overall and summer range mapped across majority of the Project area.
SUMMER RANGE	That part of the range of a species where 90% of the individuals are located between spring green-up and the first heavy snowfall, or during a site-specific period of summer as defined for each Data Analysis Unit. Summer range is not necessarily exclusive of	

CPW SAM Layer <sup>1</sup>	Definition <sup>1</sup>	Distribution On/Near Project
	winter range; in some areas winter range and summer range may overlap.	
<b>PRODUCTION RANGE**</b>	That part of the overall range of elk occupied by the females from May 15 to June 15 for calving.	Production range mapped along on the eastern most portion of the project area where the waste rock landform area will be located.
<b>WINTER CONCENTRATION AREA**</b>	That part of the winter range of elk where densities are at least 200% greater than the surrounding winter range density during the average 5 winters out of 10 from the first heavy snowfall to spring green-up or during a site-specific period of winter as defined for each Data Analysis Unit.	Winter concentration area mapped along the central portion of the project area from north to south.
<b>WINTER RANGE**</b>	That part of the overall range of a species where 90% of the individuals are located during the average 5 winters out of 10 from the first heavy snowfall to spring green-up, or during a site-specific period of winter as defined for each Data Analysis Unit. Winter Range is not delineated for Elk on the Eastern Plains.	Winter range mapped across the entire project area.
<b>LYNX</b>		
POTENTIAL HABITAT <sup>2</sup>	Areas having the highest potential of lynx occurrences in the state. These areas usually contain positive, probable, or possible reports. This information was derived from modeling potential lynx habitat ( <i>see footnote for additional information</i> ).	Mapped along the higher elevation hillslopes to the north and south of the Project area. Portion of the Project area along north-facing slopes are mapped as having potential lynx habitat.
<b>MOOSE</b>		
OVERALL RANGE	The area which encompasses all known seasonal activity areas within the observed range of a population of moose.	Overall range mapped along the central mountains of Colorado including the entire Project area.
SUMMER RANGE	That part of the overall range where 90% of the individuals are located during the summer months. This summer timeframe will be delineated with specific start/end dates for each moose population within the state (ex: May 1 to Sept 15). Summer range is not necessarily exclusive of winter range.	Summer range mapped along the central mountains of Colorado including the entire Project area.
<b>MOUNTAIN LION</b>		
OVERALL RANGE	The area which encompasses all known seasonal activity areas within the observed range of a population.	Overall range mapped along the central mountains of Colorado including the entire Project area.
<b>MULE DEER</b>		
OVERALL RANGE	Area which encompasses all known seasonal activity areas within the observed range of a mule deer population.	Overall range mapped throughout the entire state of Colorado including the entire Project area.
SUMMER RANGE	Part of the Overall Range where 90% of the individuals are located between spring green-up and the first heavy snowfall. Summer Range is not	Summer range mapped along the central mountains of Colorado including the entire Project area.

CPW SAM Layer <sup>1</sup>	Definition <sup>1</sup>	Distribution On/Near Project
	necessarily exclusive of Winter Range; in some areas Winter Range and Summer Range may overlap.	
WINTER RANGE**	Part of the Overall Range where 90% of the individuals are located during the average five winters out of ten from the first heavy snowfall to spring green-up, or during site-specific period of winter as defined for each Data Analysis Unit. Winter Range is only delineated for migratory populations.	Winter range mapped across the entire Project area.
WINTER CONCENTRATION AREA**	Part of the Overall Range where higher quality habitat supports significantly higher densities than surrounding areas. These areas are typically occupied year-round and are not necessarily associated with a specific season. Includes rough break country, riparian areas, small drainages, and large areas of irrigated cropland.	Concentration area is mapped across the central portion of the Project area.
<b>PLAINS GARTERSNAKE</b>		
OVERALL RANGE	The area which encompasses all known seasonal activity areas within the observed range of a population.	Overall range mapped along the central mountains of Colorado including the entire Project area.
<b>PRAIRIE LIZARD AND PLATEAU FENCE LIZARD</b>		
OVERALL RANGE	The area which encompasses all known seasonal activity areas within the observed range of a population.	Overall range mapped along the central mountains of Colorado including the entire Project area.
<b>PRAIRIE RATTLESNAKE AND WESTERN RATTLESNAKE</b>		
OVERALL RANGE	The area which encompasses all known seasonal activity areas within the observed range of a population.	Overall range mapped along the central mountains of Colorado including the entire Project area.
<b>SMOOTH GREENSNAKE</b>		
OVERALL RANGE	The area which encompasses all known seasonal activity areas within the observed range of a population.	Overall range mapped along the central mountains of Colorado including the entire Project area.
<b>TERRESTRIAL GARTERSNAKE</b>		
OVERALL RANGE	The area which encompasses all known seasonal activity areas within the observed range of a population.	Overall range mapped along the central mountains of Colorado including the entire Project area.
<b>WILD TURKEY</b>		
OVERALL RANGE	The area which encompasses all known seasonal activity areas within the observed range of a population.	Overall range mapped along the central mountains of Colorado including the entire Project area.

<sup>1</sup> Colorado Parks and Wildlife (CPW) Species Activity Mapping (SAM) Layers and Definitions taken from: <https://cpw.state.co.us/learn/Maps/CPW-Public-GIS-Species-Activities-Definitions.pdf>.

<sup>2</sup> *Potential habitat* refers to areas that have been identified by CPW using modeling of possible habitat attributes using vegetation cover type, elevation, climate, and other site characteristics. *Potential habitat* does not indicate that species are necessarily present. Lynx, which are listed as having *potential habitat* within the Project area, are generally found in moist, subalpine coniferous forests. These forest types are not present in the Project area.

**\*\* CPW SAM Layer is considered “High Priority Habitat” based on CPW’s “Recommendations to Avoid and Minimize Impacts to Wildlife from Land Use Development in Colorado (CPW 2023c).**

For the big game species that are likely to migrate through the Project area, the Project is not mapped within the following CPW activity use areas:

<b>BIGHORN SHEEP</b>	<ul style="list-style-type: none"> <li>-Highway Crossing</li> <li>-Production Area</li> <li>-Limited Use Area</li> <li>-Resident Population</li> <li>-Migration Corridors</li> <li>-Summer Concentration</li> <li>-Severe Winter</li> <li>-Winter Concentration</li> </ul>
<b>BLACK BEAR</b>	<ul style="list-style-type: none"> <li>-Fall Concentration</li> <li>-Human Conflict Area</li> <li>-Summer Concentration</li> </ul>
<b>ELK</b>	<ul style="list-style-type: none"> <li>-Highway Crossing</li> <li>-Limited Use Area</li> <li>-Resident Population</li> <li>-Migration Corridors</li> <li>-Summer Concentration</li> <li>-Severe Winter</li> </ul>
<b>MOOSE</b>	<ul style="list-style-type: none"> <li>-Priority Habitat</li> <li>-Concentration Area</li> <li>-Winter Range</li> </ul>
<b>MULE DEER</b>	<ul style="list-style-type: none"> <li>-Highway Crossing</li> <li>-Resident Population</li> <li>-Severe Winter Range</li> </ul>

#### **2.4.4 SITE-SPECIFIC WILDLIFE USE OF THE PROPOSED PROJECT**

Generally, the Project provides adequate year-round habitat for the big game species listed in **Section 2.4.3**. The vegetation communities of the Project can provide a variety of wildlife habitat values such as general foraging areas, refuge, nesting, or movement corridors for a variety of species. The overall quality of the existing habitat within the Project is good, given the relatively undisturbed nature of the area.

Bighorn sheep are common in the area and most often can be found along the south-facing slopes adjacent to the CCP and within the Project during the spring and fall (Butler 2020). During the summer, bighorn sheep are less common and are more likely to be found at higher elevations further away from the Project. Black bear and mountain lion are common through all areas of the Project; however, CPW SAM data indicate that the Project is not the location of black bear fall/summer concentration areas and human conflict areas. According to Butler (2020), most mountain lion and bear are observed along the CCP north of the Project in the vicinity of mile marker 3 and 4. Elk are ubiquitous throughout, and may use the Project as general habitat, forage, and cover. No elk migration routes are mapped by CPW SAM for the Project. According to Butler (2020), most elk are observed north of the Project between CCP mile markers 5 and 6.5. However, elk, bighorn sheep, and mule deer may occasionally cross the Project to access water sources to the north (e.g., Fountain Gulch) and to the east (e.g., spring in unnamed drainage (i.e. the

eastern WRL drainage)). Mule deer are commonly observed between CCP Mile Markers .5 and 2 to the south of the Project, and bighorn sheep are common between CCP mile markers 1.5 and 2 (Butler 2020) within and adjacent to the Project's south-facing slopes.

Wetland and riparian areas can provide a variety of wildlife habitat features such as cover, forage, nesting habitat and can act as a movement corridor for various small mammals, amphibians, birds and reptiles. The predominant wetland/riparian habitat types within or adjacent to the Site include Fountain Gulch to the north, Clear Creek to the east and south, and the unnamed drainage to the east. Wildlife values associated with these habitats are generally considered higher due to vegetation diversity, cover, refuge, and a seasonal water source for wildlife. The deep drainages along Fountain Gulch and Clear Creek also provide a valuable wildlife movement corridor adjacent to the Project due to the structural complexity including overstory canopy trees, mid-story shrubs, dense herbaceous vegetation, and variable topography that provides significant cover in an otherwise open and agricultural landscape.

### 3.0 IMPACT ASSESSMENT

#### 3.1 IMPACTS ON VEGETATION

The Project was evaluated for potential impacts to vegetation communities. **Table 6** presents the impacts from each mining phase on the vegetation communities present within the DRMS permit boundary. **Figures 4, 5, 6, 7 and 8** identify the impacts for each phase, land use class, and vegetation cover type.

**Table 6. Impacts to Land Use Class and Vegetation Cover Type within the Project.<sup>1</sup>**

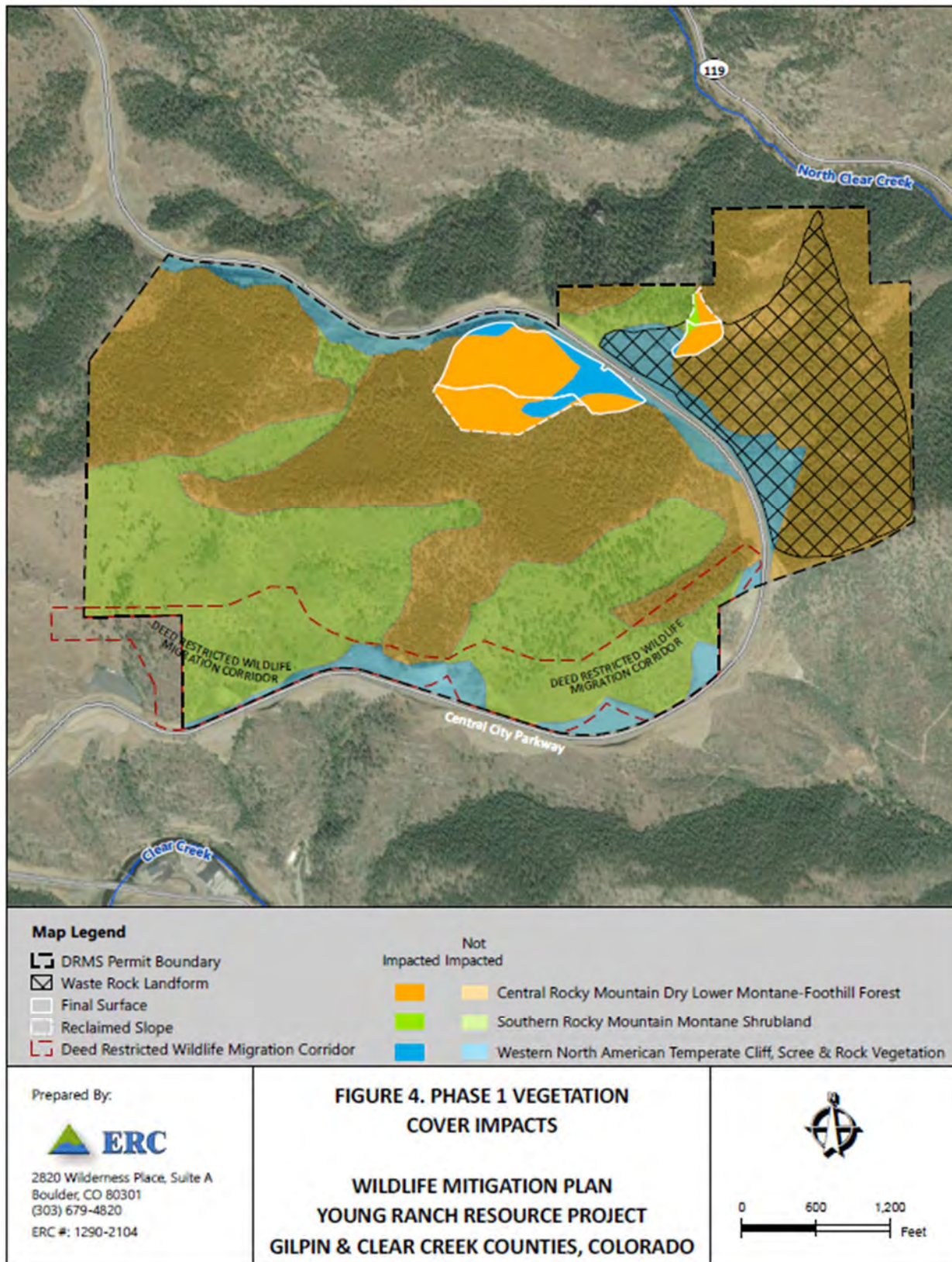
Phase 1				
Vegetation Community	Final Mined Surface* (acres)	Reclaimed Slope^ (acres)	Waste Rock Landform Surface* (acres)	Waste Rock Landform Reclaimed Slope^ (acres)
Central Rocky Mountain Dry Lower Montane-Foothill Forest	11.7	5.7	1.5	0.6
Southern Rocky Mountain Montane Shrubland	0	0	0.1	0.3
Western North American Temperate Cliff, Scree and Rock Vegetation	3.7	1.0	0.1	0
<b>Total</b>	<b>15.4</b>	<b>6.7</b>	<b>1.7</b>	<b>0.8</b>
Phase 2				
Vegetation Community	Final Mined Surface* (acres)	Reclaimed Slope^ (acres)	Waste Rock Landform Surface* (acres)	Waste Rock Landform Reclaimed Slope^ (acres)
Central Rocky Mountain Dry Lower Montane-Foothill Forest	37.3	1.4	13.4	4.6

<sup>1</sup> ^ Reclaimed slope only

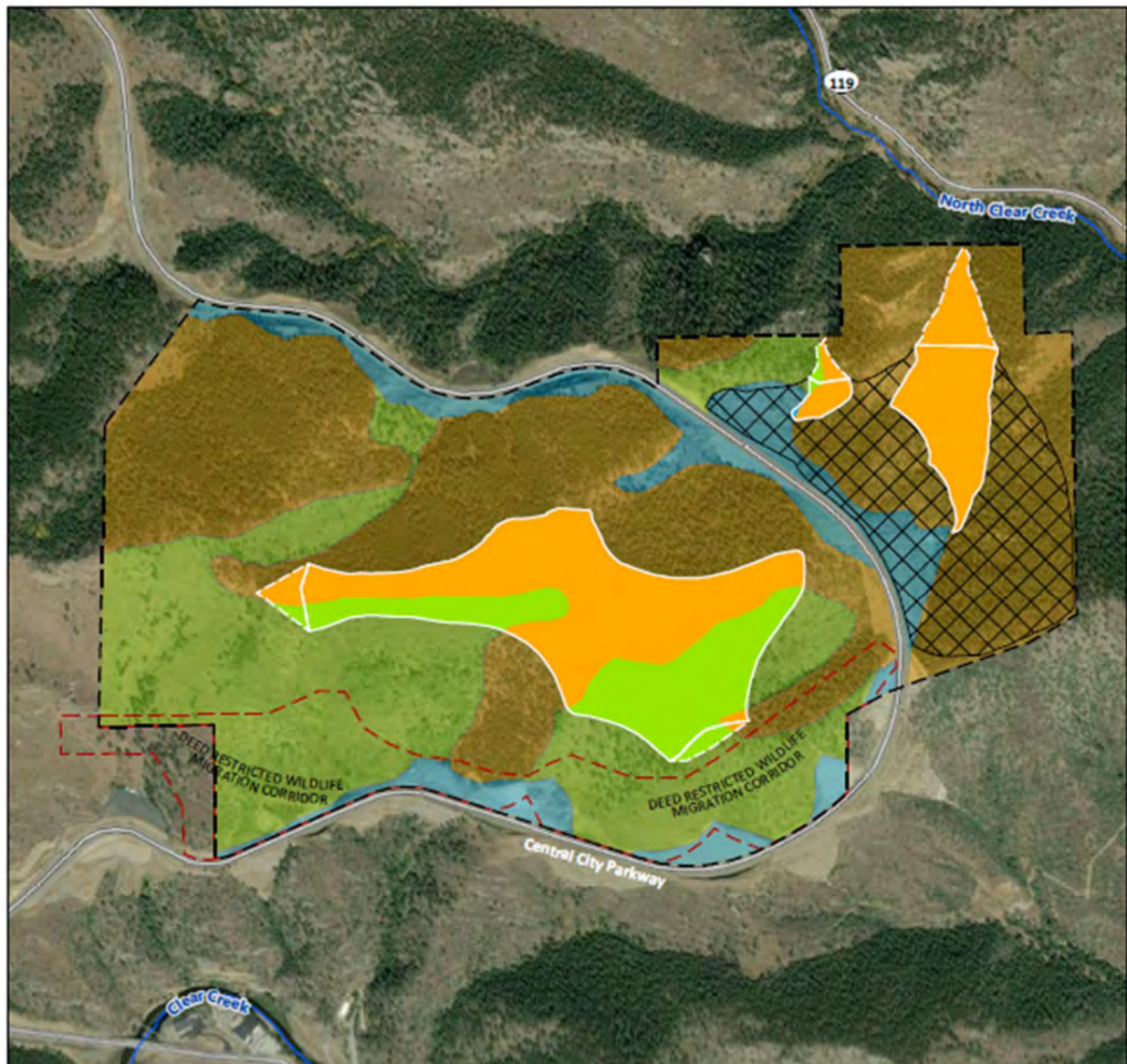
\* Flat surface only








Southern Rocky Mountain Montane Shrubland	24.0	1.3	0.1	0.3
Western North American Temperate Cliff, Scree and Rock Vegetation	0	0	0.1	0
<b>Total</b>	<b>61.3</b>	<b>2.7</b>	<b>13.6</b>	<b>4.9</b>
<b>Phase 3</b>				
<b>Vegetation Community</b>	<b>Final Mined Surface* (acres)</b>	<b>Reclaimed Slope^ (acres)</b>	<b>Waste Rock Landform Surface* (acres)</b>	<b>Waste Rock Landform Reclaimed Slope^ (acres)</b>
Central Rocky Mountain Dry Lower Montane-Foothill Forest	90.5	10.1	21.6	8.7
Southern Rocky Mountain Montane Shrubland	27.5	19.4	0.1	0.2
Western North American Temperate Cliff, Scree and Rock Vegetation	4.6	2.0	0.6	0
<b>Total</b>	<b>122.6</b>	<b>31.5</b>	<b>22.4</b>	<b>8.9</b>
<b>Phase 4</b>				
<b>Vegetation Community</b>	<b>Final Mined Surface* (acres)</b>	<b>Reclaimed Slope^ (acres)</b>	<b>Waste Rock Landform Surface* (acres)</b>	<b>Waste Rock Landform Reclaimed Slope^ (acres)</b>
Central Rocky Mountain Dry Lower Montane-Foothill Forest	53.3	41.7	29.1	22.0
Southern Rocky Mountain Montane Shrubland	8.9	17.4	0.0	0.5
Western North American Temperate Cliff, Scree and Rock Vegetation	0.8	5.5	7.8	1.6
<b>Total</b>	<b>63.0</b>	<b>64.7</b>	<b>36.9</b>	<b>24.1</b>
<b>Phase 5</b>				
<b>Vegetation Community</b>	<b>Final Mined Surface* (acres)</b>	<b>Reclaimed Slope^ (acres)</b>	<b>Waste Rock Landform Surface* (acres)</b>	<b>Waste Rock Landform Reclaimed Slope^ (acres)</b>
Central Rocky Mountain Dry Lower Montane-Foothill Forest	28.9	45.3	0	0
Southern Rocky Mountain Montane Shrubland	26.8	15.9	0	0
Western North American Temperate Cliff, Scree and Rock Vegetation	3.2	0	0	0
<b>Total</b>	<b>58.9</b>	<b>61.2</b>	<b>0.0</b>	<b>0.0</b>







#### Map Legend

-  DRMS Permit Boundary
-  Waste Rock Landform
-  Final Surface
-  Reclaimed Slope
-  Deed Restricted Wildlife Migration Corridor

Not  
Impacted Impacted

-  Central Rocky Mountain Dry Lower Montane-Foothill Forest
-  Southern Rocky Mountain Montane Shrubland
-  Western North American Temperate Cliff, Scree & Rock Vegetation

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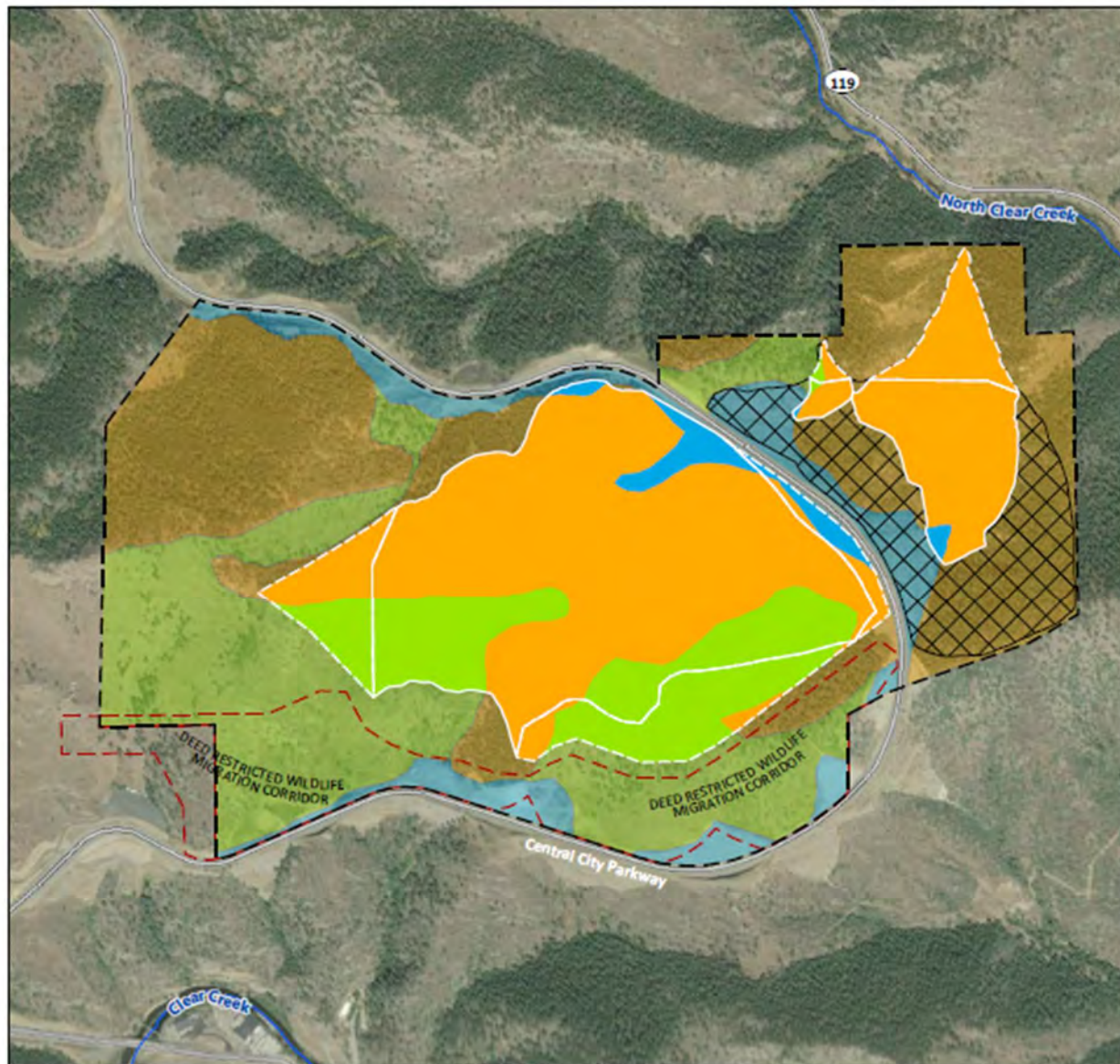
#### FIGURE 5. PHASE 2 VEGETATION COVER IMPACTS

WILDLIFE MITIGATION PLAN  
YOUNG RANCH RESOURCE PROJECT  
GILPIN & CLEAR CREEK COUNTIES, COLORADO





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Feet








#### Map Legend

 DRMS Permit Boundary


 Waste Rock Landform


 Final Surface


 Reclaimed Slope

 Deed Restricted Wildlife Migration Corridor

Not  
Impacted Impacted

 Central Rocky Mountain Dry Lower Montane-Foothill Forest

 Southern Rocky Mountain Montane Shrubland

 Western North American Temperate Cliff, Scree & Rock Vegetation

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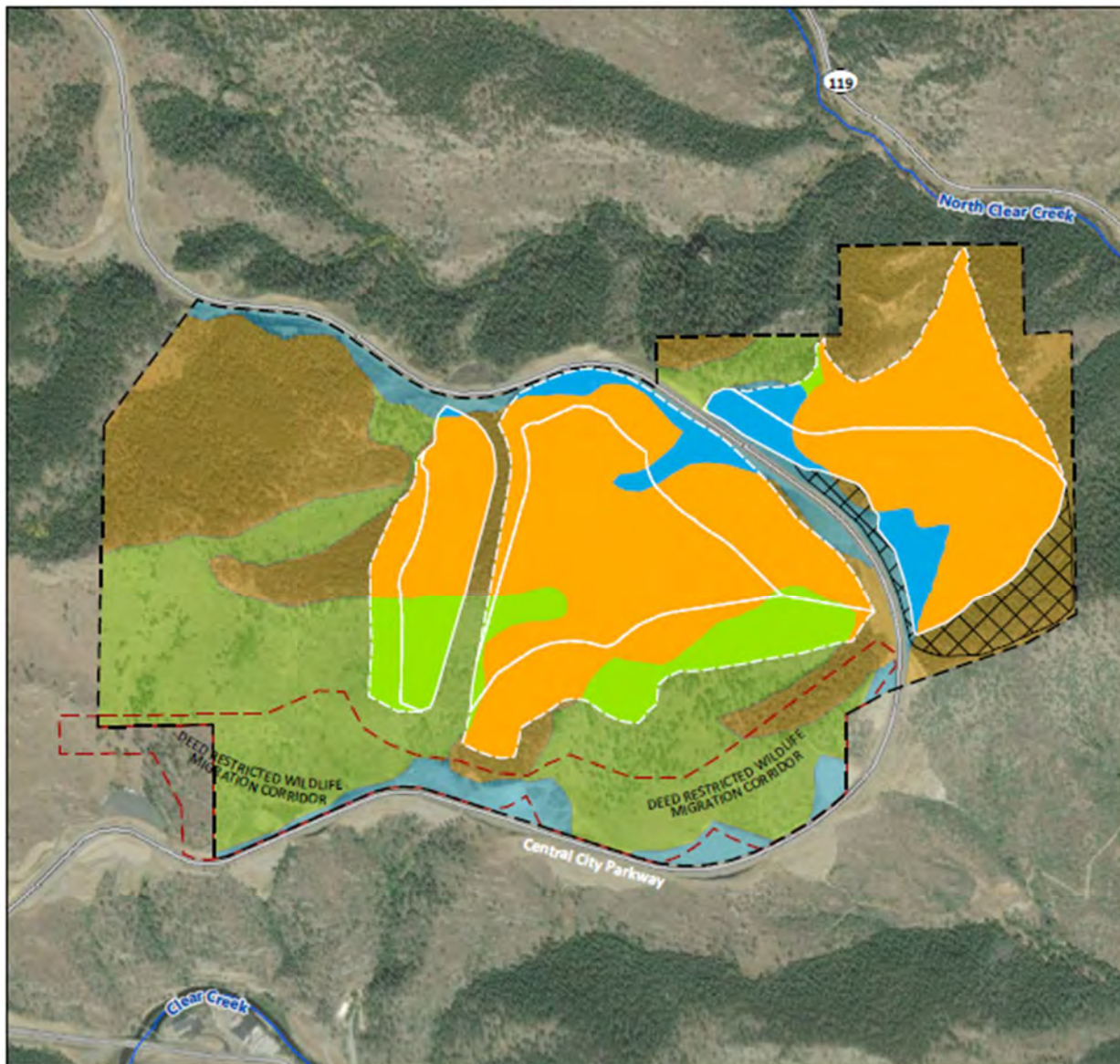
#### FIGURE 6. PHASE 3 VEGETATION COVER IMPACTS

**WILDLIFE MITIGATION PLAN  
YOUNG RANCH RESOURCE PROJECT  
GILPIN & CLEAR CREEK COUNTIES, COLORADO**



0 600 1,200  
Feet





**Map Legend**

-  DRMS Permit Boundary
-  Waste Rock Landform
-  Final Surface
-  Reclaimed Slope
-  Deed Restricted Wildlife Migration Corridor

Not  
Impacted Impacted

-  Central Rocky Mountain Dry Lower Montane-Foothill Forest
-  Southern Rocky Mountain Montane Shrubland
-  Western North American Temperate Cliff, Scree & Rock Vegetation

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(303) 679-4820  
ERC #: 1290-2104

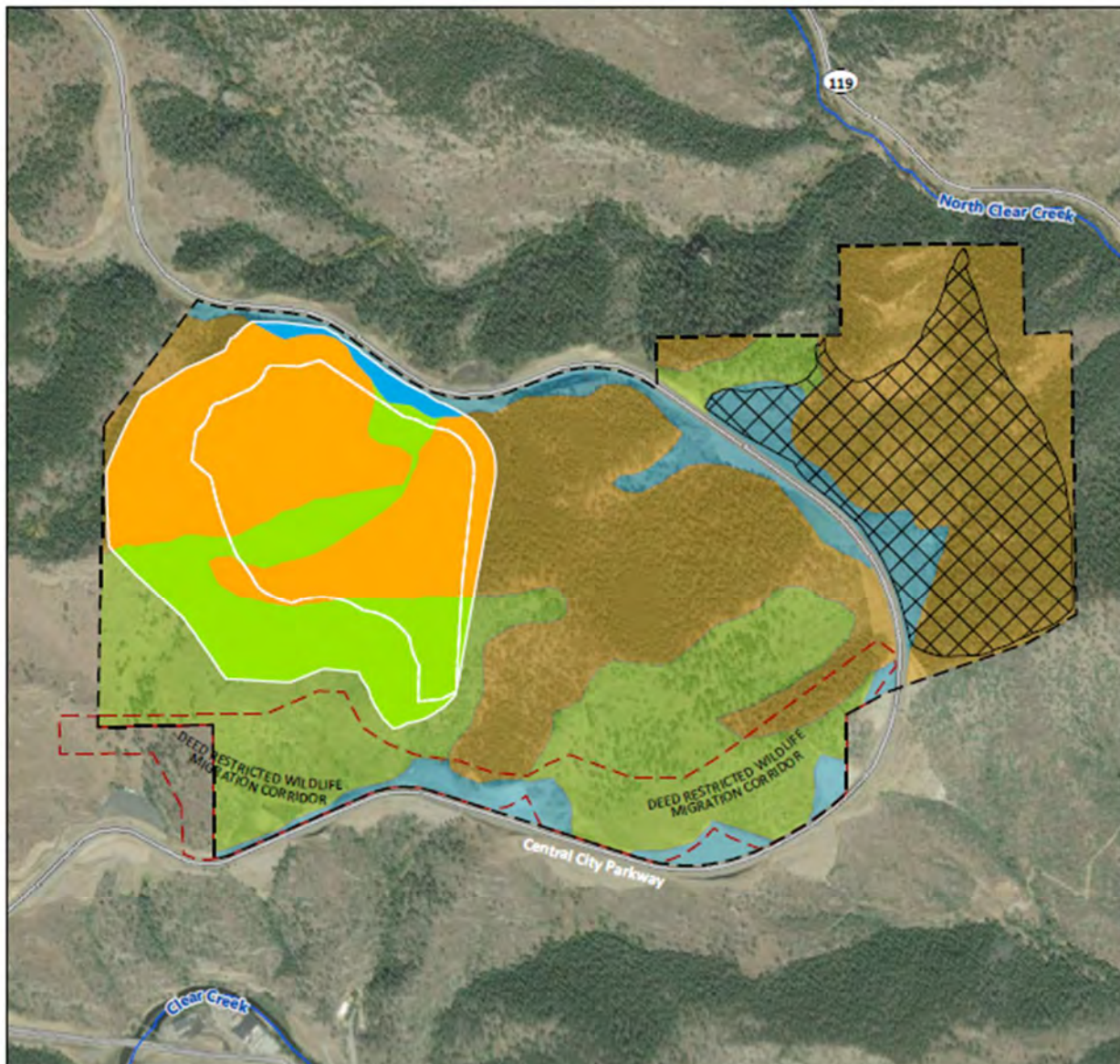
**FIGURE 7. PHASE 4 VEGETATION  
COVER IMPACTS**

**WILDLIFE MITIGATION PLAN  
YOUNG RANCH RESOURCE PROJECT  
GILPIN & CLEAR CREEK COUNTIES, COLORADO**













0 600 1,200  
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**Map Legend**

 Waste Rock Landform	 Not Impacted	 Impacted
 Final Surface	 Central Rocky Mountain Dry Lower Montane-Foothill Forest	
 Reclaimed Slope	 Southern Rocky Mountain Montane Shrubland	
 DRMS Permit Boundary	 Western North American Temperate Cliff, Scree & Rock Vegetation	
 Deed Restricted Wildlife Migration Corridor		

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**FIGURE 8. PHASE 5 VEGETATION  
COVER IMPACTS**

**WILDLIFE MITIGATION PLAN  
YOUNG RANCH RESOURCE PROJECT  
GILPIN & CLEAR CREEK COUNTIES, COLORADO**



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### 3.2 IMPACTS ON COLORADO PARKS AND WILDLIFE (CPW) SPECIES ACTIVITY MAPPING (SAM) AND HIGH PRIORITY HABITAT AREAS (HPH)

The Project is located within the CPW mapped seasonal range of overall/summer range/winter for several big game species including mule deer, elk, moose, black bear, and bighorn sheep (**Attachment B** maps). The identified habitat ranges for mule deer, elk, moose, black bear and bighorn sheep designate very large regional territories utilized by the identified species. The Site represents only a *de minimis* portion of some of these species' regional habitat ranges. Therefore, the project is not anticipated to negatively impact individuals or populations of wildlife overall/summer/winter ranges.

- **As shown on Figures 4, 5, 6, 7 and 8, the footprint of the Project is intentionally designed to minimize the impact to south-facing slopes within Clear Creek County. One "Deed Restricted Wildlife Migration Corridors" will be established to allow for populations of big game species to continue to access the Clear Creek corridor to the south of the Project. Prior to the start of mining, the southernmost 77.2 acres of the site will be included.**

CPW has recently developed Recommendations to Avoid and Minimize Impacts to Wildlife from Land Use Development in Colorado in July (CPW 2023c). The recommendations identify High Priority Habitat (HPH) by species and provide general recommendations related to disturbances. These recommendations were originally developed specifically for the Colorado Oil and Gas Commission as part of fluid mineral development; however, CPW has provided these recommendations for other land use proposals.

CPWs recommendations for impacts to HPH include timing limitations (TL), controlled surface use (CSU) site specific relocation (SSR), no surface occupancy (NSO) and no ground disturbance (NGD). The following definitions are provided (CPW 2023c):

**TL** means "the area is closed to fluid mineral exploration and development, surface-disturbing activities, and additional specified activities during the time-frame identified".

**CSU** means "the area is open to fluid mineral leasing and development subject to special operating constraints to project the specified resource values".

**SSR** is "similar to a CSU in that it allows some development while protecting the identified resource values with special constraints. These constraints may include shifting the activity away from the resource value needing protection".

**NSO** means "that use or occupancy of the land surface for fluid mineral exploration or development and all activities associated with fluid mineral leasing (e.g. truck-mounted drilling, stationary drilling, geophysical exploration equipment off designated routes, and construction of wells, pads, compressors or pipelines) are prohibited to protect resource values".

**NGD** means "that the area is closed to all surface-disturbing activities".

**Table 7** below lists the CPW SAM data which identifies the following "High Priority Habitat Areas" within the Project area. These species habitat will be disturbed as a result of the project.

**Table 7. CPW Listed High Priority Habitat Areas**

Scientific Name	Common Name	HPH*	CPW Recommendation
<i>Ovis canadensis</i>	Bighorn Sheep	Winter Range	TL, CSU and/or SSR
<i>Odocoileus hemionus</i>	Mule Deer	Winter Concentration Area	TL, CSU and/or SSR
<i>Cervus canadensis</i>	Elk	Winter Concentration Area	TL, CSU and/or SSR
		Production Area	TL, CSU and/or SSR

\*Based on CPW SAM Data (CPW 2023b) and *CPW's Recommendations to Avoid and Minimize Impacts to Wildlife from Land Use Development in Colorado* (CPW 2023c).

#### Bighorn Sheep

The CPW recommendation for winter range habitat for bighorn sheep include TL, CSU and/or SSR. The recommendations include “TL - No permitted or authorized human activities (including overflights) from November 1 to April 30; CSU and SSR - Surface density limitation of one pad per square mile and less than one linear mile of routes per square mile (640 acres). If pad or route density cannot be achieved or maintained, implement offsite mitigation to offset functional habitat loss”.

- Bighorn sheep winter range habitat will be disturbed as a direct result of the project. To mitigate disturbance to bighorn sheep winter range habitat, a 77.2-acre deed restricted wildlife corridor will be implemented. The deed restriction is discussed in **Section 1.3** and is depicted in **Figures 4, 5, 6, 7 and 8**. Additionally, **Section 4.0** details specific potential mitigation options that will be considered and are depicted on **Figures 10, 11, 12, 13 and 14**. Therefore, impacts to bighorn sheep winter range habitat will be minimized.

#### Mule Deer

The CPW recommendation for winter concentration areas for mule deer include TL, CSU and/or SSR. The recommendations include “TL - No permitted or authorized human activities from December 1 to April 30; CSU/SSR - Surface density limitation of one pad per square mile and less than one linear mile of routes per square mile (640 acres). If pad or route density cannot be achieved or maintained, implement offsite mitigation to offset functional habitat loss.”

- Mule deer winter concentration area habitat will be disturbed as a direct result of the project. To mitigate disturbance to mule deer winter concentration areas, a 77.2-acre deed restricted wildlife corridor will be implemented. The deed restriction is discussed in **Section 1.3** and is depicted in **Figures 4, 5, 6, 7 and 8**. Additionally, **Section 4.0** details specific potential mitigation options that will be considered and are depicted on **Figures 10, 11, 12, 13 and 14**. Therefore, impacts to mule deer winter concentration area habitat will be minimized.

#### Elk

The CPW recommendation for winter concentration areas and production areas for elk include TL, CSU and/or SSR. The recommendations for winter concentration area habitat include “TL - No permitted or authorized human activities from December 1 to April 30; CSU/SSR - Surface density limitation of one pad per square mile and less than one linear mile of routes per square mile (640 acres). If pad or route density cannot be achieved or maintained, implement offsite mitigation to offset functional habitat loss.” The recommendations for production area habitat include “TL - No permitted or authorized human activities

from May 15 to June 30; CSU/SSR - Surface density limitation of one pad per square mile and less than one linear mile of routes per square mile (640 acres). If pad or route density cannot be achieved or maintained, implement offsite mitigation to offset functional habitat loss.”

- Elk winter concentration area habitat and production area habitat will be disturbed as a direct result of the project. To mitigate disturbance to elk winter concentration area habitat and elk production area habitat, a 77.2-acre deed restricted wildlife corridor will be implemented. The deed restriction is discussed in **Section 1.3** and is depicted in **Figures 4, 5, 6, 7 and 8**. Additionally, **Section 4.0** details specific potential mitigation options that will be considered and are depicted on **Figures 10, 11, 12, 13 and 14**. Therefore, impacts to elk winter concentration area habitat and elk production area habitat will be minimized.

### 3.3 MIGRATORY BIRD TREATY ACT

Based upon literature review and an onsite assessment, ERC has determined that some migratory birds may utilize the Project area, however, are not anticipated to be impacted. Migratory birds are protected under the MBTA and killing or possession of these birds is prohibited. Proposed activities which will remove native vegetation, in particular large overstory trees should first ensure that active nests are not disturbed by conducted a bird nesting survey. Generally, the active nesting season for most migratory birds in this region of Colorado occurs between April 1 and August 31.

- **Migratory birds will not likely be impacted as a result of the Project.**

### 3.4 FEDERAL AND STATE THREATENED AND ENDANGERED SPECIES

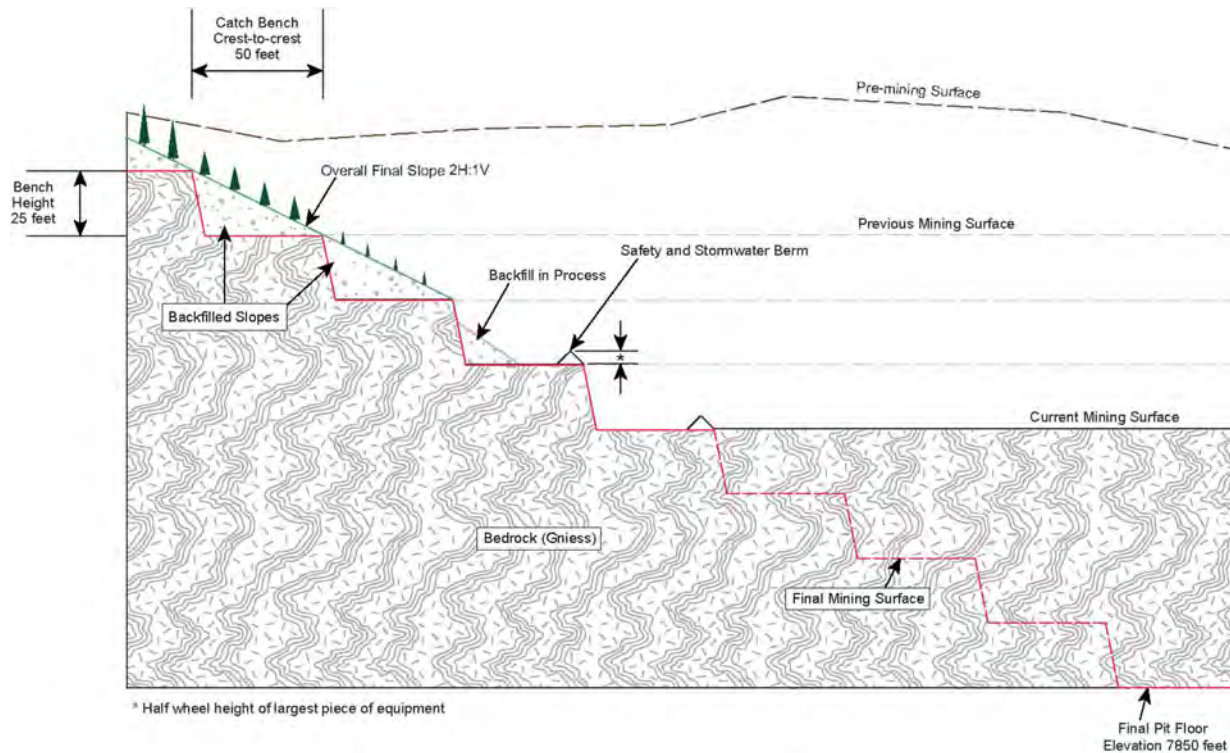
No federally listed threatened and endangered species and/or habitat protected under the ESA were identified within Project. The vegetation communities within the Project were investigated as potential habitat for federally listed species. Potential federal listed threatened and endangered species habitat was found to lack one or more habitat components critical for the federally listed species likely to occur in the area.

- **Federal and/or State threatened and endangered species are not likely to be adversely affected as a result of the Project.**

### 3.5 IMPACTS ON GENERAL WILDLIFE USE AT THE PROPOSED YOUNG RANCH RESOURCE

As with any Project, potential disturbances from construction, natural habitat loss and increased human activity can result in increased human-wildlife conflicts, increased mortality, habitat fragmentation, dispersion of wildlife populations and adjustments in wildlife use patterns. The direct loss of habitat (vegetation removal) through the conversion of land from forest/shrubland to an aggregate extraction operation represents the greatest impact of the proposed Project. The proposed Project affects potential wildlife use within the proposed disturbance areas (e.g. mining phases) for a finite time period. This will represent a temporary loss of habitat. However, as discussed in **Section 1.2** and **Section 1.4**, mining will occur in five phases, with reclamation/reseeding occurring between each phase. As shown on **Table 6** and **Figures 4 through 8**, only a portion of each mining phase will be disturbed. Reclamation and mining will occur on a bench basis and will be much smaller than the total area of each phase. Thus, it is expected that wildlife may use portions of the Project that have been reclaimed before the overall operation is complete. A schematic showing reclamation of the mining benches is shown on **Figure 9** below.

Figure 9. Schematic Showing Mining Slope and Reclamation Plan (Source: Greg Lewicki Associates, PLLC).



The proposed Project may have indirect impacts to wildlife use. Increased noise, lighting, human activity and general heavy construction operations will result in localized dispersion and avoidance of use in the immediate vicinity of the Project. Subsequently, wildlife movement through the Project to adjacent areas may be affected by the proposed activity.

- **Disturbance to wildlife is inevitable with any proposed activity, especially in the mountainous areas of Colorado and Clear Creek/Gilpin Counties. Impacts on wildlife use from the proposed Project would include direct temporary elimination of potential habitat, including CPW High Priority Habitats, within the Project area, and temporary localized displacement associated with additional noise and lighting from the proposed Project. This localized loss of habitat is not anticipated to significantly disrupt regional migration or movement patterns and would not threaten the overall health and viability of a species. Nearby lands that adjoin the Project area are largely undeveloped therefore it is anticipated that local wildlife (specifically elk, mule deer, and bighorn sheep) would easily adapt to disturbances and find sufficient habitat to sustain locally displaced species. In the long-term, the proposed Project will be fully reclaimed at the conclusion of mining which will restore some degree of wildlife habitat over time, unlike residential/commercial developments which may persist permanently. As stated in Section 1.4 and discussed above, interim reclamation will be used throughout all mining phases to ensure that vegetation within previously developed portions of the Project become re-established to provide forage for wildlife.**

## 4.0 ACTIONS TO AVOID, MINIMIZE, AND MITIGATE WILDLIFE IMPACTS

The following section provides information regarding potential wildlife mitigation options that are available for the Project. Smart technology (described in **Section 4.1**), wildlife underpasses, fencing, and exit ramps are the preferred choice for this Project based on knowledge of known wildlife migration corridors as well as topographic constraints (CPW 2020a). It is important to note that at the time of installation and prior to each mining phase, the best technology will be evaluated (i.e., smart technology vs. underpass). As described in **Section 2.0** to this report, a variety of wildlife species may occupy the Project, including small game, big game, and avian species. Generally, the mitigation options provided herein are geared toward helping to reduce the chance of wildlife-vehicle collisions and enhance the effectiveness of wildlife movement areas within or adjacent to the Project. As discussed in **Section 2.4.4**, wildlife movement areas include seasonal migration paths, winter range, within home range movements, and dispersal movements between populations. **Figures 10 through 14** to this report provides suggestions for the placement of site-specific mitigation features, including smart technology, wildlife underpasses, wildlife fencing, and exit ramps. The purpose of these mitigation features is to allow for continued wildlife use of the area during the life of the Project, while implementing protective measures to help avoid human-wildlife interactions. Mitigation options shown on **Figures 10 through 14** are placed in prioritization areas that are most likely to see wildlife-vehicle collisions and wildlife movement, as described in **Section 2.4.4**

- **The goal of the mitigation options shown on Figures 10 through 14 is to disperse big game species away from the Project by installing smart technology and/or underpasses, wildlife fencing, and exit ramps at strategic locations where wildlife movements are known to occur and to minimize for the direct loss of HPH discussed in Section 3.2.**

### 4.1 DESCRIPTION OF POTENTIAL MITIGATION OPTIONS

#### Wildlife Overpasses

Wildlife overpasses are a habitat conservation practice where structures are designed to allow for safe passage of terrestrial species over the top of human-made barriers. Of the types of human-made barriers that penetrate and divide wildlife habitat, roads have been the most widespread and have had the most detrimental effects (Spellerberg 1998). Road fragmentation affects wildlife populations by decreasing the habitat quality and amount, increasing mortality due to wildlife-vehicle collisions, preventing access to foraging and other resources, and subdividing wildlife into smaller, more vulnerable populations. Generally, the advantage to using a wildlife bridge would be the potential to place soil and seed native vegetation along the top, creating a “green bridge” and increasing native plant habitat. Wildlife overpasses and underpasses should complement one another in that each are utilized to a greater extent by different species. As examples, mule deer and elk tend to prefer wildlife overpasses, while black bear and mountain lion generally prefer wildlife underpasses (Huijser 2008). The approach of the grades perpendicular to the road can be a determining factor in the feasibility of using a wildlife bridge versus a wildlife culvert. Wildlife bridges are typically less economical to construct than wildlife culverts.



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**Wildlife Culverts/Underpasses**

Wildlife culverts/underpasses (preferred choice for this Project) are a habitat conservation practices where structures are designed to allow for safe passage of flightless, terrestrial species under human-made barriers. As with wildlife bridges, wildlife culverts/underpasses should be designed in coordination with CPW to determine optimal placement along the barrier. Studies have shown that underpasses can effectively be used underneath a two-lane highway (Western EcoSystems 2011, Capson 2014). Wildlife underpasses are most effective in conjunction with continuous fencing and berms to funnel wildlife movement into the underpasses. One advantage to using a wildlife culvert versus a wildlife bridge would be the opportunity to tie wetland and water drainage Projects into wildlife culvert Projects. Another advantage would be that wildlife culverts are more economical of the two. A disadvantage to using wildlife culverts is the possibility of snow and ice buildup, which can reduce the effectiveness of the underpasses. Wildlife culverts should be constructed in a manner where wildlife does not feel confined during use (Western EcoSystems 2011, Capson 2014).

**Game Cameras**

Game cameras should be installed at each wildlife culvert and bridge to determine the effectiveness of those mitigation measures and determine the needs around scheduled maintenance, sediment and/or snow and ice removal. Monitoring is a valuable tool to evaluate the use of underpasses and overpasses (Western EcoSystems 2011). Game cameras are a minimally disruptive means of observing wildlife and functional capacity of wildlife mitigation measures. Game cameras also provide a less invasive method of observing sensitive and protected species in the area than human observation. Cameras as a detection method allows for the possibility to alert wildlife managers of potential conflicts when they arise.

**Wildlife Guards**

Wildlife guards are metal grids placed on the ground (usually over ditches) with openings designed small enough to allow vehicles and pedestrians to pass over, and large enough that wildlife is unable to. Wildlife guards are similar to cattle guards, although they are generally at least twice the width of a standard cattle guard in order to accommodate for certain deer and pronghorn species' ability to jump over greater distances (Reed et al. 1974). Wildlife guards should be placed at all access roads onto the highway corridor to reduce wildlife accessibility. A disadvantage to the installation of wildlife guards is that they may be a potential hazard to cyclists and pedestrians (Peterson et al. 2003).

**Wildlife Escape/Exit Ramps/Slope Jumps**

Wildlife escape ramps are one-way passages designed to move wildlife out of areas that are detrimental to wildlife and human use, such as a roadway. Wildlife ramps can be designed in a variety of sizes and constructed with a variety of materials. Large ramps are considered the most effective but also the most expensive measure to escape from highway corridors (Dodd et al. 2007, Gagnon et al. 2009). These ramps are generally constructed with raised retaining walls of either pressure treated planks or concrete walls on footers. Ramps are typically built on relatively level terrain with a wall erected up to 6 feet, behind which, fill is used to create a sloping ramp on the fenced corridor side of the fence. An opening in the fence allows animals to jump out and down off the ramp yet prevents them from jumping up and breaching the corridor. Perpendicular wing fences help facilitate animals slowing down and seeing the opening in the fence

through which they can escape the fenced corridor (AZDOT 2019). The smaller, scaled-down ramps are both functionally and cost effective, and thus increase their application under limited budgets. An escape ramp design constructed from anchored gabion baskets have also been used in the western U.S. (Bristow and Crabb 2008). This escape ramp design provides yet another cost-effective alternative to expensive full-sized ramp designs. Due to their lower cost and increased potential for application, along with their demonstrated effectiveness elsewhere (Hammer 2001), these small escape ramp designs provide a viable and preferred option to larger, more costly ramp designs. Slope jumps are an inexpensive measure for wildlife escape within a fenced/bermed corridor. Along the fencing an eight to twelve-foot section of the fence is lowered approximately to 4-5 feet above the ground with the down slope away from the highway. The shorter section of fencings creates an opening wildlife can identify and jump through onto the downslope. The gradient of the slope needs to be so that entry into the corridor from the downslope is not possible. Existing and future bridge abutments create a natural drop when complemented with wildlife fencing.

### **Wildlife One-Way Gates**

The earliest reported application of escape measures were one-way gates with spring loaded metal tines (Reed et al. 1974). These one-way gates have been widely applied in the western U.S. and Canada, including along State Route 260. Gates are typically installed in the fence at fence offsets so that animals that travel along the fence encounter and thus pass through them, exiting the corridor. However, it has been reported that mule deer in Utah used earthen escape jumps 8 to 11 times more frequently than one-way gates (Hammer 2001, Bissonette and Hammer 2000). Although earthen jumps are considerably more expensive than one-way gates, it has been found that they were considerably more cost effective than one-way gates, when considering reduced incidence of wildlife-vehicle collisions associated with fenced corridors with ramps. Given the comparative reduced efficacy, one-way gates should be considered as a lower priority option for a wildlife escape measure from fenced corridors even with their relatively low cost and ease of installation.

### **Right-of-Way Vegetation Management**

Increasing and enhancing lines of sight between motorists and wildlife would reduce incidents of wildlife-vehicle collisions. Improved visibility can be facilitated by removal of vegetation and maintenance of grass and herbaceous plants. Grasses and herbaceous vegetation are a food source for ungulates in a forested environment and may be an attractant (Rea et al. 2003). The creation of open habitat could reasonably be a deterrent to smaller animals such as birds and butterflies, increasing the barrier effect of roads. A roadside vegetation management plan should be designed with small animal habitat, visibility, and reduction of wildlife-vehicle collisions in mind.

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**Wildlife Safe Fencing**

Wildlife safe fencing is an important component in mitigation design for highway corridors and mining activities. All fencing that are problematic for wildlife including loose wires, barbed wires, wires spaced too closely together, and fencing that lacks the appropriate number of breaks, crossings, and wildlife escape ramps in the instance of road corridors. Mitigating wildlife-vehicle collisions at the ends of wildlife fencing is an important component to reducing conflicts along gaps in corridor barriers. Wildlife warning signs, ending the fence near the road, boulder fields between the fence and road, wildlife guards across the road, electric mats embedded in the road surface, and strategies that allow for better driver visibility such as ending fences on straight highway sections or with increased lighting are all effective mitigation strategies for reducing collisions (Huijser et al. 2008).

**Earthen Berms**

Earthen berms should be placed strategically to complement wildlife safe fencing that would help to funnel wildlife to the designated road crossings (overpasses and underpasses). Berms should also be used alongside wildlife safe fencing to encompass the entire mining operation minimize conflict between wildlife and human operations. Earthen berms can be installed or retrofitted along wildlife underpasses with ledges to encourage tunneling by mid-size mammals and amphibians of varying sizes (Veenbaas et al. 1999). Additional benefits to installing berms parallel with road corridors is the reduction of traffic disturbance and noise to the surrounding habitat, while also enhancing roadside snow drift controls.

**Avoid Impacts to Riparian and Other Important Wildlife Corridors**

Riparian and other important corridors should be preserved and protected to the greatest extent practicable. Riparian corridors are unique habitats that provide critical habitat and migration pathways for a variety animal species. Other important wildlife corridors may be considered in the placement of wildlife crossings and reducing impacts. For example, Canada lynx (*Lynx canadensis*), an endangered species, prefers to travel along ridges and saddles within tree cover through the mountains (Koehler 1990). A minimum of a 50 buffer, extending from the riparian corridor edge (not just the wetland buffer) should be established and maintained. Preserving movement along these corridors would be essential for optimizing wildlife crossing effectiveness.

**Problem Species Management**

Right-of-way corridors and lands in and around mining activities should be routinely maintained to prevent the establishment and spread of noxious weeds. Disturbed lands should be temporarily or permanently reclaimed with appropriate native species to provide competition for invasive plant species. Impacts from problematic animal species should be considered during construction and maintenance efforts. For example, the mountain pine beetle (*Dendroctonus ponderosae*) is a native Colorado bark beetle that predominately infest ponderosa pine (*Pinus ponderosa*), lodgepole pine (*P. contorta*), and limber pine (*P. flexilis*). Eventually infestation can lead to the death of the host tree and become a hazard to the roadway, mining operation, or other mitigation structures. Management may include removal of infested trees, using trap trees, solar treatments, pesticides, or pheromone packets (Leatherman et al. 2011).

### **Avoid Construction Operation during Nesting Season**

Locally, mining operations may cause severe displacement of terrestrial species causing stress to be placed on adjacent lands. Mining operations being performed outside of the nesting season for a bird species may mitigate disruptions and reduce overall displacement. No new mining areas should be opened during the active nesting season. Rearing young requires intense energy expenditure for the parents and is a highly vulnerable time for offspring bound to the nest. Implementing CPW buffer recommendations during construction and maintenance may help to eliminate destruction of or disturbance to active nests (CPW 2020).

### **Minimize Artificial Light Use at Night**

Artificial lighting at nighttime in and around mining operations and roadways has a detrimental effect on wildlife and should be minimized to the greatest extent practicable while maintain safe operations. Artificial light disturbs sleep cycles (Raap et al. 2015), interrupts predation activities (Rich et al. 2006), and influences plant-animal interactions (Bennie et. al 2015). Non-essential nighttime lights should be turned off during non-operating hours and lighting should not spill off site to avoid unnecessary nighttime wildlife disturbance. Lighting should not extend into riparian or other important wildlife corridors.

### **Increasing Wildlife Signage, Controlling Traffic Volume, and Speed**

Strategically placed wildlife warning signs have shown to increase motorist's alertness while driving through highway corridors. Flashers should be installed to wildlife signage and triggered at dawn, dusk, or throughout the night depending on the site-specific placement. Automatic speed cameras are an effective tool in speed reduction and vehicle collision reduction (Decina et al. 2007). A systematic review of the effectiveness of speed cameras showed a reduction in vehicle speed by an average of between 1-15%, a reduction in the proportion of vehicles violating the speed limit by 14-65%, a reduced total of crashes by 8-49%, and reduced fatal and serious-injury crashes 11-44% (Wilson et al. 2010). Traffic volume and speed are contributing factors to wildlife road mortality. This relationship is not necessarily linear and can vary by species (Charry et al. 2009). If it is known when traffic and wildlife will interact over a specific period, temporary mitigation measures that reduce traffic or slow vehicle speeds may be useful. Traffic calming measures may also include increased human enforcement in speed reduction zones, use of speed bumps, and road design measures. Speed limit reduction could be implemented during night-time or seasonally for migration events. Digital signage with variable speed limit controls would allow for ease in implementation.

### **Smart Technology**

Smart technology is being considered at several locations for the Project. At the time of installation and prior to each mining phase, the best technology will be evaluated (i.e., smart technology vs. underpass or combination). Smart technology may include a variety of options discussed above or a combination of mitigation options that best suit the type of species where mitigation is warranted. For example, fencing in combination with crossing structures (underpass, exit ramp, etc.) may be the most effective system for terrestrial wildlife. It may also be determined that at-grade wildlife crossings provide more benefit versus grade-separated wildlife crossings (i.e., underpass/overpass), especially in areas where topography may constrain the placement of underpasses. Due to topographic constraints or other factors, underpasses

may not be the best choice for wildlife. Smart technology may also include future technology yet to be designed (i.e. remote sensing, wildlife detection systems, etc.).

#### 4.2 MITIGATION ACTION SUMMARY TABLE

**Table 8** below provides a summary of potential mitigation options for the Project. Additionally, **Figures 10 through 14** provides priority areas within and adjacent to the Project where certain mitigation options are recommended. The mitigation areas shown on **Figures 10 through 14** are the locations most likely to have either wildlife-vehicle conflict and/or wildlife movement.

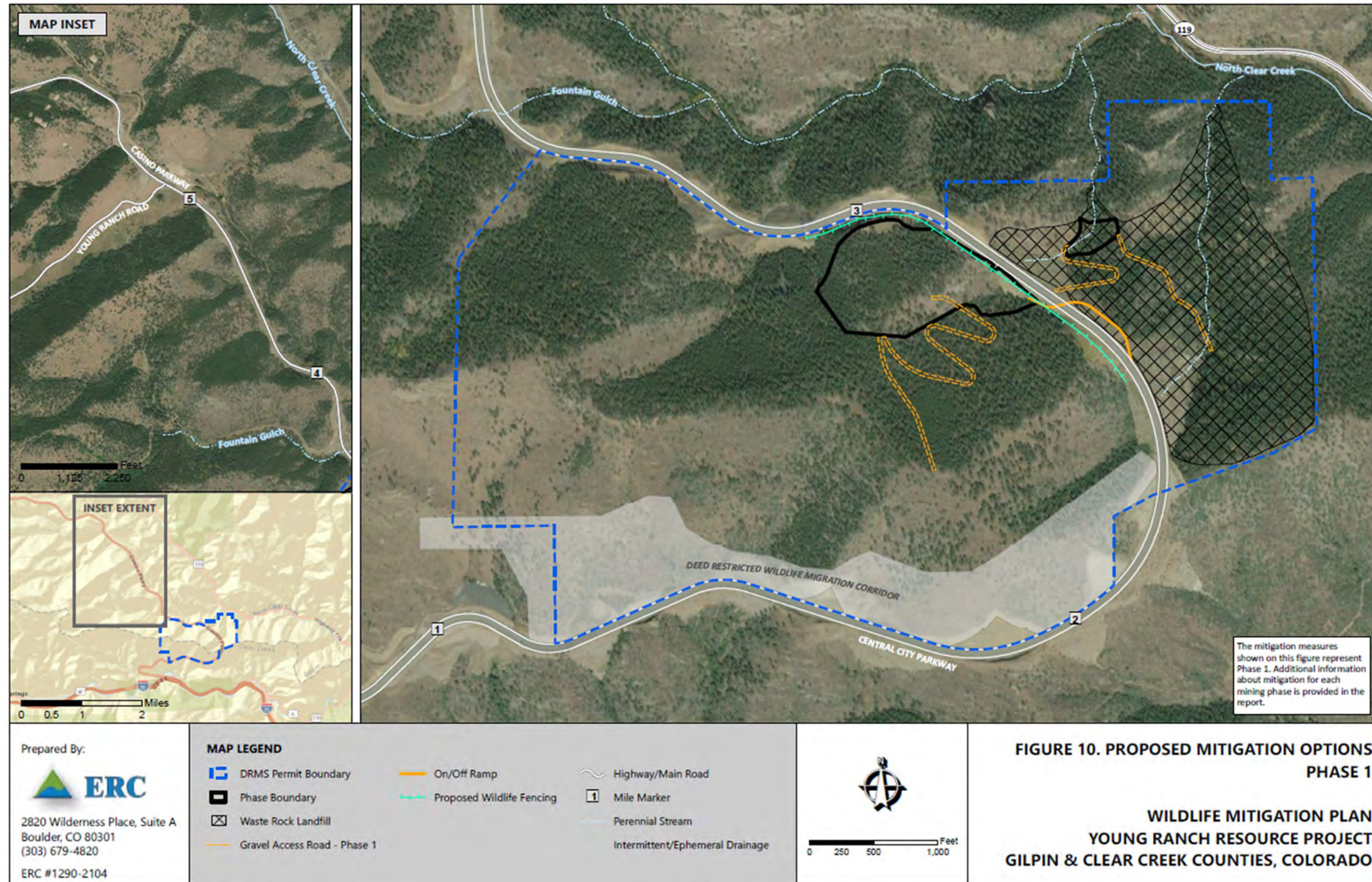
**Table 8. Mitigation Action Summary Table**

Mitigation Action Summary Table		
Action	Intended Effect	Potential Concerns
Wildlife Overpasses	Create safe passage for wildlife species across human made barriers. Allow for additional native plant habitat creation.	May aid in the spread of invasive species, fire, parasites, and pathogens. Cost can be prohibitive.
Wildlife Culverts/Underpasses (preferred choice)	Create safe passage for wildlife species across human made barriers. Could be in conjunction with wetland and stream preservation Projects.	May aid in the spread of invasive species, parasites, and pathogens. Maintenance may be required to remove ice and snow build up.
Game Cameras	Document effectiveness and utilization of mitigations measures/maintenance needs.	Observation is limited to mid-size to larger animals and by camera angles
Wildlife Guards	Prevention of wildlife from entering on access roadways into fenced highway corridors and mining operations.	Hazardous to cyclist and pedestrian.
Wildlife Escape Ramps/Slope Jumps	Allow for wildlife that have entered onto fenced highway corridors to exit.	Relative cost to one-way gates. Slope jumps require specific topography to be effective.
Wildlife One-way Gates	Allow for wildlife that have entered onto fenced highway corridors to exit.	Limited relative efficacy to escape ramps.
Vegetation Management in the Right-of-Way	Increase visibility along roadways to allow for wildlife and motorist early detection of one another. Reduce spread of invasive plant species.	Sustained seasonal maintenance.
Wildlife Safe Fencing	Funneling wildlife towards crossings and preventing wildlife from entering highway corridors and mining operations. Preventing human-wildlife conflicts.	Some maintenance required to prevent loose wiring and contiguous effectiveness.
Earthen Berms	Funneling wildlife towards crossings and preventing wildlife from entering highway corridors and	Could create a visual barrier for motorists when wildlife is behind the berm within the highway corridor.

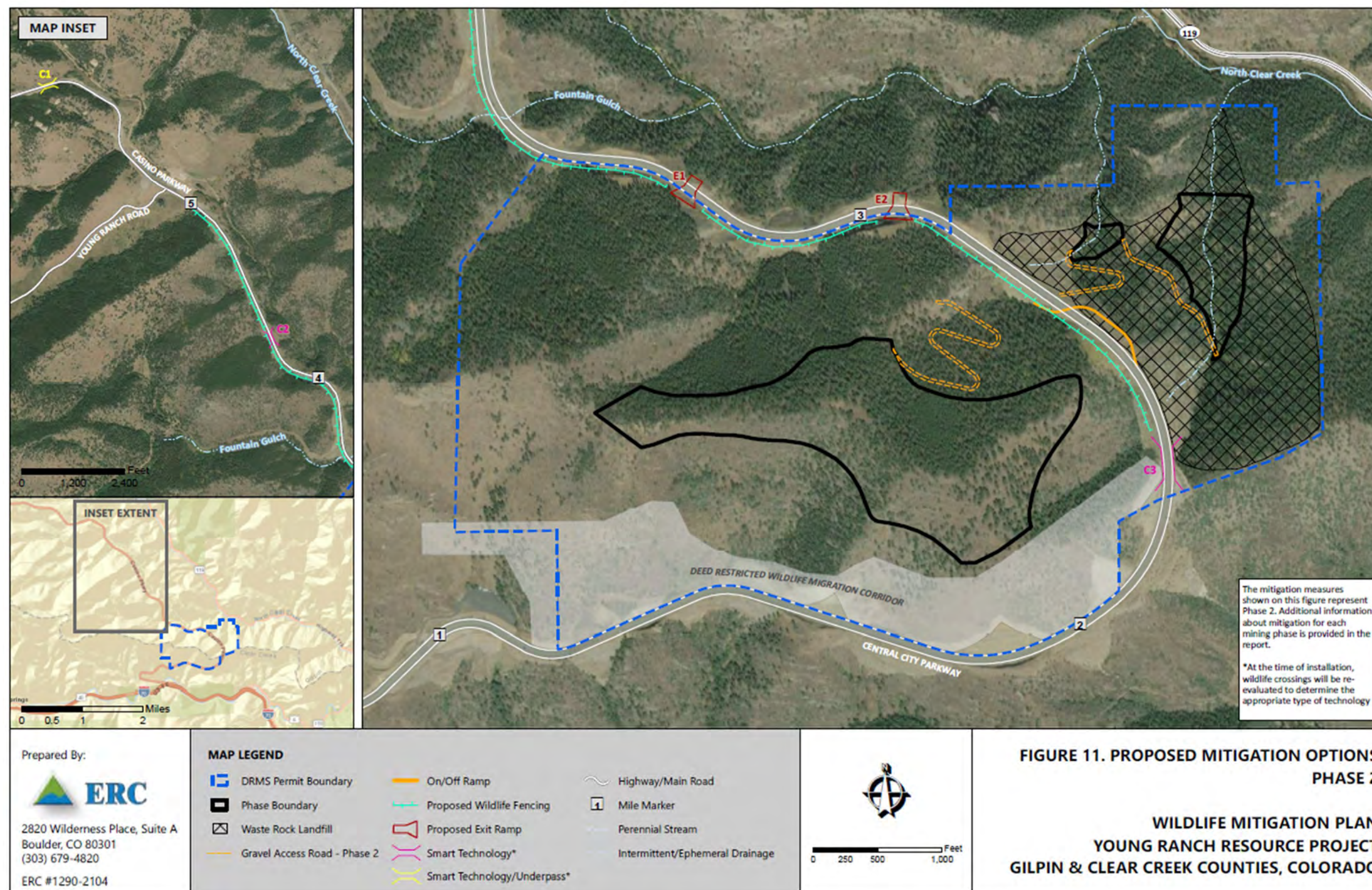


	mining operations. Preventing human-wildlife conflicts. Increasing snow drift barrier protection and low-cost noise reduction	
Avoid Impacts to Riparian and Other Important Wildlife Corridors	Protects critically important, wetlands, streams, corridor habitats, and riparian and other site-specific dependent species.	Initial construction costs may be increased.
Problem Species Management	Enhance native habitat disturbed by highway corridors and mining operations, reduce tree fall danger, mitigate fire danger potential, and reduce mitigation measure damage costs.	Sustainable seasonal maintenance.
Avoid Construction Operation during Nesting Season	Reduce impacts during energy intense rearing process to birds	Limited season without potential for snow and ice during construction.
Minimize Artificial Light Use at Night	Reduce detrimental effects of artificial lighting on wildlife and plant-wildlife cycles.	Reduce visibility dependent safety measures.
Increasing Wildlife Signage, Controlling Traffic Volume, and Speed	Increase motorist alertness, reduce vehicle speeds, and increase available reaction times for motorists.	Flasher and lighting around signs may increase light pollution along roadways.
Smart Technology	Create safe passage for wildlife species across human made barriers. Incorporates a variety of mitigation options that best suit the Project. Allows for the use of future technologies (i.e., remote sensing, wildlife detection systems, etc.)	No Concerns

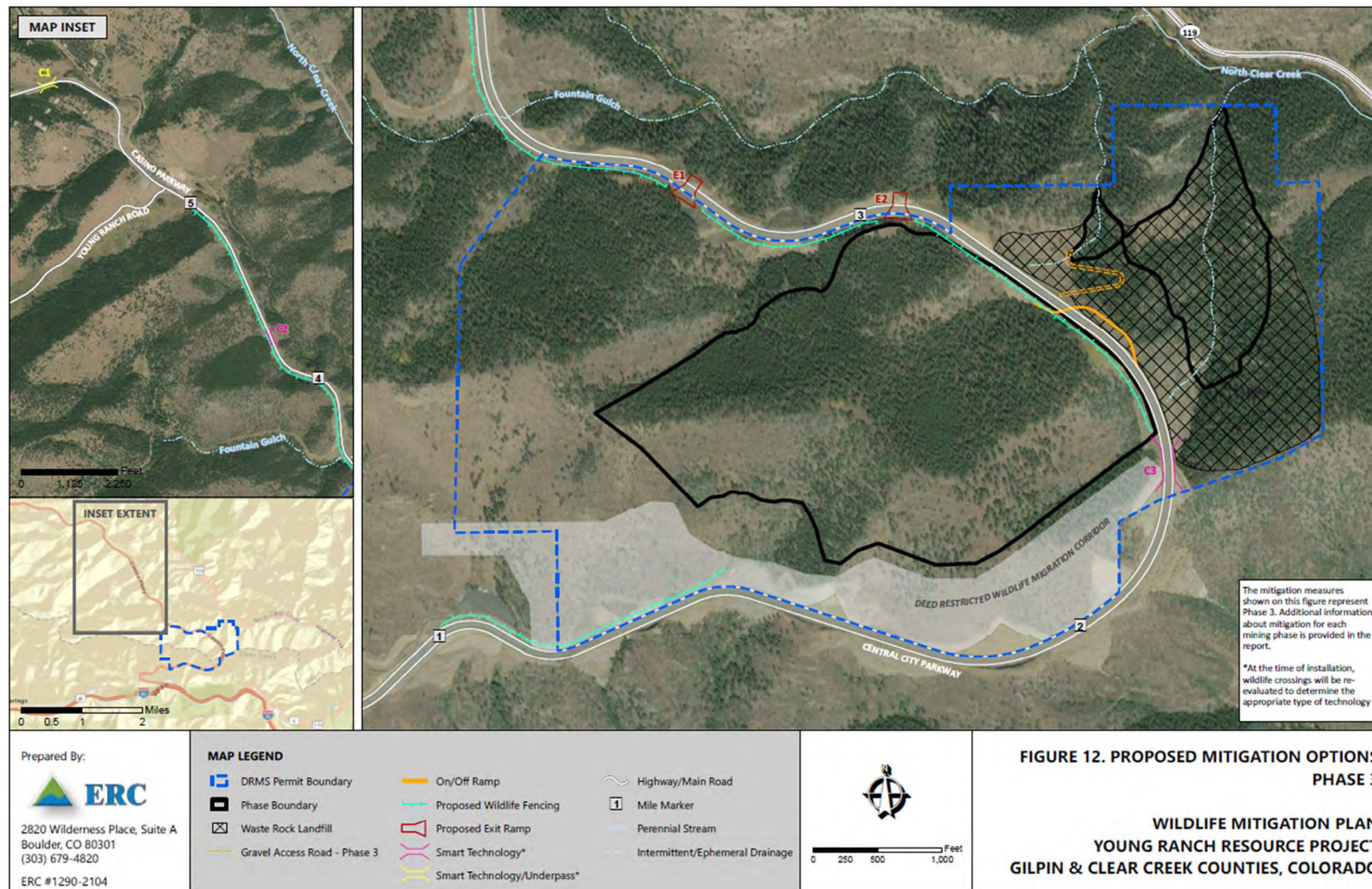




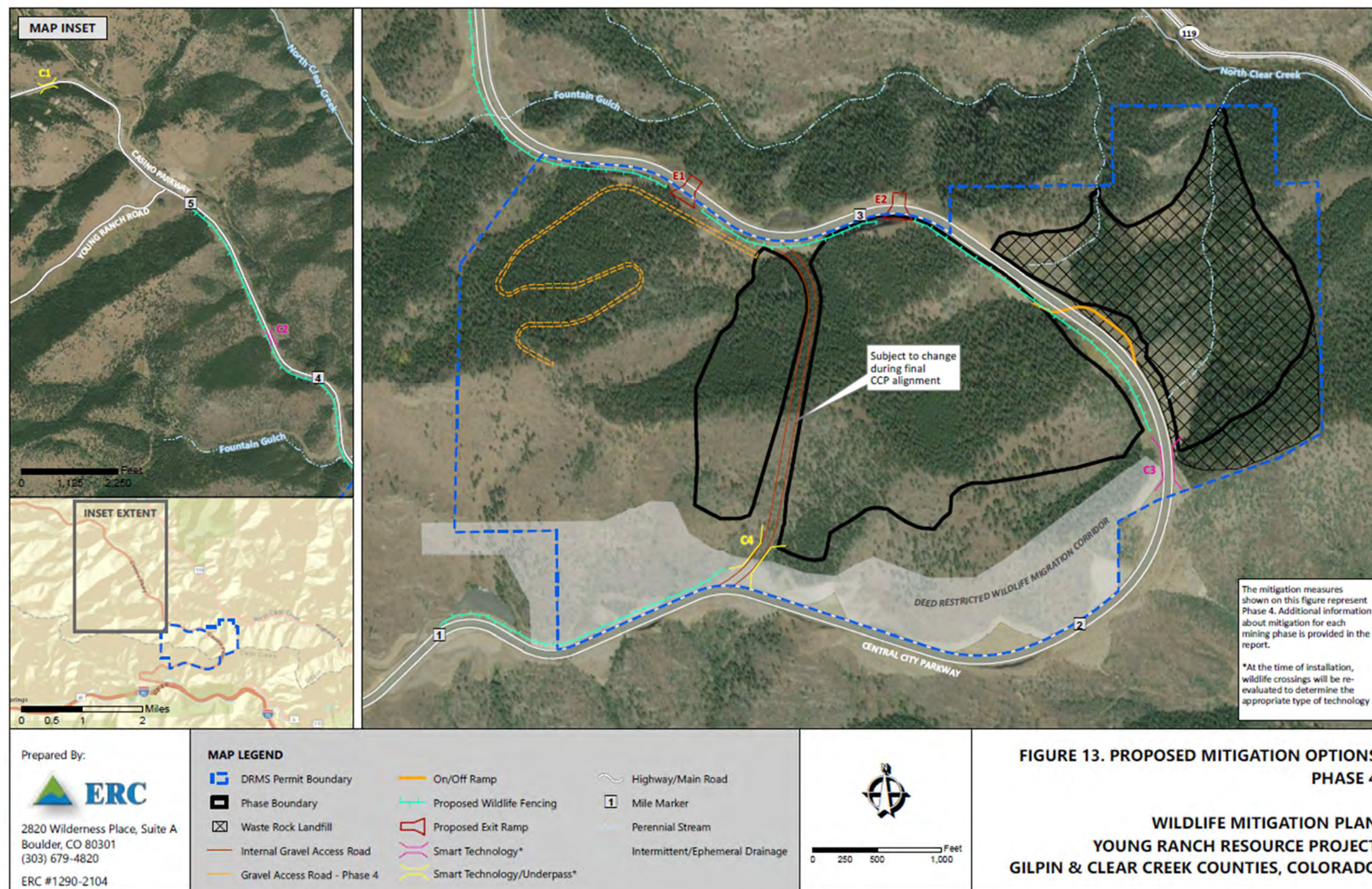




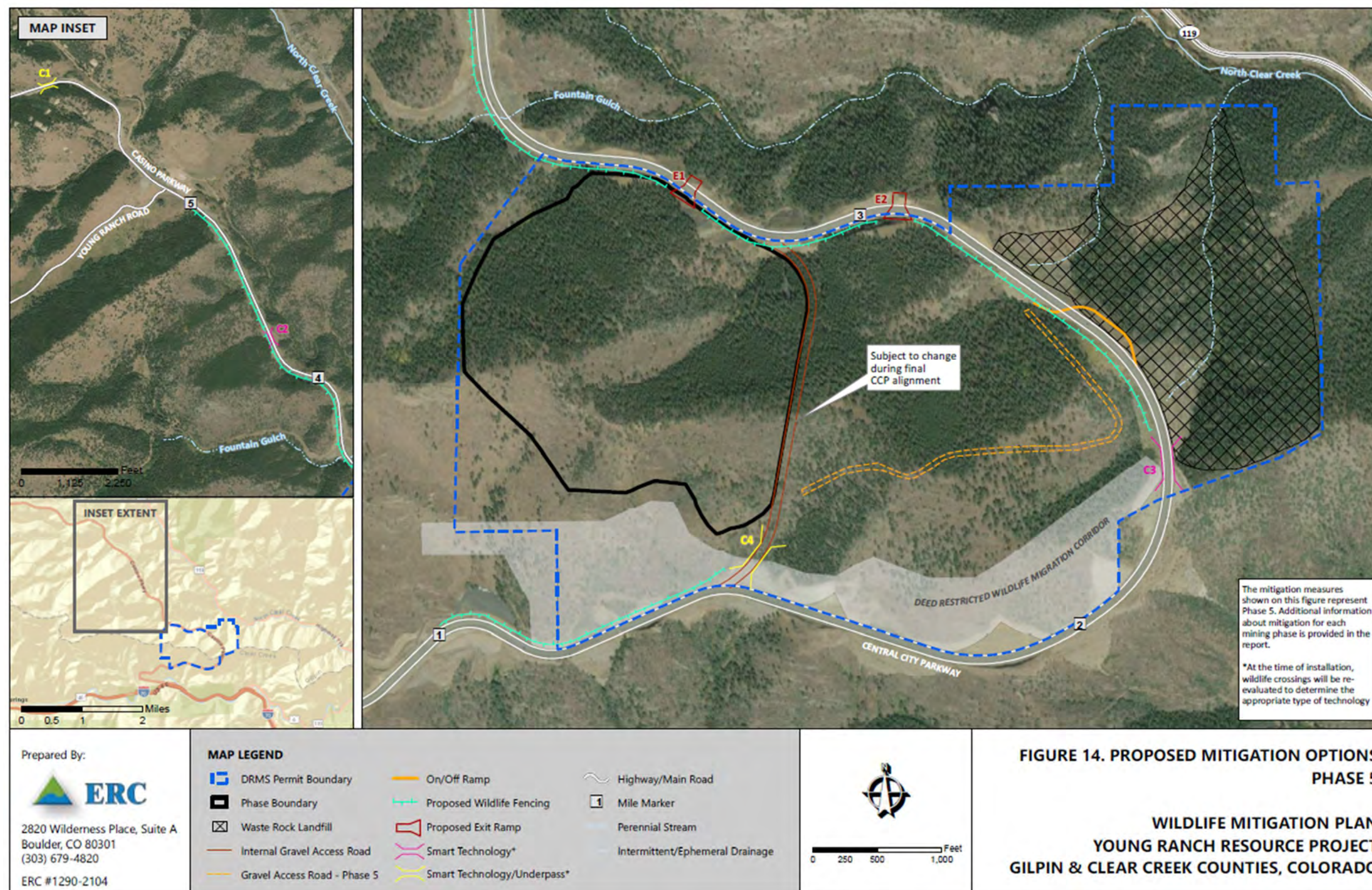














### 3.05.0 SUMMARY AND PROJECT SCHEDULE

Providing big game animals with safe opportunities to maintain movement patterns, to cross roadways and disturbed areas can greatly reduce potential impacts of roadways, open pits, processing areas, and disposal areas associated with the Project. To ensure effectiveness, mitigation measures should be placed in locations where animals naturally approach and cross certain areas. Design-based mitigation should consist of minimizing barriers to lessen the impact of at-grade crossings or providing structures for above- or below-grade crossings while using barriers to reduce at-grade crossings. Additionally, habitat management (i.e., revegetation) near suspected migration routes or seasonal ranges within the Project (i.e., south facing slopes for bighorn sheep) may help reduce crossing rates in high disturbance areas. The following provides a generalized list for consideration.

1. **Berms and fencing.** Tall earthen berms with native vegetation should be placed strategically around Project area in effort to reduce visual disturbance and noise. Wildlife-safe exclusion fencing should also be considered to surround the active work zones to discourage wildlife access thereby minimizing human-wildlife conflict with operations. Fencing should be eliminated in non-active work zones to promote wildlife use.
2. **Mitigation Project Locations.** As shown on **Figures 10 through 14**, there are numerous locations within the Project where underpasses, exit ramps, or other structures may be placed to promote wildlife movement through the Project. To identify the location of these features, habitat suitability or areas where animals are likely to concentrate should be the primary indicator of crossing activity. Consider how landscape structure (i.e., steep slopes, natural barriers, etc.) interact with habitat suitability to increase the level of use an area receives wildlife. Additionally, the type of mitigation being installed will be re-evaluated during each phase.
3. **Phased mining approach.** As discussed in **Section 1.2** and **Section 3.5**, mining will occur in five phases. Interim reclamation will occur between phases, allowing potential wildlife habitat to become re-established prior to the completion of overall mining activities. Reclamation should be completed as soon as possible with each phase. This will allow potential wildlife use on portions of the Project during the operating period.
4. **Weed Control.** All disturbed and non-disturbed lands should be routinely maintained to prevent the establishment and spread of noxious weeds. Any non-active disturbed lands should be temporarily or permanently reclaimed with appropriate native species.
5. **CCP Wildlife Signage.** Upon further discussion and approval from Central City Parkway management, additional wildlife caution signs may be appropriate in the vicinity of the Project along the CCP to warn motorized vehicles and minimize wildlife collisions.
6. **Employee Education.** Project employees should be educated on the sensitivity of wildlife harassment in the area.
7. **Secure Dumpsters and Debris.** All dumpsters and debris should be contained in wildlife safe containers from not only bears but also birds and small mammals.

8. **Final Reclamation.** The final reclamation plan is essential to ensure only temporary disturbances occur. The reclamation plan should consider reestablishment of appropriate native species and local habitat communities. Upon reclamation the area should be reopened for wildlife use and general open space to minimize long-term regional impacts to wildlife. The seed mix chosen for revegetation of the Project should be selected to establish a diverse, effective, and long-lasting vegetative cover that is capable of self-regeneration without continued dependence on irrigation, soil amendments or fertilizer, and provides equal or better coverage than the existing vegetation of the surrounding area. Plantings should be limited to grasses, forbs, and trees that are well-suited to the Project considering the soils and climate. The overall goal (and it is anticipated) that revegetation of the Project will provide better forage/habitat for wildlife versus existing conditions.
9. **Traffic Control.** Posted speed limits should be observed and slow down lanes will be installed at the Project entrance (CCP on/off ramp) to enhance safety. During mining operations, truck operators should be advised of potential wildlife hazards. Additional wildlife signage will be placed along the CCP.

As shown on **Figures 10 through 14**, proposed mitigation options will be installed that are unique and tailored to each mining phase. Additionally, mitigation options will be installed on portions of the CCP north of the Project (between mile markers 4 through 6). No wildlife mitigation is currently present along the CCP. The locations of these mitigation options have been selected at each location based on local site knowledge, topographical constraints, knowledge of wildlife movement/migration routes, as well as overall habitat considerations. Additionally, the Deed Restricted Wildlife Migration Corridor as discussed in **Section 1.3** has been set aside along the southern Project boundary. This migration corridor will provide a permanent migration corridor for bighorn sheep (and other wildlife) during the life of the Project.

**Table 9** below provides a summary of the mitigation options that will be installed during each phase of the Project. It is important to note that at the time of installation, wildlife crossings will be re-evaluated to determine the appropriate type of technology (i.e., Smart Technology).

**Table 9. Mitigation Installation Schedule**

Project Phase	Mitigation Options
Pre-Mine/Opening: 1 year	Install wildlife crossing signs along CCP, install wildlife monitoring cameras at selected locations (locations TBD).
	<b>Purpose:</b> Initial evaluation of wildlife interaction in the Phase 1 area. Initial public warnings on CCP as mining operations initiate. Initial data collected to refine Phase 1 Mitigation Options.
Phase 1 (Figure 9): 6 years	Install wildlife fencing along Phase 1 portion of the CCP immediately north and south of the on/off ramp to the Mine entrance. Wildlife crossing signs at fencing ends.
	<b>Purpose:</b> Minimize wildlife-collision potential from south to the north movements in the vicinity of the on/off ramp and directing wildlife away from on-off ramp to safer CCP crossing zones. Wildlife-conflict not of high concern from north to south moving into on/off ramp Mine entrance due to physical landform barriers.
Phase 2 (Figure 10): 7 years	Install smart technology/underpass <sup>1</sup> wildlife crossing C1. Install smart technology wildlife crossing C1, C2 and C3. Install wildlife exit ramps E1 and E2. Install wildlife fencing with wildlife crossing signs at fencing ends along CCP from Phase 1 area past Phase 2 to CCP Mile Marker 5.
	<b>Purpose:</b> Additional fencing to minimize wildlife-collision potential from south to the north movement on CCP. C1 and C2 provide designated wildlife crossings across CCP in known high wildlife-conflict areas. C3 with additional fencing to minimize wildlife-conflict within the primary wildlife migration corridor. Maintain migration in east-west across CCP. E1 and E2 with additional fencing for wildlife to move across CCP from south to north towards Fountain Gulch.
Phase 3 (Figure 11): 30 years	Install wildlife fencing with wildlife crossing signs at fencing ends from CCP Mile Marker 1 to the central access gravel road.
	<b>Purpose:</b> Promote wildlife movement within the migration corridor limiting movement out of the corridor and onto CCP. Additional fencing not required along CCP east of gravel access road near Mile Marker 2 due to physical landform barriers.
Phase 4 (Figure 12): 9 years	Install smart technology wildlife crossing C4 along internal gravel access road.
	<b>Purpose:</b> C4 to minimize wildlife-conflict within the primary wildlife migration corridor. Maintain migration in east-west across gravel access road.
Phase 5 (Figure 13): 43 years	Continue wildlife monitoring at appropriate crossings.
	<b>Purpose:</b> all mitigation options have been implemented as part of Phase 4. Continuing monitoring to make adjustments based on collected data.

<sup>1</sup>Crossings where both smart technology and/or an underpass is proposed will be re-evaluated prior to each mining phase to determine which technology will be used.

#### 4.06.0 REFERENCES

- Arizona Department of Transportation. AZDOT. 2019. Wildlife Escape Measures. June, Arizona Transportation Research Center, Arizona Department of Transportation, Phoenix, Arizona, USA.
- Bristow, K., and M. Crabb. 2008. Evaluation of distribution and trans-highway movement of desert bighorn sheep: Arizona Highway 68. Final Project 588 report. Arizona Transportation Research Center, Arizona Department of Transportation, Phoenix, Arizona, USA.
- Bennie, J., Duffy, J.P., Davies, Y.W., Correa-Cano, M.E. & Gaston, K.J. (2015) Global trends in exposure to light pollution in natural terrestrial ecosystems. *Remote Sensing*, 7, 2715– 2730.
- Butler, Wayne. 2020. Personal Communication. City of Central City highway maintenance.
- Capson, Eileen. 2014. Is the Wildlife Underpass Working? Project Needs Funding & Fencing. The Idaho World (Boise County) as reprinted by Idaho Department of Transportation. December 3. Available at: <http://apps.itd.idaho.gov/Apps/MediaManagerMVC/NewsClipping.aspx/Preview/79806>
- Charry, B., and J. Jones. 2009. Traffic volume as a primary road characteristic impacting wildlife: A tool for land use and transportation planning. Pages 159– 172 in P. J. Wagner, D. A. Nelson, and E. Murray, editors. *Proceedings of the 2009 International Conference on Ecology and Transportation*. Center for Transportation and the Environment, North Carolina State University, 2010, Raleigh, North Carolina
- Colorado Department of Transportation. CDOT. 2018. Migratory Bird Treaty Act Compliance: Noise and Vibration Standard Bridge Maintenance Activity Pilot Project.
- Colorado Oil & Gas Conservation Commission. COGCC. 2021. Statement of Basis, Specific Statutory Authority and Purpose Amendments to Current Rules of the Colorado Oil and Gas Conservation Commission, 2 C.C.R. § 404-1. Cause No. IR Docket No. 230200062 High Priority Habitat Maps Rulemaking.
- CPW. State Wildlife Action Plan. 2015. Species of Greatest Conservation Need. July 20. Available at: [https://cpw.state.co.us/Documents/WildlifeSpecies/SWAP/CO\\_SWAP\\_Chapter2.pdf](https://cpw.state.co.us/Documents/WildlifeSpecies/SWAP/CO_SWAP_Chapter2.pdf)
- CPW. 2016. Nongame species – regulations. Statue 33-2-104. 2020. Available at <https://leg.colorado.gov/sites/default/files/images/olls/crs2016-title-33.pdf>
- CPW. 2020. Recommended buffer zones for raptors. Available at: <https://cpw.state.co.us/Documents/WildlifeSpecies/LivingWithWildlife/Raptor-Buffer-Guidelines.pdf>.
- CPW. 2020a. Big Game Winter Range and Migration Corridors. Available at: <https://cpw.state.co.us/Documents/Hunting/BigGame/2020BigGameWinterRangeandMigrationCorridorsReport.pdf>
- CPW. Colorado Parks and Wildlife. 2023. Species Profiles. Available online at: <https://cpw.state.co.us/learn/Pages/SpeciesProfiles.aspx>
- CPW. 2023a. Threatened and Endangered List. Available at <http://cpw.state.co.us/learn/Pages/SOC-ThreatenedEndangeredList.aspx>



- CPW. 2023b. Species Activity Mapping (SAM), Geographic Information Systems (GIS) Data. Updated December. Available online at: <http://www.arcgis.com/home/item.html?id=190573c5aba643a0bc058e6f7f0510b7>
- CPW. 2023c. Colorado Park's and Wildlife (CPW) Recommendations to Avoid and Minimize Impacts to Wildlife from Land Use Development in Colorado. Available at: [https://cpw.state.co.us/Documents/Conservation-Resources/Energy-Mining/CPW\\_HPH-Map-Layers.pdf](https://cpw.state.co.us/Documents/Conservation-Resources/Energy-Mining/CPW_HPH-Map-Layers.pdf)
- Decina, L. E., L. Thomas, R. Srinivasan, and L. Staplin. 2007. Automated Enforcement: A Compendium of Worldwide Evaluations of Results. Office of Research and Technology, Behavioral Technology Research Division, National Highway Traffic Safety Administration, Washington, D.C.
- Dodd, N. L., J. W. Gagnon, S. Boe, A. Manzo, and R. E. Schweinsburg. 2007. Evaluation of measures to minimize wildlife-vehicle collisions and maintain wildlife permeability across highways – State Route 260, Arizona, USA. Final Project 540 report (2002-2006). Arizona Transportation Research Center, Arizona Department of Transportation, Phoenix, Arizona, USA. [http://www.dot.state.az.us/TPD/ATRC/publications/Project\\_reports/PDF/AZ540.pdf](http://www.dot.state.az.us/TPD/ATRC/publications/Project_reports/PDF/AZ540.pdf)
- Dodd, N. L., J. W. Gagnon, S. Boe, K. Ogren, and R. E. Schweinsburg. 2009. Effectiveness of wildlife underpasses in minimizing wildlife-vehicle collisions and promoting wildlife permeability across highways: Arizona Route 260. Final Project report 603, Arizona Transportation Research Center, Arizona Department of Transportation, Phoenix, Arizona, USA. [http://www.dot.state.az.us/TPD/ATRC/publications/Project\\_reports/PDF/AZ603.pdf](http://www.dot.state.az.us/TPD/ATRC/publications/Project_reports/PDF/AZ603.pdf)
- Gagnon, J. W., N. L. Dodd, S. Sprague, K. Ogren, and R. E. Schweinsburg. 2009. Preacher Canyon wildlife fence and crosswalk enhancement Project evaluation- State Route 260. Final Project report submitted to Arizona Department of Transportation, Phoenix, Arizona, USA. Hammer, M. L. 2001. Effectiveness of earthen escape ramps in reducing big game mortality in Utah. Thesis, Utah State University, Logan, USA.
- Google Earth. Google Earth Imagery. Various dates 2001 through 2023. Available online at: <http://www.google.com/earth/index.html>
- Hammer, M. L. 2001. Effectiveness of earthen escape ramps in reducing big game mortality in Utah. Thesis, Utah State University, Logan, USA.
- Huijser, M. P., P. McGowen, A. P. Clevenger, and R. Ament. 2008. Wildlife-vehicle collision reduction study: best practices manual. Report to Congress. U.S. Department of Transportation, Federal Highway Administration, Washington D.C., USA.
- Koehler, Gary M. 1990. Population and habitat characteristics of lynx and snowshoe hares in north central Washington. Canadian Journal of Zoology. 68: 845-851. [18030]
- Leatherman, D.A., I. Aguayo and T.M. Mehall. 2011. CSU Extension: Mountain Pine Beetle. Revised September. Available at: <https://static.colostate.edu/client-files/csfs/pdfs/MPB.pdf>
- NatureServe 2023. NatureServe Explorer Central Database. Ecological Association Comprehensive Report. Available online at: <http://explorer.natureserve.org>. December.
- Peterson, M.N., R.R. Lopez, N.J. Silvy, C.B. Owen, P.A. Frank, and A.W. Braden. 2003. Evaluation of deer-exclusion grates in urban areas. Wildlife Society Bulletin 31(4): 1198–1204.

- Raap T, Pinxten R, Eens M (2015) Light pollution disrupts sleep in free-living animals. Scientific Reports 5, article number: 13557.
- Rea, R. V. 2003. Modifying roadside vegetation management practices to reduce vehicular collisions with moose *Alces alces*. *Wildlife Biology*. 9:81-91.
- Rich, Catherine & Longcore, Travis (eds). 2006. *Ecological Consequences of Artificial Night Lighting*. Island Press. Covelo, California. Pages 15-42.
- Reed, D. F., T. M. Pojar, and T. N. Woodard. 1974. Use of one-way gates by mule deer. *Journal of Wildlife Management* 38:9-15.
- Spellerberg, I. F. (1998). "Ecological effects of roads and traffic: A literature review". *Global Ecology and Biogeography*.
- United States Fish & Wildlife Service. 1996. *Platanthera praeclara* (western prairie fringed orchid) recovery plan (10.56 MB). USFWS, Ft. Snelling, Minnesota. vi + 101 pp.
- United States Fish & Wildlife Service. 2013. Available at: [https://www.fws.gov/southwest/es/Documents/R2ES/MexicanSpottedOwl\\_5-YrReview\\_Aug2013.pdf](https://www.fws.gov/southwest/es/Documents/R2ES/MexicanSpottedOwl_5-YrReview_Aug2013.pdf)
- United States Fish & Wildlife Service. 2017. Available at: [https://www.fws.gov/mountain-prairie/es/species/mammals/lynx/SSA2018/01112018\\_SSA\\_Report\\_CanadaLynx.pdf](https://www.fws.gov/mountain-prairie/es/species/mammals/lynx/SSA2018/01112018_SSA_Report_CanadaLynx.pdf)
- United States Fish & Wildlife Service. 2023. Species Profile. Available at: <https://www.fws.gov/mountain-prairie/es/canadaLynx.php>
- United States Fish & Wildlife Service. 2023a. Endangered and Threatened Wildlife and Plants; Establishment of a Nonessential Experimental Population of the Gray Wolf in Colorado. Federal Register, 88 FR 77014, pg 77014-77039. Available online at: <https://www.federalregister.gov/documents/2023/11/08/2023-24514/endangered-and-threatened-wildlife-and-plants-establishment-of-a-nonessential-experimental>
- Veenbaas, G., and J. Brandjes. 1999. Use of fauna passages along waterways under highways. In *Proceedings of the 1999 International Conference on Wildlife Ecology and Transportation*, Missoula, Montana.
- Western EcoSystems Technology, Inc. 2011. Evaluation of Mule Deer Crossing Structures in Nugget Canyon, Wyoming. Prepared for Wyoming Department of Transportation and U.S. Department of Transportation Federal Highway Administration. FHWA-WY-11/02F. Laramie, WY. September. Available at: [http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Planning/Research/RS01209\\_1102F.pdf](http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Planning/Research/RS01209_1102F.pdf)
- Wilson C, Willis C, Hendrikz JK, Le Brocque R, Bellamy N. Speed cameras for the prevention of road traffic injuries and deaths. *Cochrane Database of Systematic Reviews* 2010, Issue 10. Art. No.: CD004607. DOI: 10.1002/14651858.CD004607.pub3.

# **APPENDIX A**

## **Site Photographs**

**Appendix A. Photographs showing characteristics of habitat identified within the Project Area.**



**Photo 1.** Overview of upland vegetation near the central portion of the Project Area, west of Central City Parkway.



**Photo 2.** Overview of upland vegetation and topography of the central portion of the Project Area, west of Central City Parkway.



**Photo 3.** Typical understory throughout the Project Area.



**Photo 4.** View east of the Southern Rocky Mountain Montane Shrubland vegetation community within the southern portion of the Project Area.



**Photo 5.** Overview of northern drainage in the north-central portion of the Project Area.



**Photo 6.** Overview of north central portion of Project Area, south of Central City Parkway. Central Rocky Mountain Dry Lower Montane-Foothill Forest vegetation community.





**Photo 7.** View east of eastern portion of the Project Area. East of Central City Parkway



**Photo 8.** View west of the Southern Rocky Mountain Montane Shrubland vegetation community within the western portion of the Project Area.



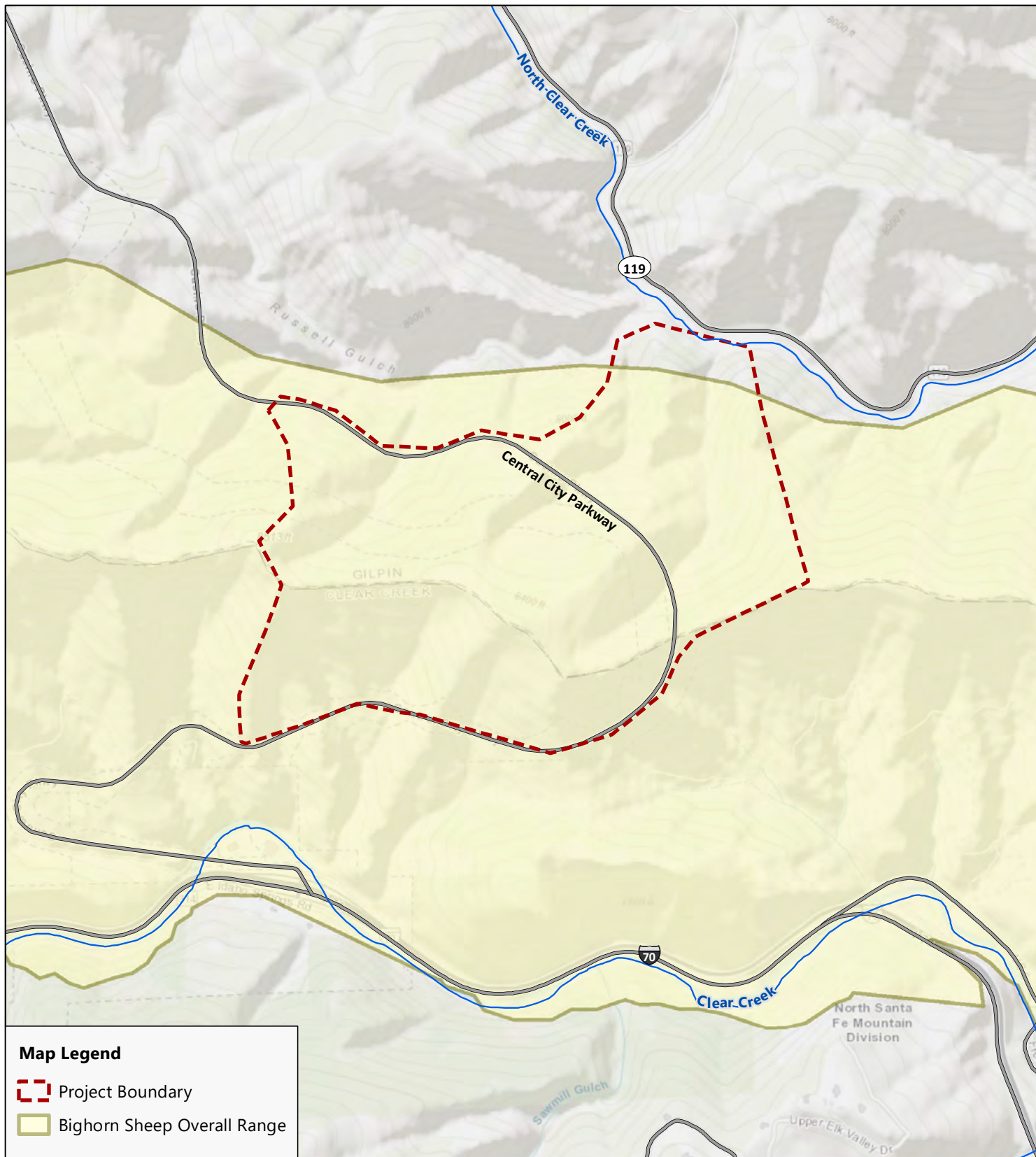
**Photo 9.** Overview of the Western North American Temperate Cliff, Scree, and Rock Vegetation community.



**Photo 10.** Overview of the Western North American Temperate Cliff, Scree, and Rock Vegetation community.

## **APPENDIX B**

### **Colorado Parks and Wildlife (CPW) Species Activity Mapping (SAM) Maps by Species**



#### Map Legend

- Project Boundary
- Bighorn Sheep Overall Range

Prepared By:



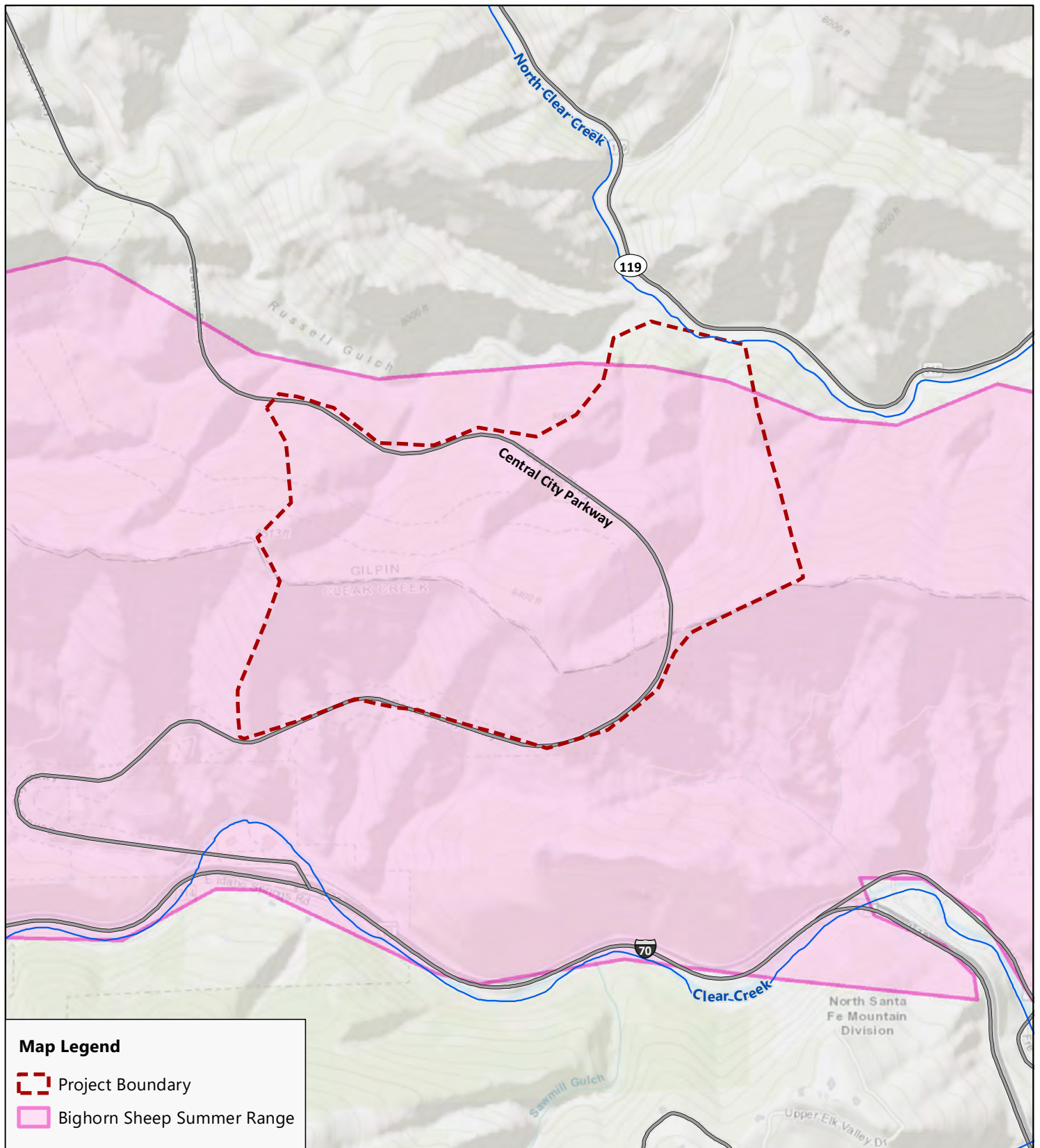
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Boulder, CO 80301  
(303) 679-4820  
ERC #: 1290-2001

## BIG HORN SHEEP - OVERALL RANGE CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO



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Feet





Prepared By:



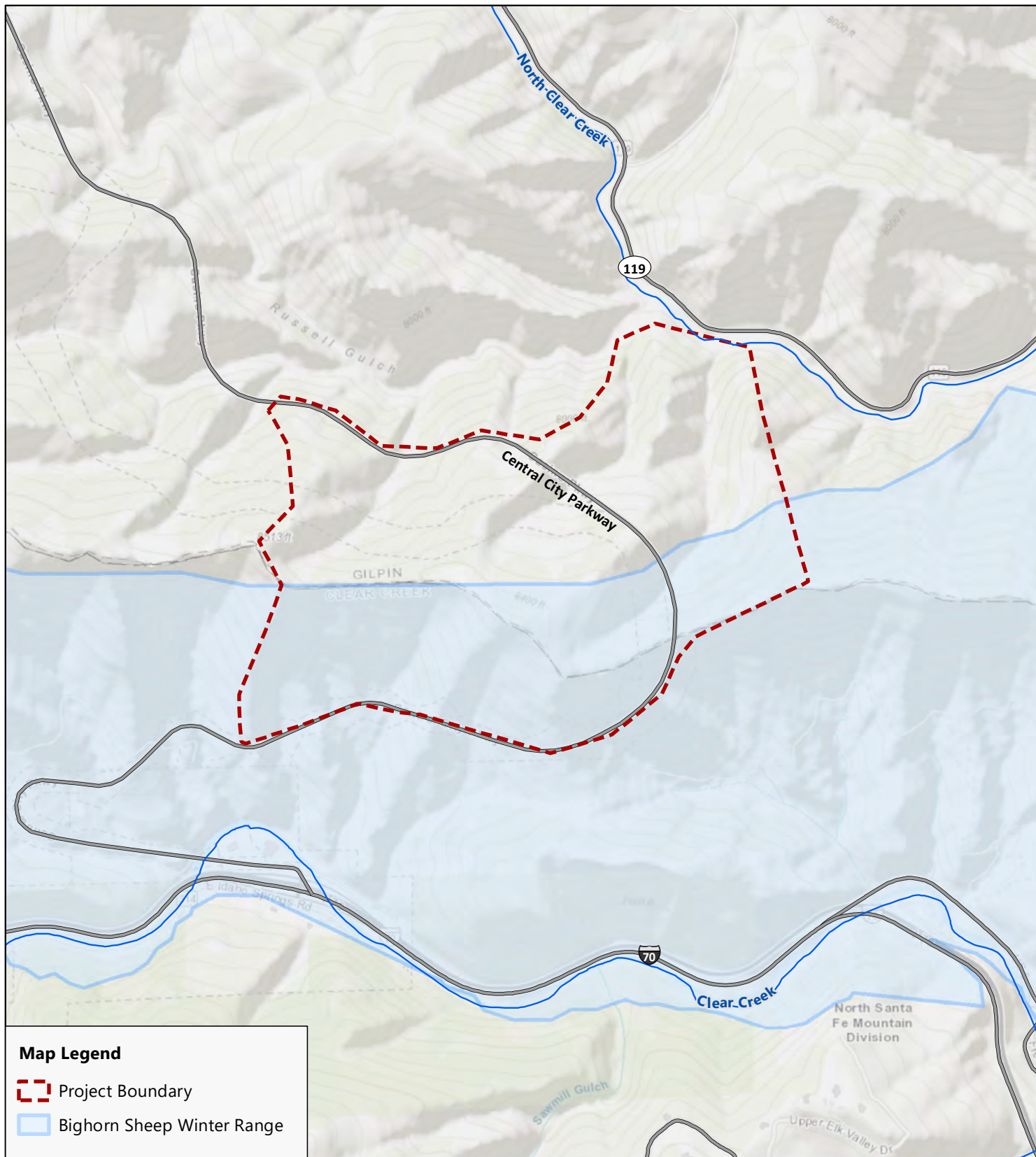
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**BIG HORN SHEEP - SUMMER RANGE  
CPW SPECIES MAP  
WILDLIFE MITIGATION PLAN  
YOUNG RANCH RESOURCE MINE  
GILPIN & CLEAR CREEK COUNTIES,  
COLORADO**



0 1,000 2,000 Feet





#### Map Legend

- Project Boundary
- Bighorn Sheep Winter Range

Prepared By:

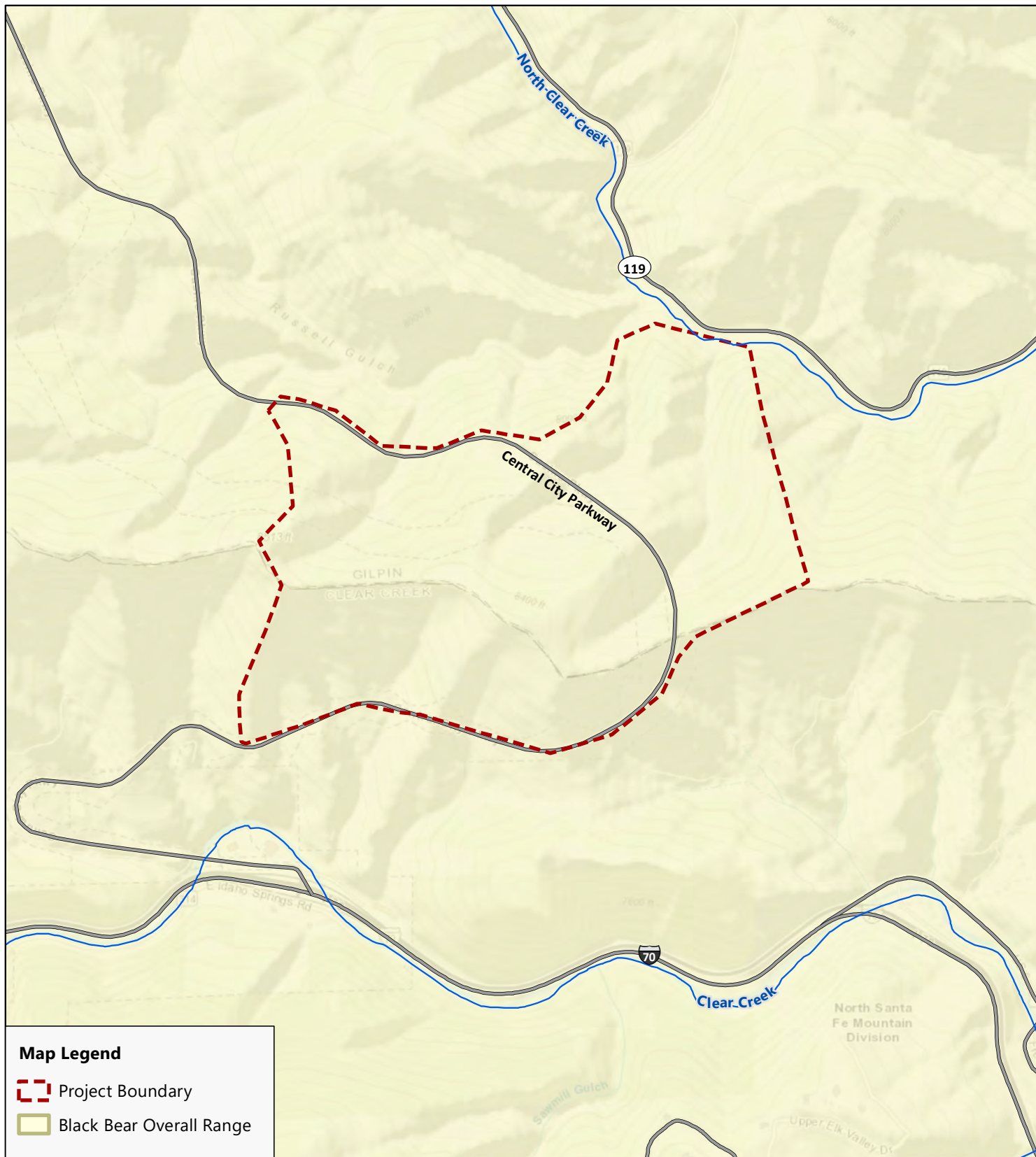


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(303) 679-4820  
ERC #: 1290-2001

## BIG HORN SHEEP - WINTER RANGE CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO



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Feet



#### Map Legend

- Project Boundary
- Black Bear Overall Range

Prepared By:



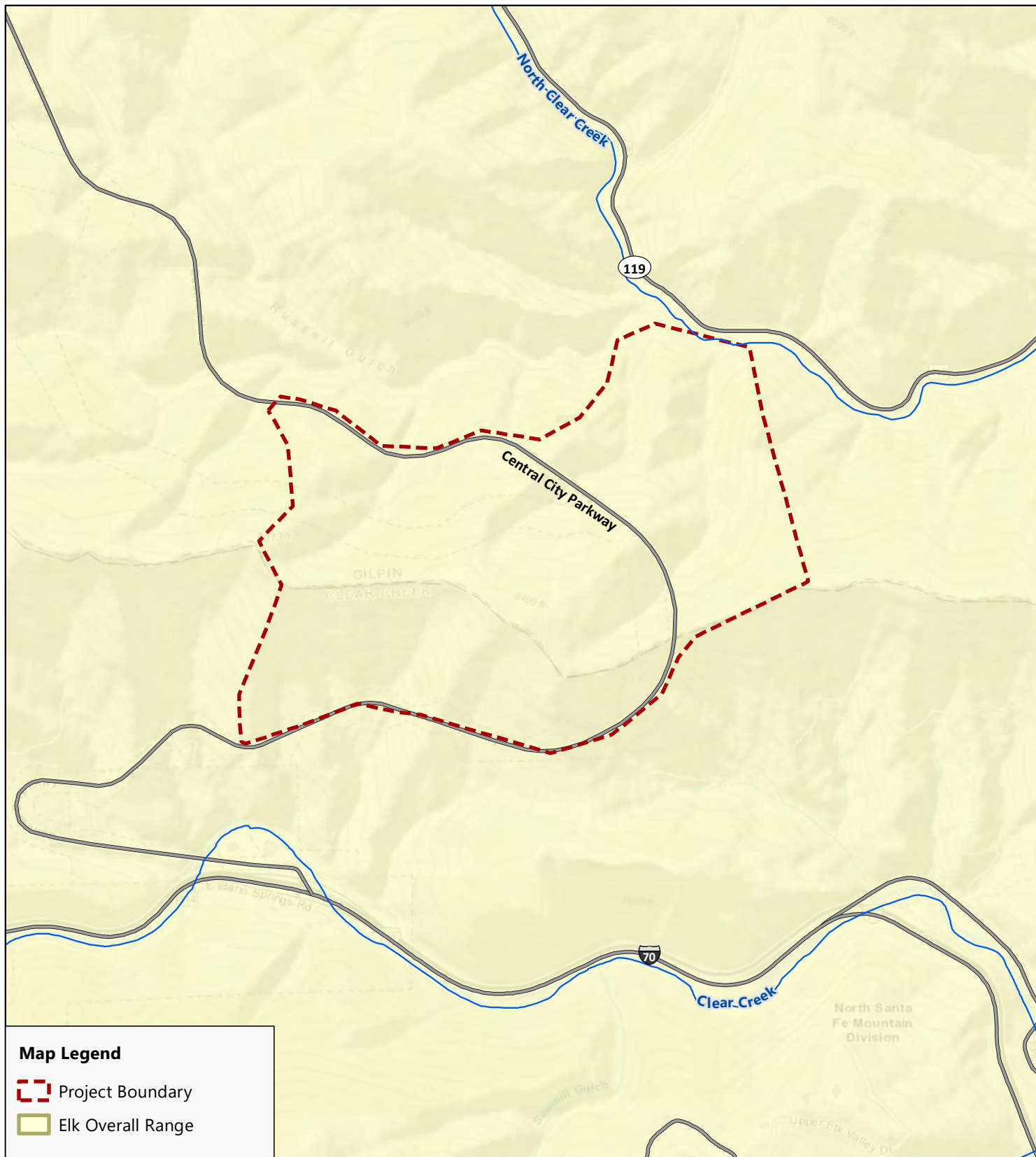
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## BLACK BEAR - OVERALL RANGE CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO





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Feet





#### Map Legend

-  Project Boundary
-  Elk Overall Range

Prepared By:

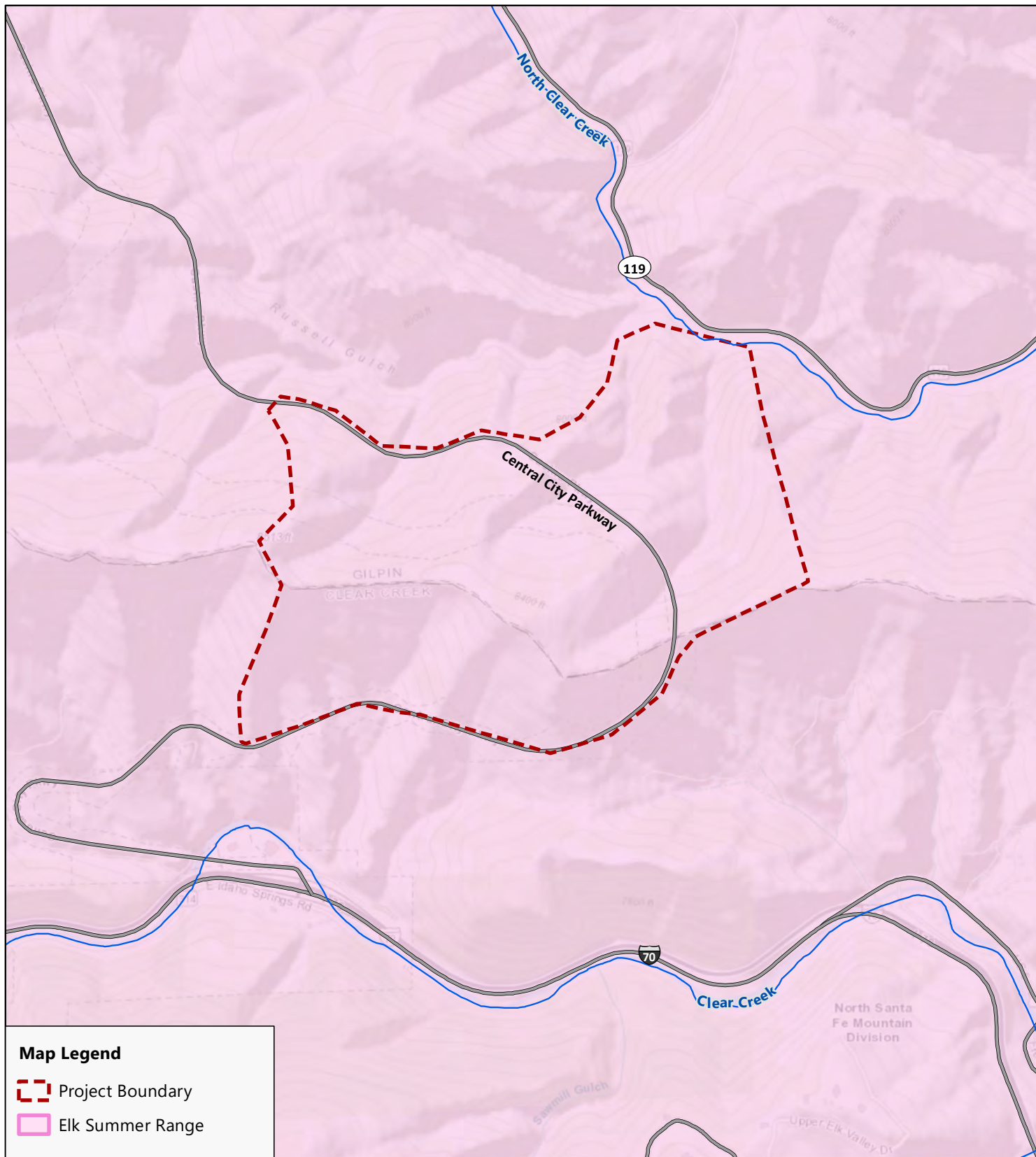


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### ELK - OVERALL RANGE CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO



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#### Map Legend

- Project Boundary
- Elk Summer Range

Prepared By:



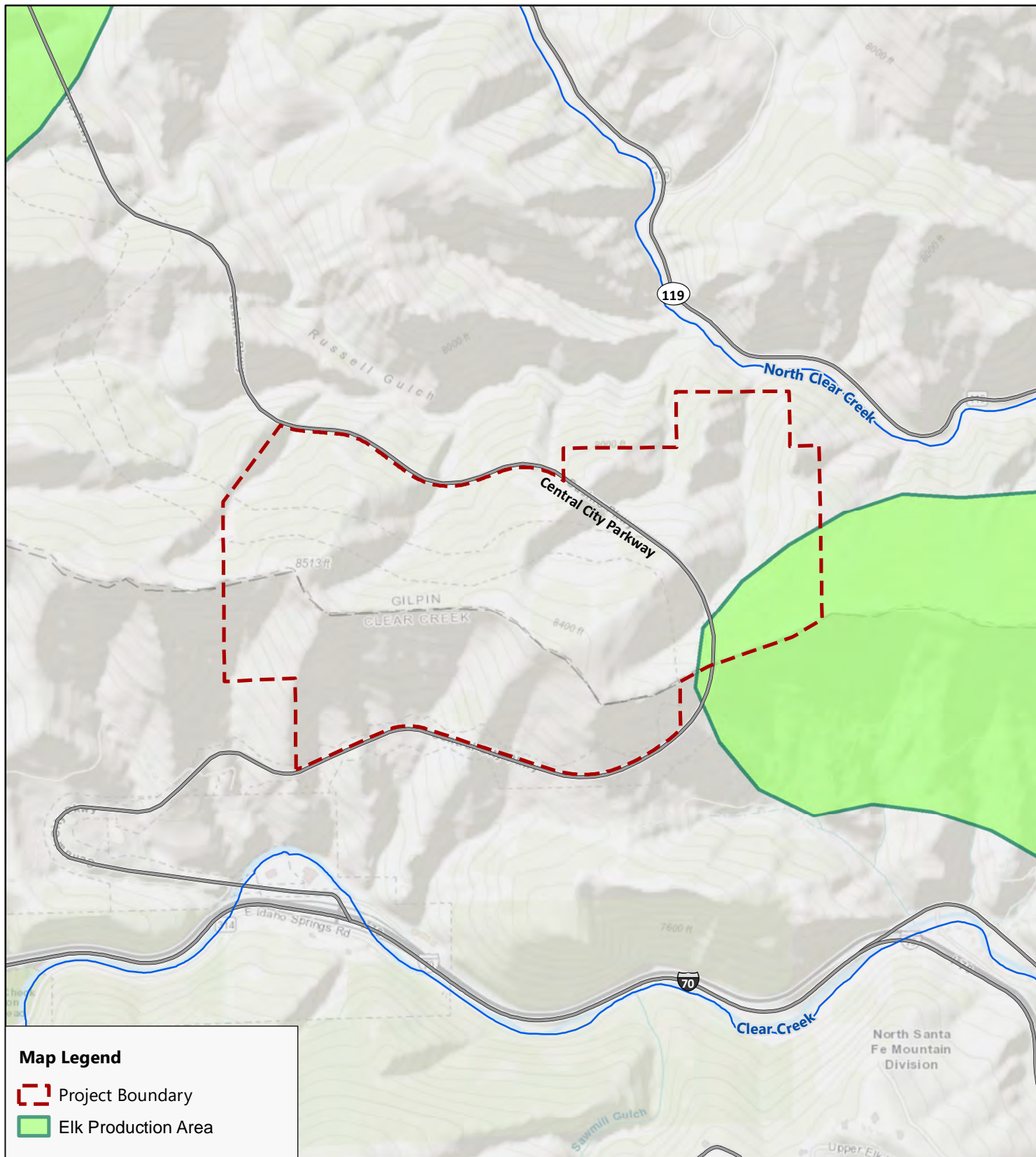
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## ELK - SUMMER RANGE CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO





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#### Map Legend

-  Project Boundary
-  Elk Production Area

Prepared By:

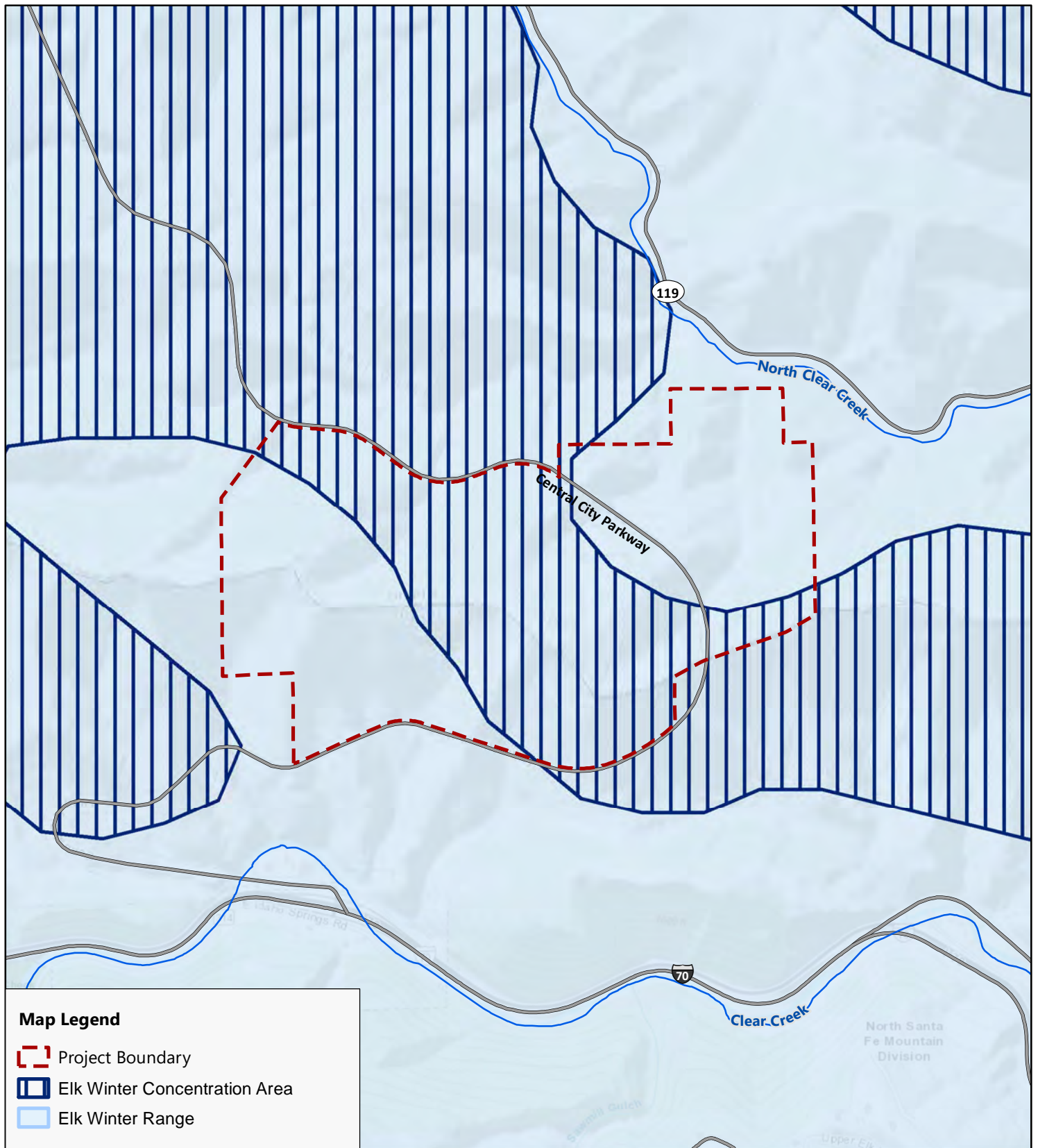


2820 Wilderness Place, Suite A  
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ERC #: 1290-2104




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Feet



#### Map Legend

-  Project Boundary
-  Elk Winter Concentration Area
-  Elk Winter Range

Prepared By:



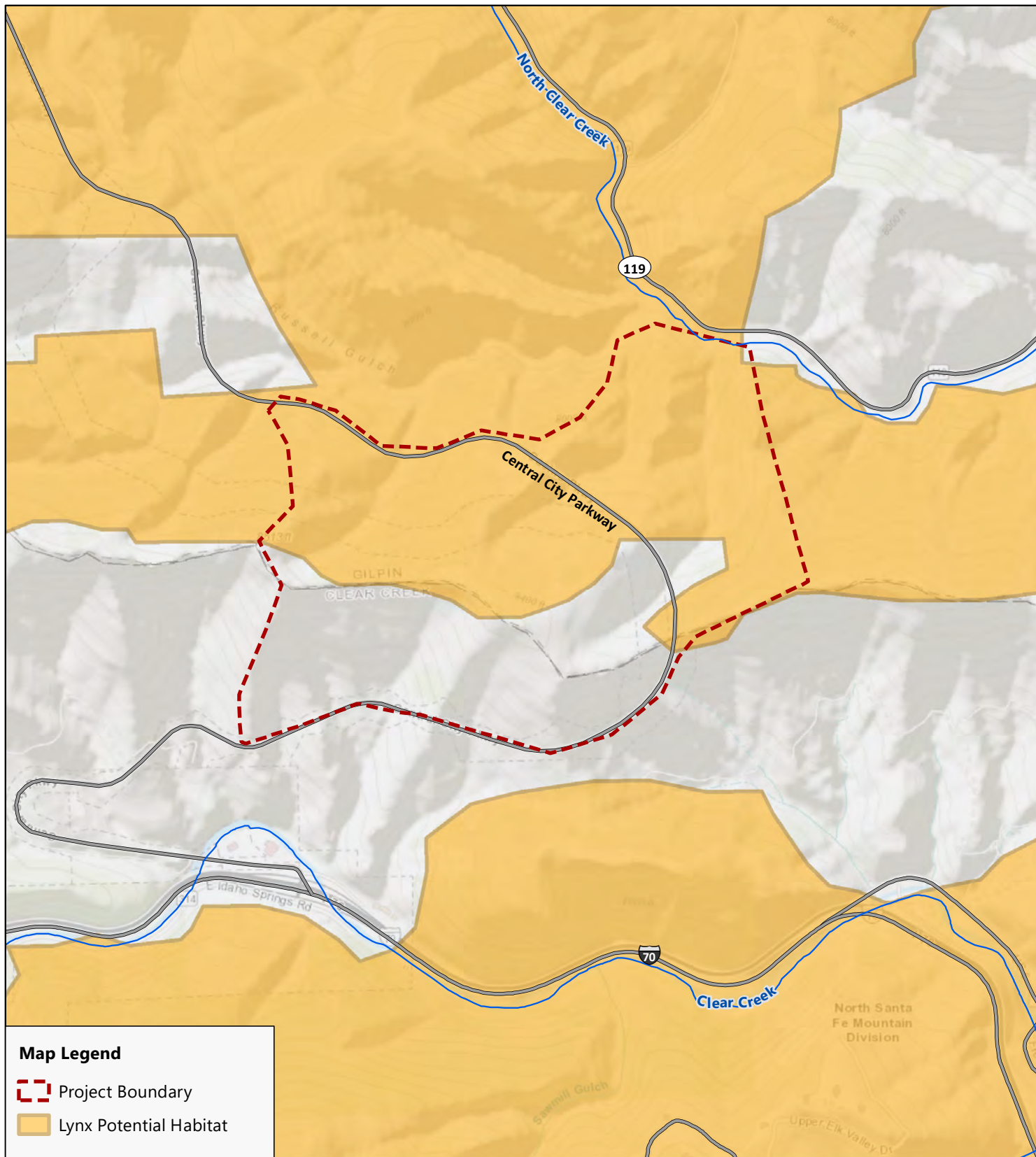
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ERC #: 1290-2104

## ELK WINTER CONCENTRATION AREA & RANGE CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO



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Feet





#### Map Legend

- Project Boundary
- Lynx Potential Habitat

Prepared By:

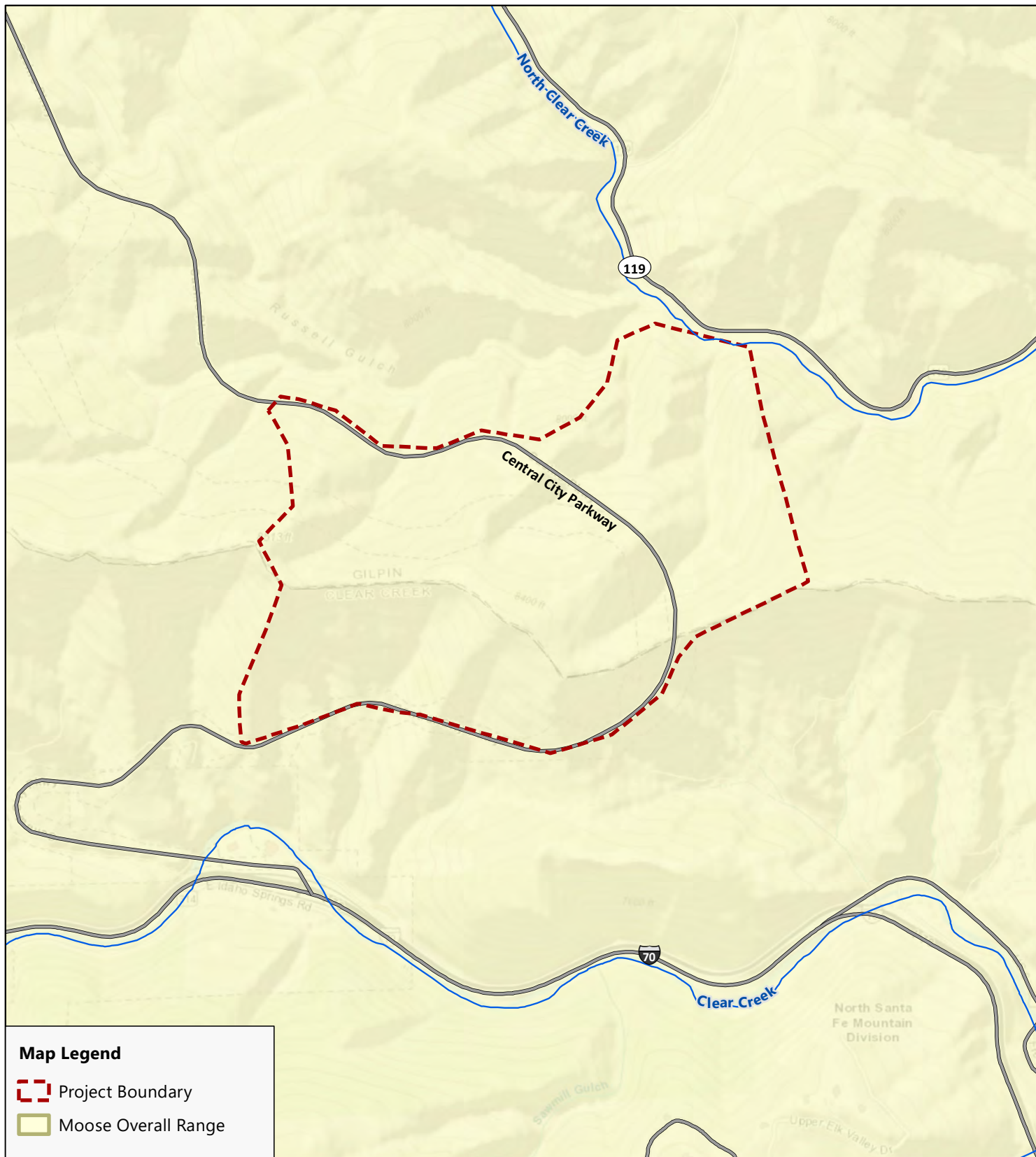


2820 Wilderness Place, Suite A  
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(303) 679-4820  
ERC #: 1290-2001

### LYNX - POTENTIAL HABITAT CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO



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Feet



#### Map Legend

- Project Boundary
- Moose Overall Range

Prepared By:



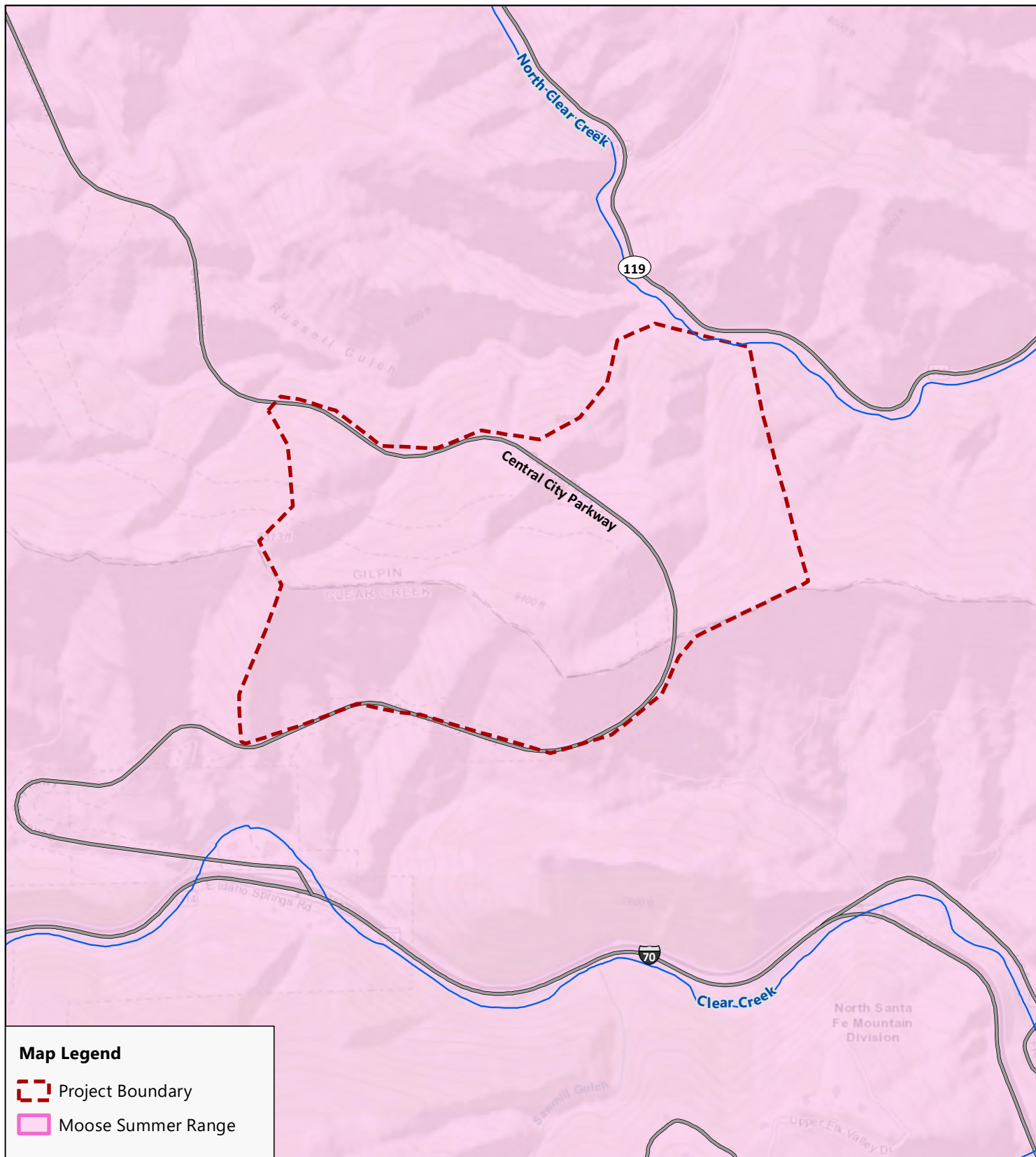
2820 Wilderness Place, Suite A  
Boulder, CO 80301  
(303) 679-4820  
ERC #: 1290-2001

## MOOSE - OVERALL RANGE CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO



0 1,000 2,000  
Feet





#### Map Legend

- Project Boundary
- Moose Summer Range

Prepared By:



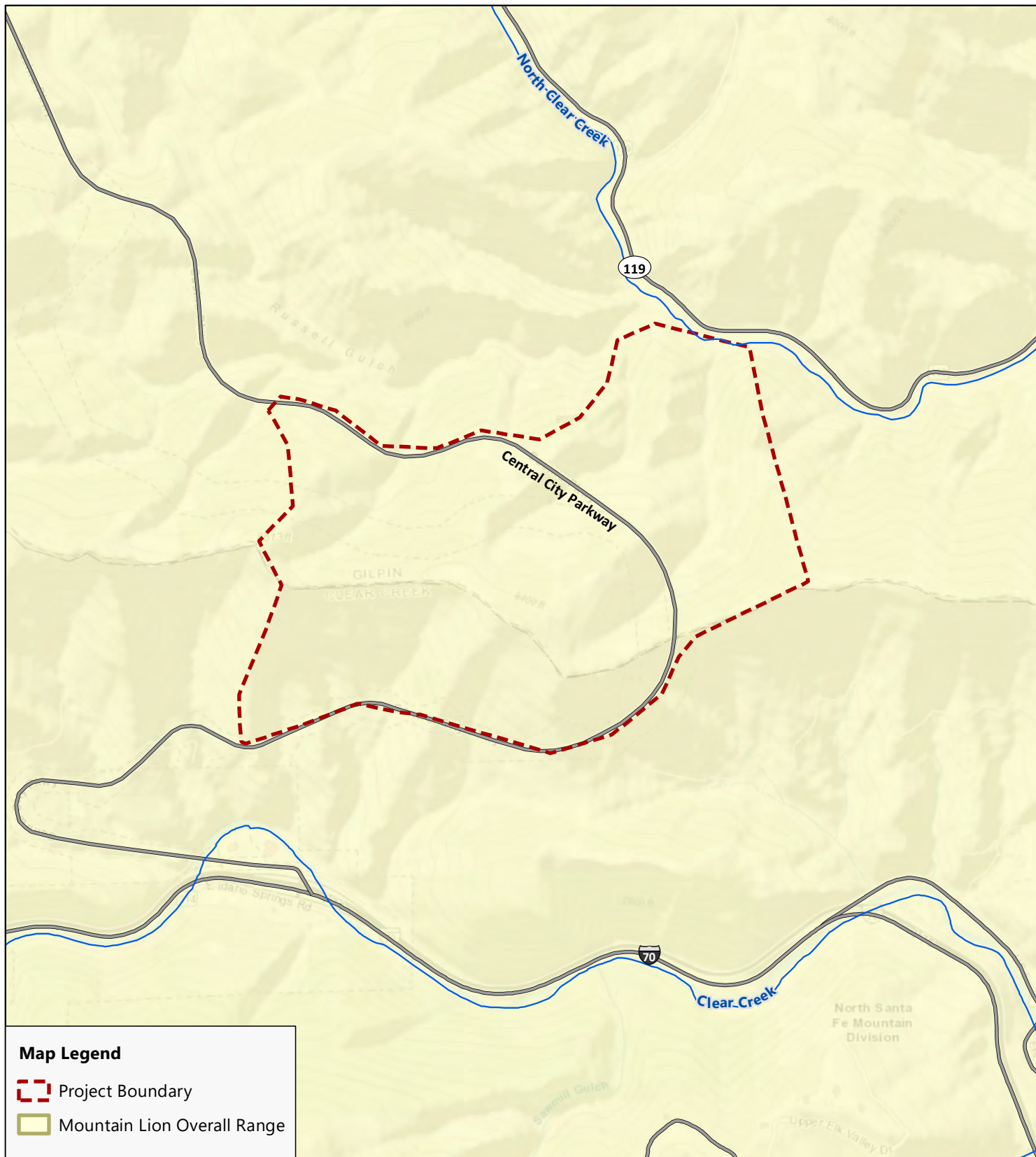
2820 Wilderness Place, Suite A  
Boulder, CO 80301  
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ERC #: 1290-2001

### **MOOSE - SUMMER RANGE** **CPW SPECIES MAP** **WILDLIFE MITIGATION PLAN** **YOUNG RANCH RESOURCE MINE** **GILPIN & CLEAR CREEK COUNTIES,** **COLORADO**



0 1,000 2,000  

 Feet



**Map Legend**

- Project Boundary
- Mountain Lion Overall Range

Prepared By:



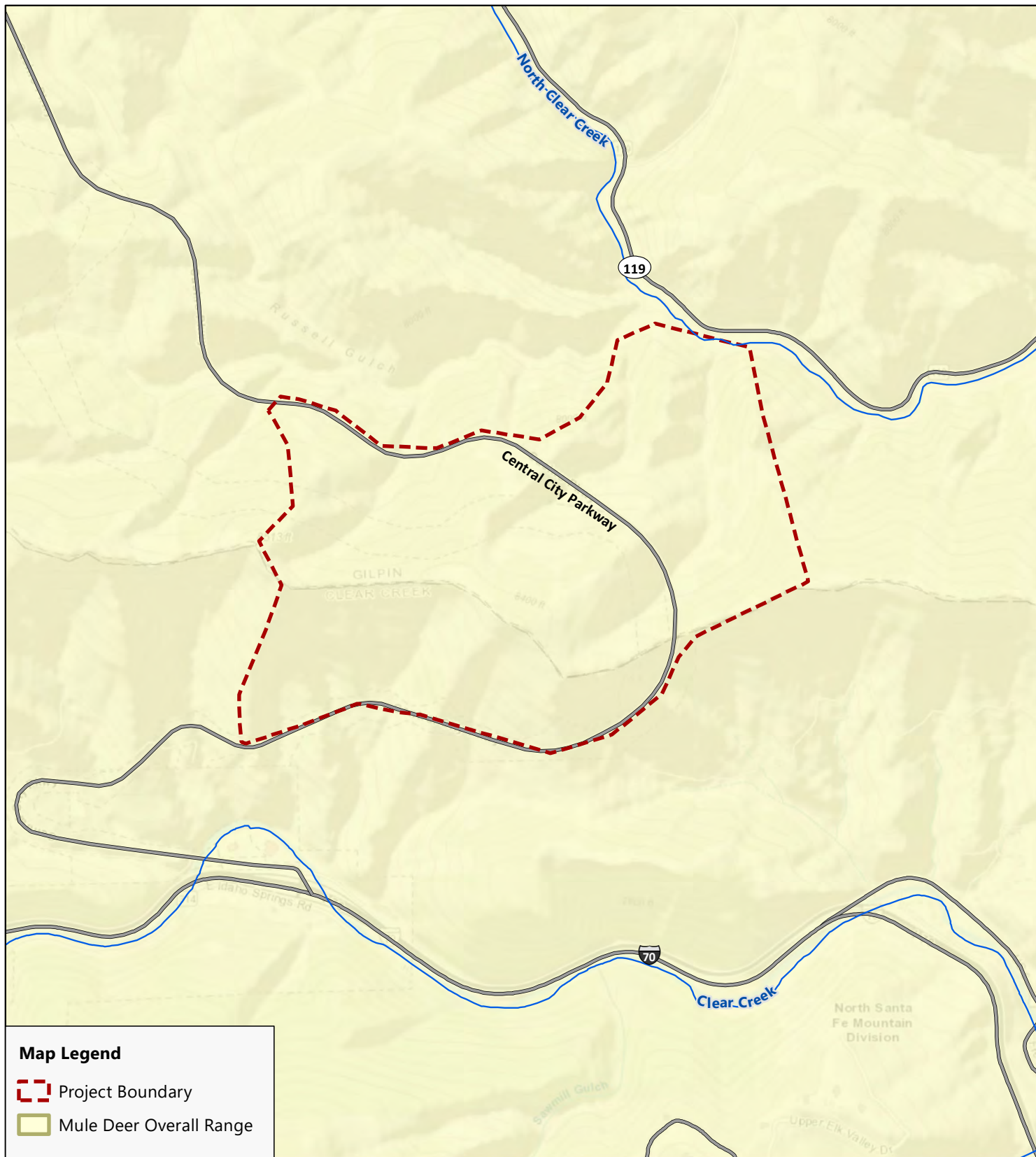
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(303) 679-4820  
ERC #: 1290-2001

**MOUNTAIN LION - OVERALL RANGE  
CPW SPECIES MAP  
WILDLIFE MITIGATION PLAN  
YOUNG RANCH RESOURCE MINE  
GILPIN & CLEAR CREEK COUNTIES,  
COLORADO**



0 1,000 2,000  
Feet





#### Map Legend

- Project Boundary
- Mule Deer Overall Range

Prepared By:

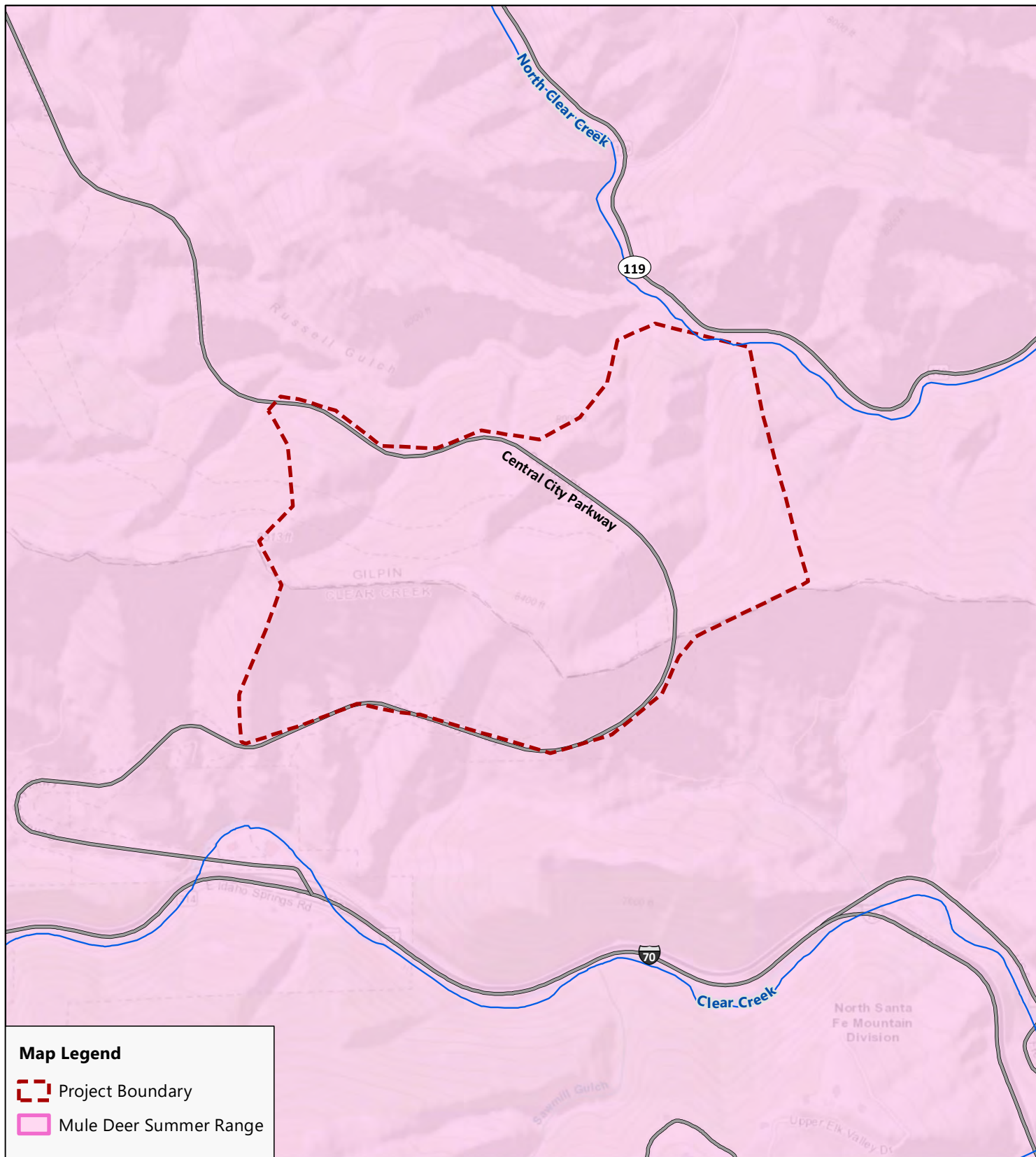


2820 Wilderness Place, Suite A  
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(303) 679-4820  
ERC #: 1290-2001

### MULE DEER - OVERALL RANGE CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO



0 1,000 2,000  
Feet



#### Map Legend

- Project Boundary
- Mule Deer Summer Range

Prepared By:



2820 Wilderness Place, Suite A  
Boulder, CO 80301  
(303) 679-4820  
ERC #: 1290-2001

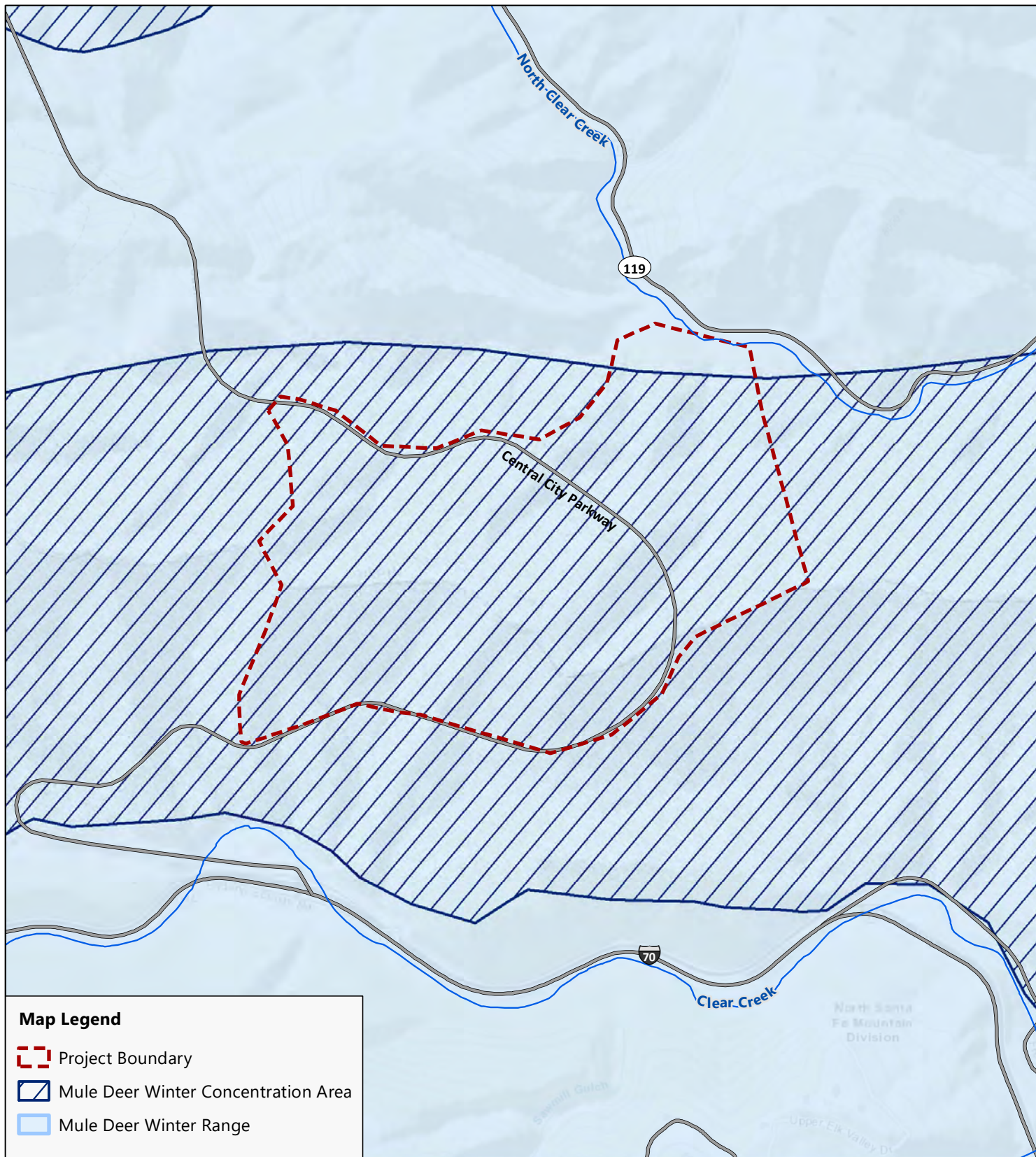
## MULE DEER - SUMMER RANGE CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO



0 1,000 2,000  
Feet

A horizontal scale bar with vertical tick marks at 0, 1,000, and 2,000 feet.





#### Map Legend

- Project Boundary
- Mule Deer Winter Concentration Area
- Mule Deer Winter Range

Prepared By:



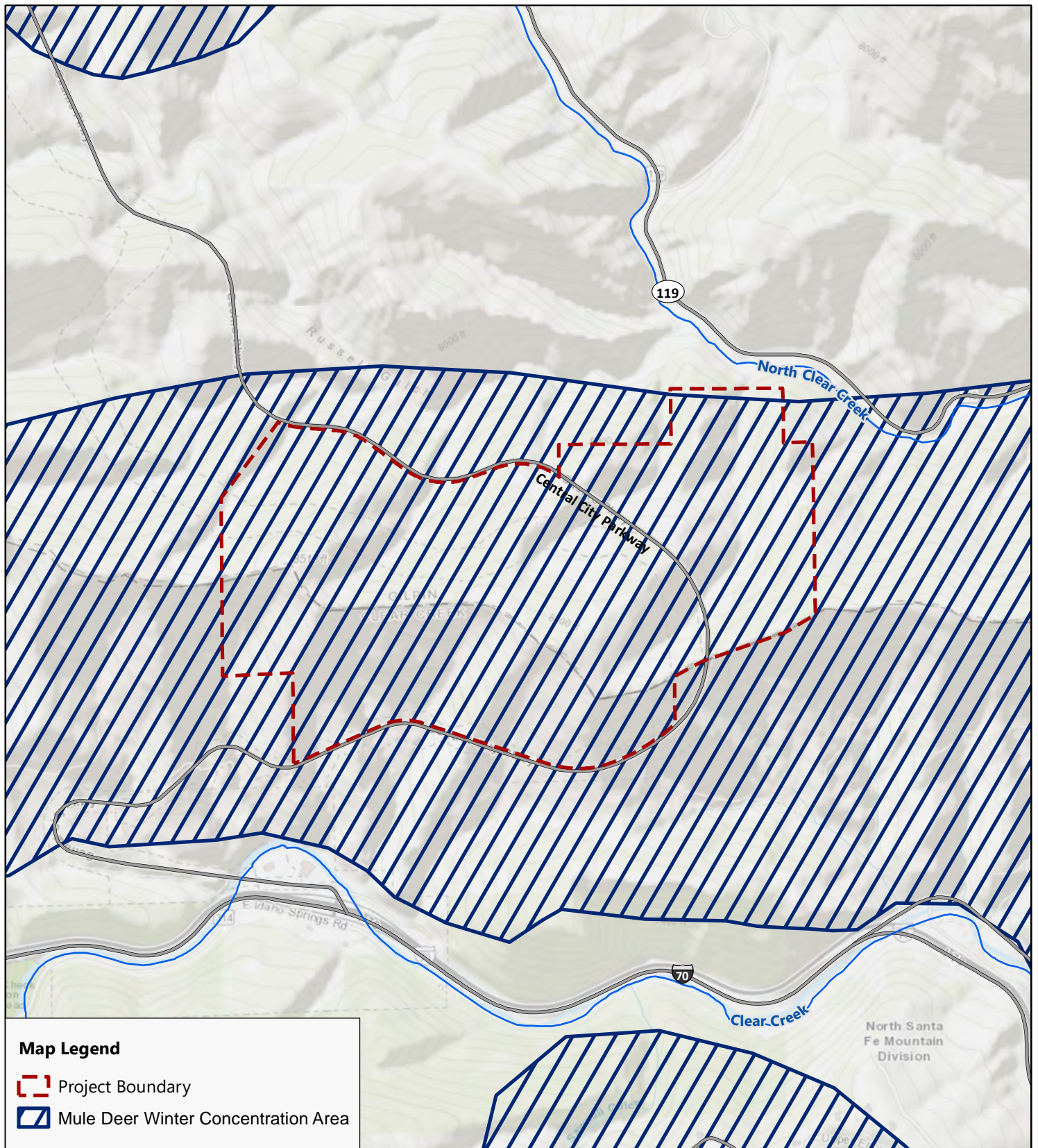
2820 Wilderness Place, Suite A  
Boulder, CO 80301  
(303) 679-4820  
ERC #: 1290-2001

## MULE DEER - WINTER RANGE CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO



0 1,000 2,000  
Feet





Prepared By:

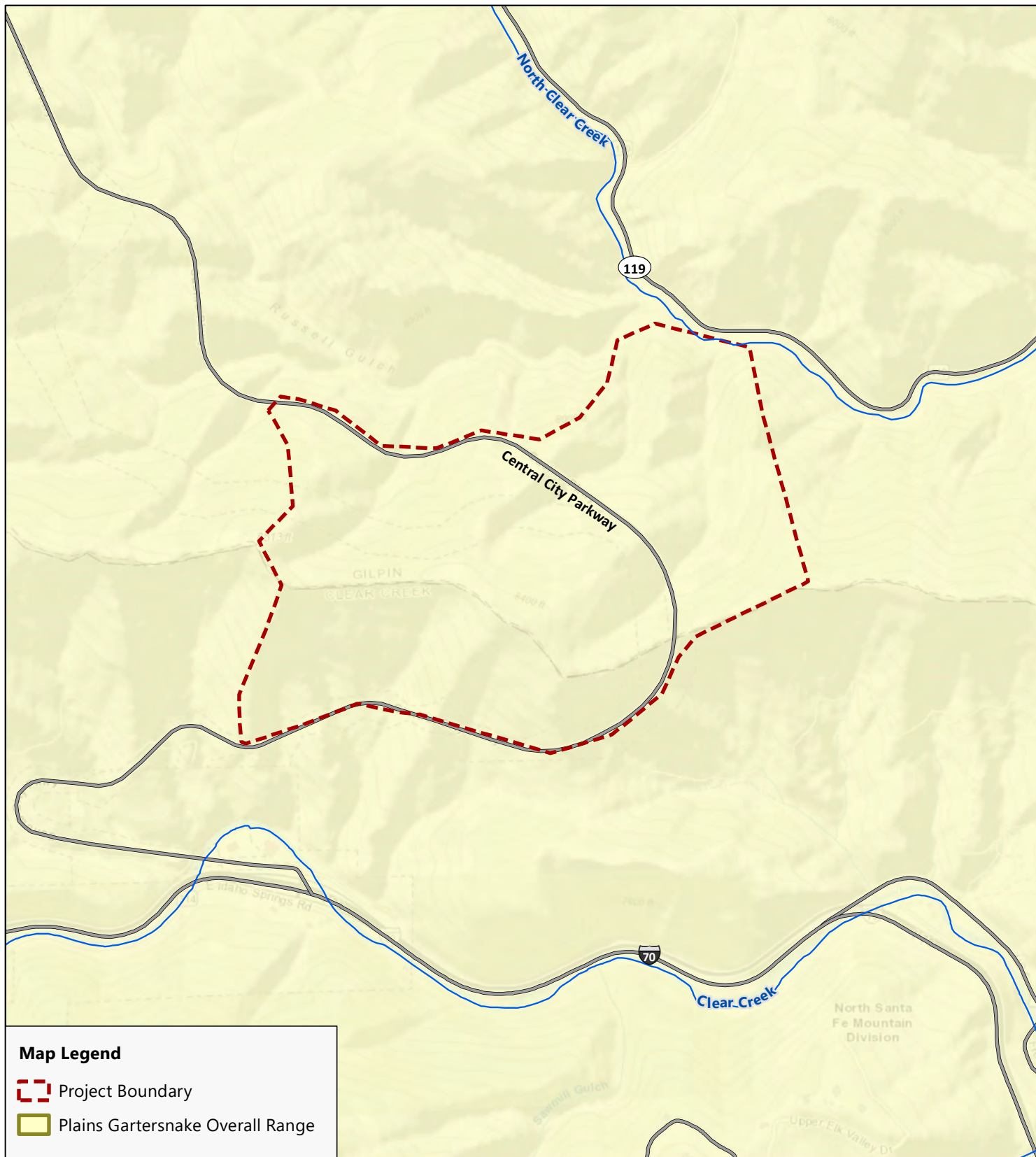


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ERC #: 1290-2104

**MULE DEER - WINTER CONCENTRATION AREA  
CPW SPECIES MAP  
WILDLIFE MITIGATION PLAN  
YOUNG RANCH RESOURCE MINE  
GILPIN & CLEAR CREEK COUNTIES, COLORADO**



0 1,000 2,000  
Feet



Prepared By:



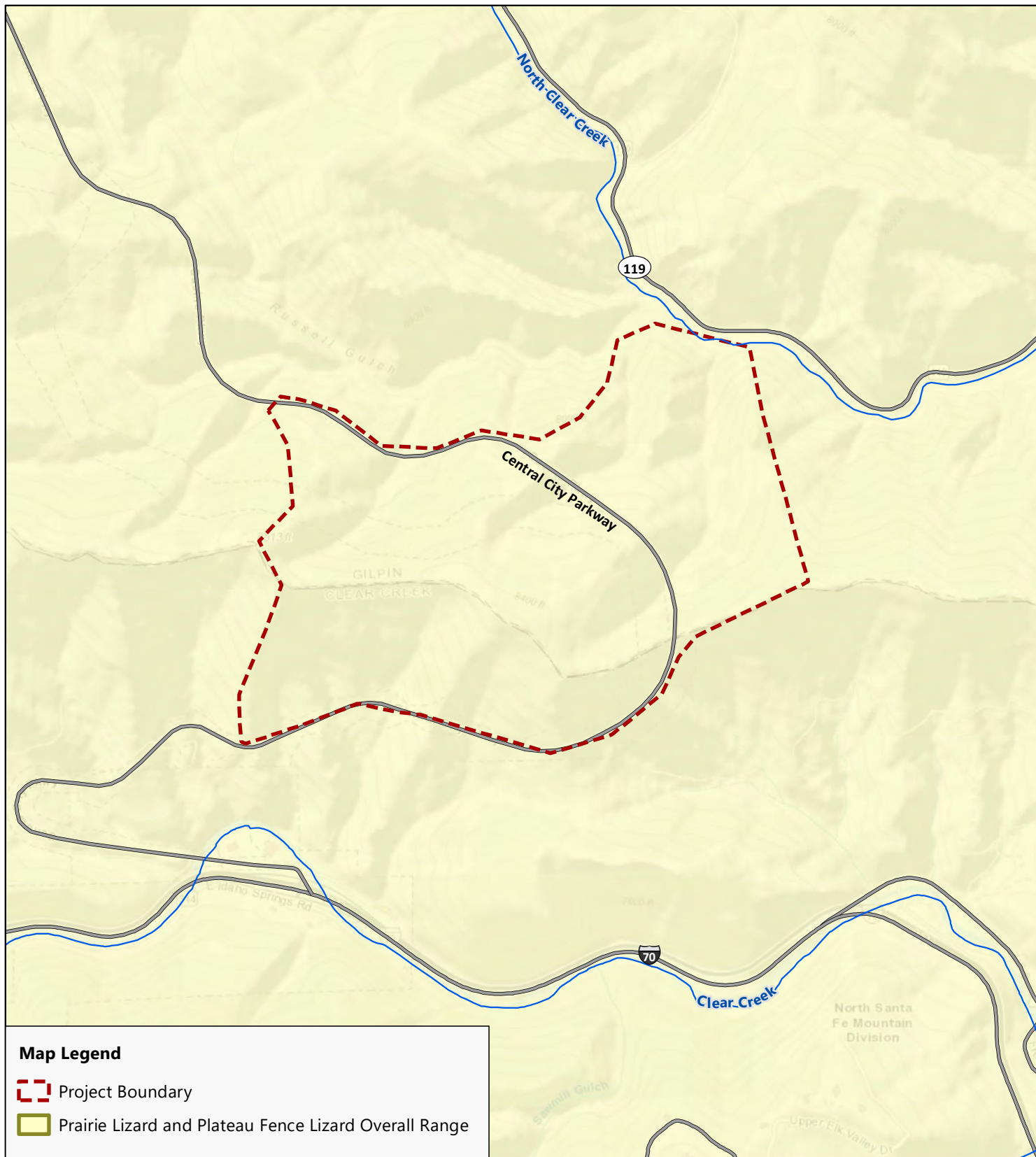
2820 Wilderness Place, Suite A  
Boulder, CO 80301  
(303) 679-4820  
ERC #: 1290-2001

**PLAINS GARTERSNAKE - OVERALL RANGE**  
**CPW SPECIES MAP**  
**WILDLIFE MITIGATION PLAN**  
**YOUNG RANCH RESOURCE MINE**  
**GILPIN & CLEAR CREEK COUNTIES,**  
**COLORADO**



0 1,000 2,000  
Feet





#### Map Legend

- Project Boundary
- Prairie Lizard and Plateau Fence Lizard Overall Range

Prepared By:



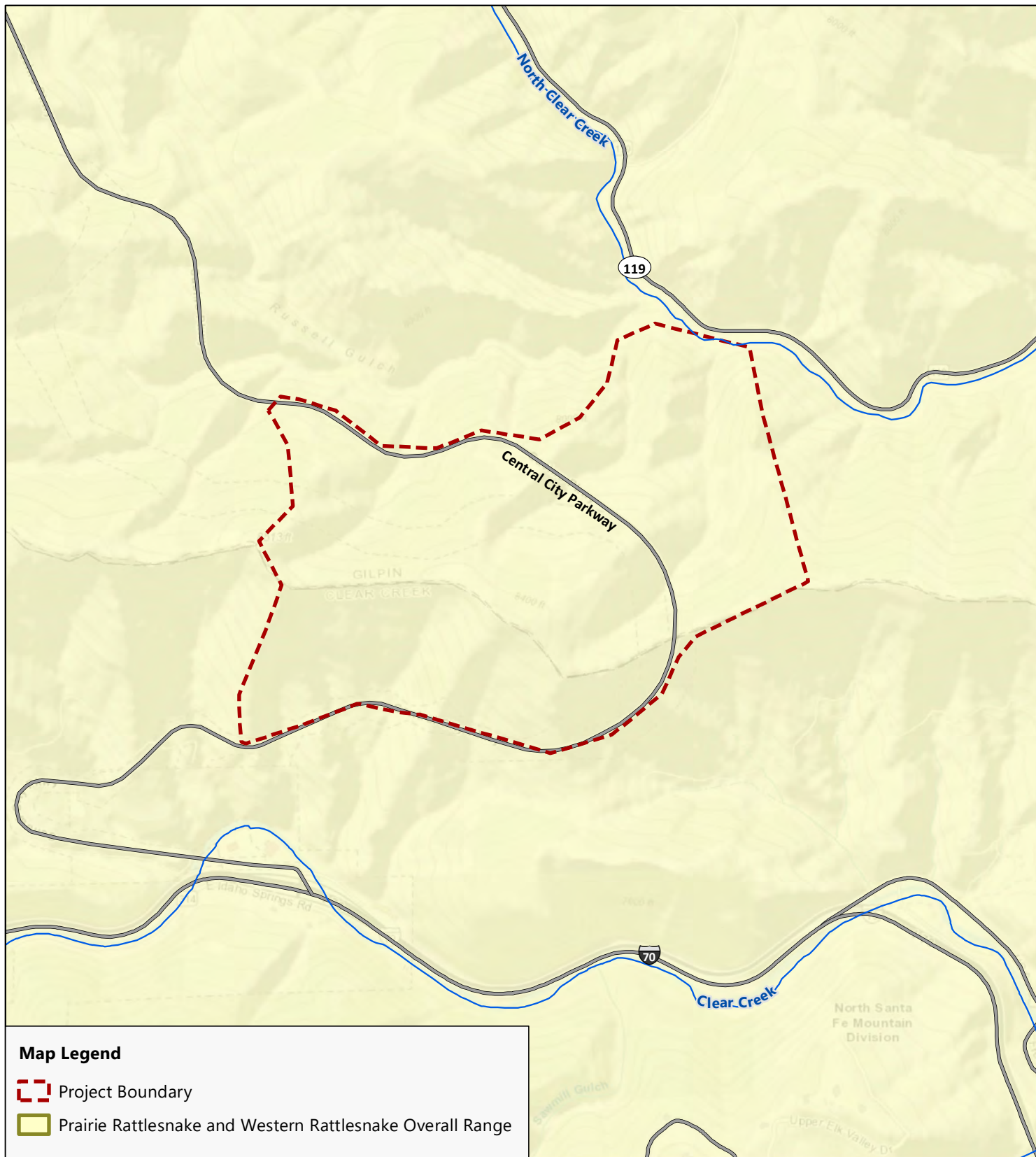
2820 Wilderness Place, Suite A  
Boulder, CO 80301  
(303) 679-4820  
ERC #: 1290-2001

### PRAIRIE LIZARD & PLATEAU FENCE LIZARD - OVERALL RANGE CPW SPECIES MAP

### WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO



0 1,000 2,000  
Feet



Prepared By:



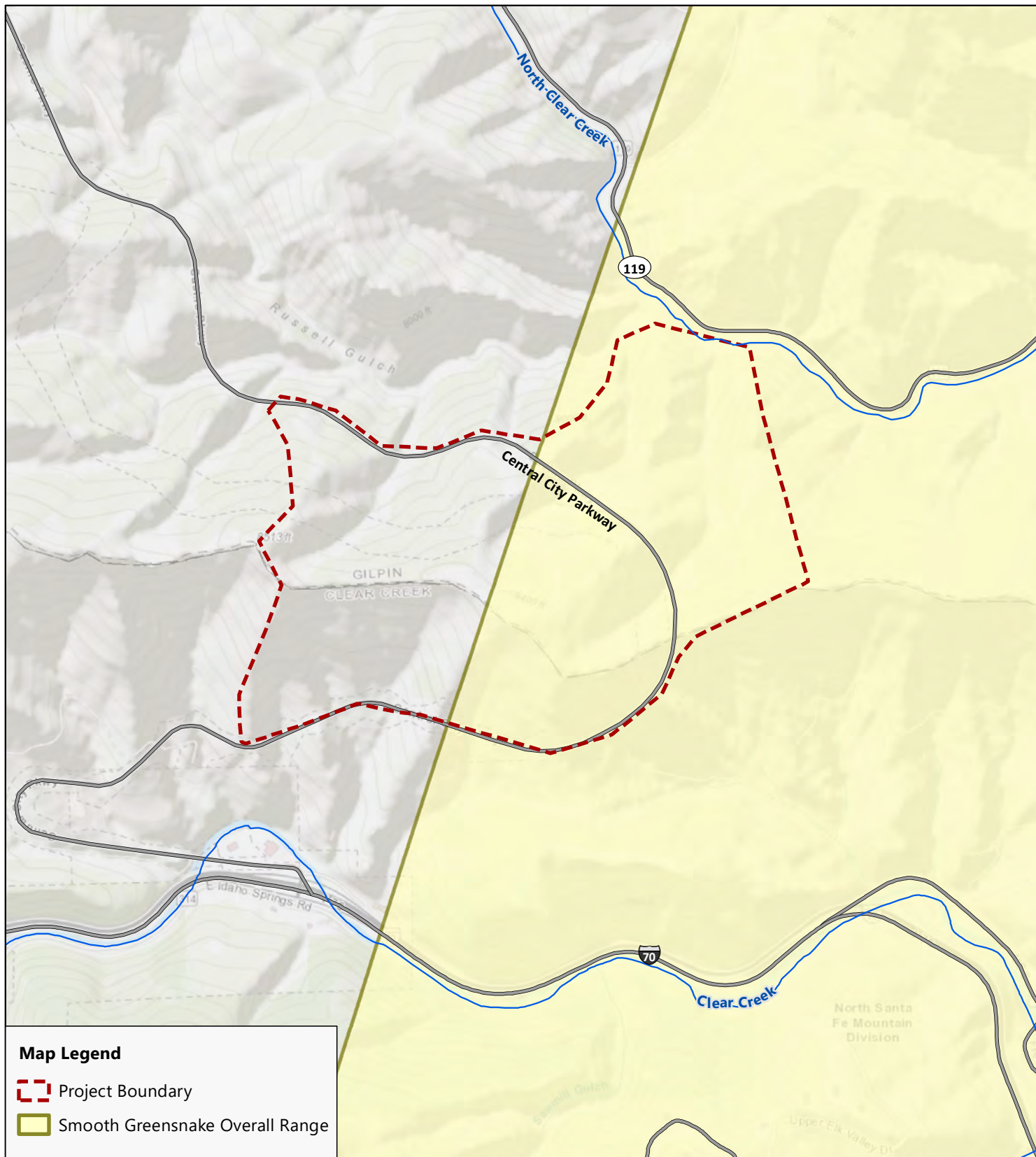
2820 Wilderness Place, Suite A  
Boulder, CO 80301  
(303) 679-4820  
ERC #: 1290-2001

**PRAIRIE RATTLESNAKE & WESTERN  
RATTLESNAKE - OVERALL RANGE  
CPW SPECIES MAP  
WILDLIFE MITIGATION PLAN  
YOUNG RANCH RESOURCE MINE  
GILPIN & CLEAR CREEK COUNTIES,  
COLORADO**



0 1,000 2,000  
Feet





#### Map Legend

- Project Boundary
- Smooth Greensnake Overall Range

Prepared By:



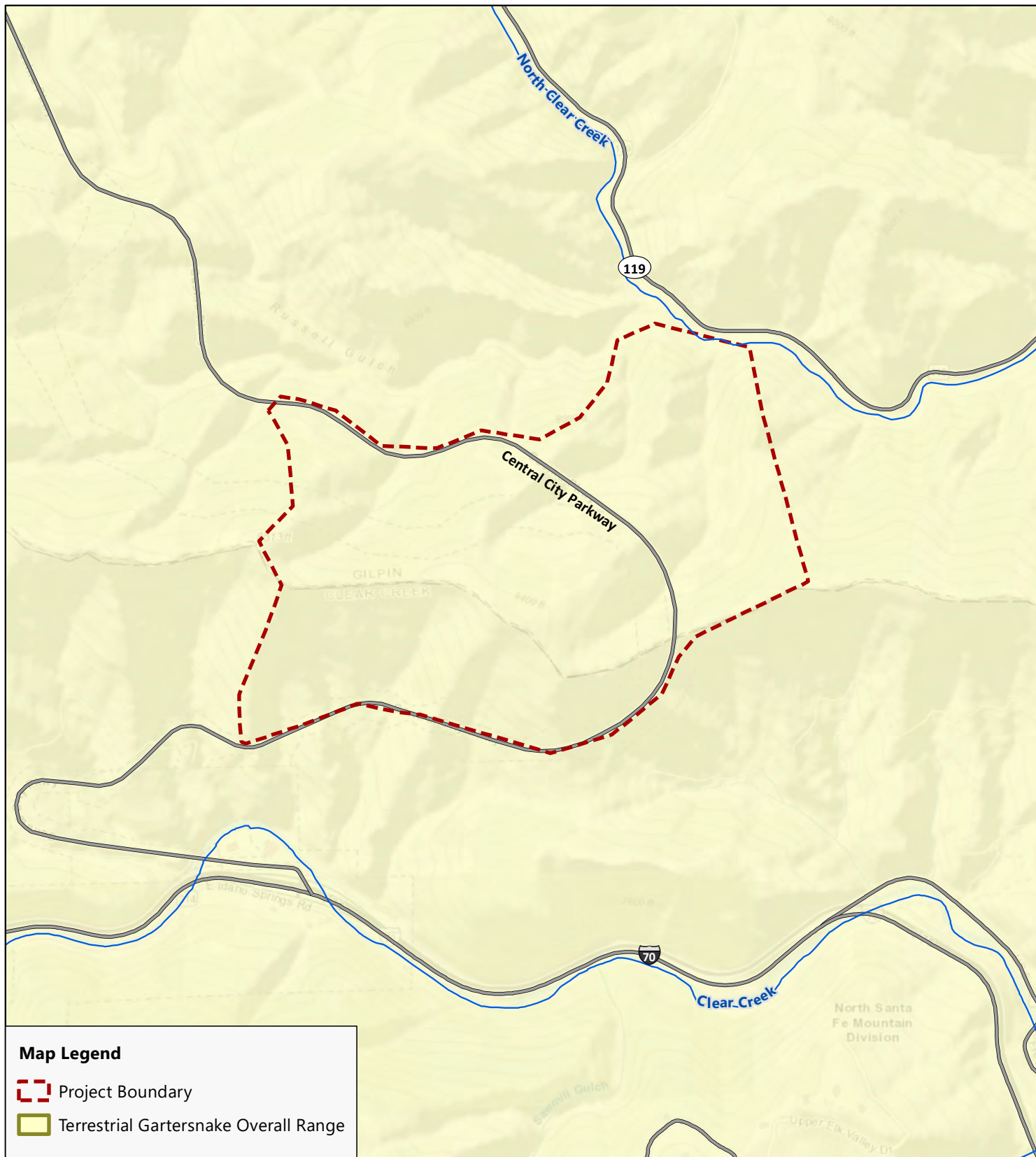
2820 Wilderness Place, Suite A  
Boulder, CO 80301  
(303) 679-4820  
ERC #: 1290-2001

## SMOOTH GREENSNAKE - OVERALL RANGE CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO



0 1,000 2,000  
Feet





Prepared By:

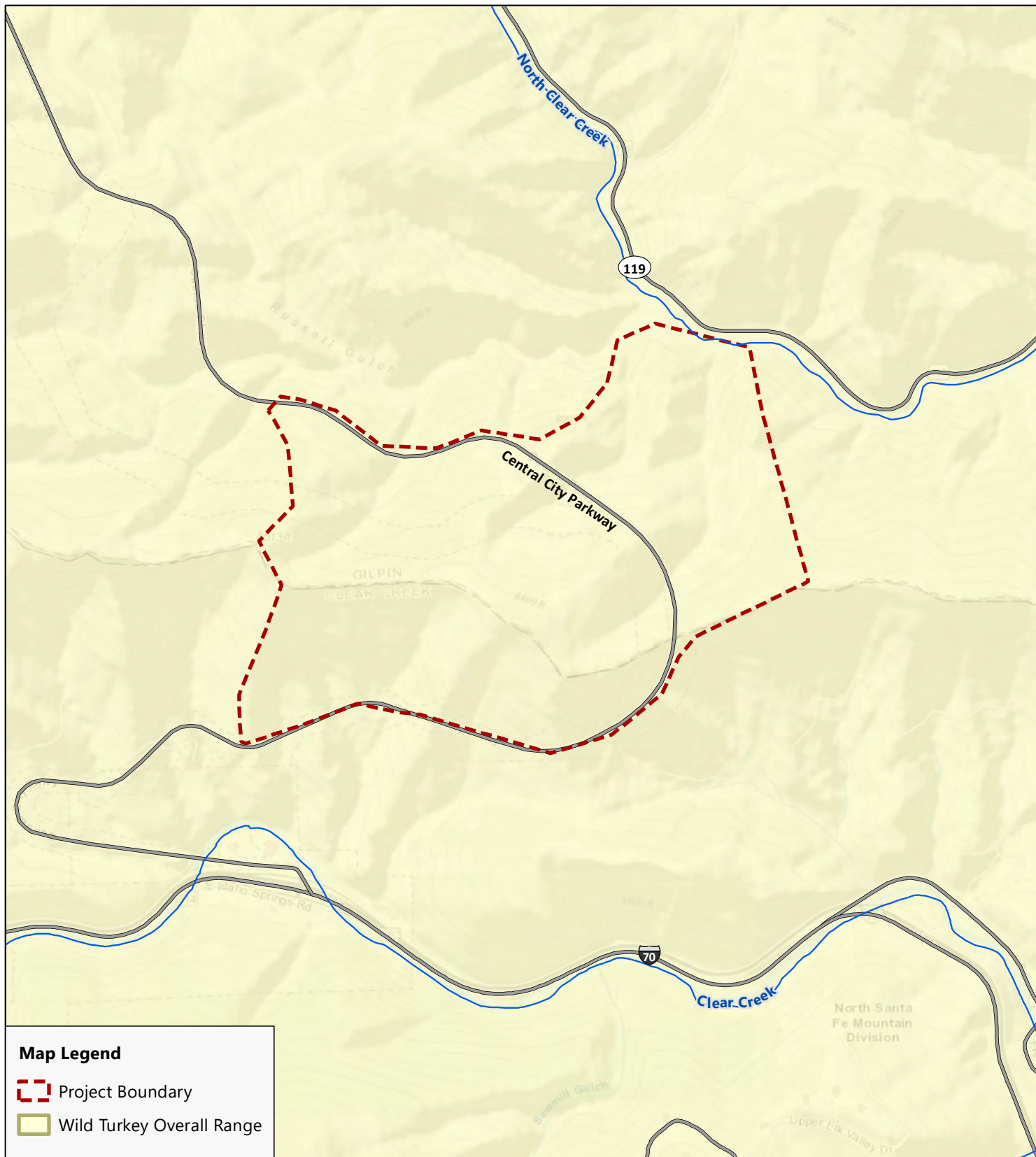


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**TERRESTRIAL GARTERSNAKE - OVERALL RANGE**  
**CPW SPECIES MAP**  
**WILDLIFE MITIGATION PLAN**  
**YOUNG RANCH RESOURCE MINE**  
**GILPIN & CLEAR CREEK COUNTIES,**  
**COLORADO**



0 1,000 2,000  
Feet



#### Map Legend

- Project Boundary
- Wild Turkey Overall Range

Prepared By:



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Boulder, CO 80301  
(303) 679-4820  
ERC #: 1290-2001

## WILD TURKEY - OVERALL RANGE CPW SPECIES MAP WILDLIFE MITIGATION PLAN YOUNG RANCH RESOURCE MINE GILPIN & CLEAR CREEK COUNTIES, COLORADO



0 1,000 2,000  
Feet