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Limiting Roped and Aerial Activities in Mineral and Hell Roaring Canyons

Environmental Assessment DOI-BLM-UT-Y010-2020-0068

Location: Grand County, Utah

Bureau of Land Management, Moab Field Office, 82 E. Dogwood, Moab, Utah

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CHAPTER 1. INTRODUCTION

The Moab Field Office of the Bureau of Land Management (BLM) proposes to enact limitations (in accordance with regulations found at 43 Code of Federal Regulations (CFR) §8365) to limit aerial and roped activities, as well as the construction of temporary or overnight structures, in Mineral and Hell Roaring Canyons, as well as along the canyon rims of the Green River corridor connecting these two canyons. The proposed restricted area excludes the Mineral Bottom BASEjumping Focus Area as defined in the 2008 Moab Resource Management Plan (RMP), the Mineral Bottom Airstrip as defined in ROW #UTU-79987, and the Fruit Bowl Highlining Area.

As a result of information received during Scoping, the following locations are also excluded from the proposed restricted area: the Waterslide (a highlining area), the Green River Bowl (a highlining area) and the climb known as the Corner Tower. The proposed area of restriction is shown on Map 1 in Appendix C. The proposed area of restriction totals 10,044 acres.

1.1. Background

In the past decade, tourism in the Moab Field Office has increased over 58%; in 2019, the Field Office hosted 1.9 million visitors, and over 3 million visitor days. During the same period, visitation increased by over 72% in nearby Canyonlands National Park. As a result of increased human pressure, recreational activities are expanding into very remote canyon regions important to important wildlife species.

Roped activities are activities involving ropes, cables, vectran, climbing aids, webbing or anchors; hereafter these activities will be referred to as "roped activities". Activities that would be affected by the proposed restriction include, but are not limited to: ziplining, high-lining, slacklining, climbing, rappelling, canyoneering and rope swinging. Aerial activities include those that either start on, conclude on or suspend over BLM land, such as BASEjumping, vaulting, human catapulting, paragliding, paramotoring, parachuting, skydiving, drone launching and aerial delivery.

Mineral and Hell Roaring Canyons are important habitat for a variety of wildlife, including golden eagles, Mexican Spotted Owl and other raptors, as well as for desert bighorn sheep. In recent years, recreational activity has increased, putting wildlife and their prime habitat at risk. People engaging in the majority of recreational activities, such as camping, hiking, biking, four wheeling, and other vehicle uses, do not access the inaccessible cliffs, steep walled canyons, slot canyons, alcoves and talus slopes in the remote backcountry of the Moab area, especially in the Mineral and Hell Roaring canyon areas. Historically, desert bighorn sheep have sought refuge here, utilizing these cliffs and canyons as escape terrain. This escape terrain has the only remaining habitats that bighorn can safely utilize year-round for lambing, rutting and daily foraging, as well as for drinking and resting needs. A variety of raptors and eagles have found isolated and undisturbed nesting in these canyons. Roped and aerial activities provide direct access into these limited remaining escape terrains and nesting sites, leaving these animals with no consistent undisturbed habitats.

The BLM seeks to mitigate this conflict by restricting those recreational activities with the greatest potential to impact wildlife in the highest valued habitats. While commercial Special Recreation Permit (SRP) holders have been required to adhere to wildlife stipulations, the general public has not, as there is currently no mechanism to restrict these activities.

Limitations on Other BLM Programs in Mineral and Hell Roaring Canyons

Mineral and Hell Roaring Canyons have been limited for many other BLM programs and activities to protect wildlife resources including desert bighorn sheep, raptors and eagles and their habitats. For example, the entire area is managed as No Surface Occupancy (NSO) for fluid mineral leasing, meaning that fluid mineral operations cannot occupy the surface of the land. This NSO stipulation extends to all other federal and non-federal surface disturbing activities, including the construction of new roads, facilities and trails.

Grazing in the two canyons is also limited to protect wildlife; Mineral Canyon is grazed by 4 horses for two months per year and Hell Roaring is grazed by 94 cattle for two months per year (winter grazing only). Approximately 2.5 miles of the road up Mineral Canyon (past the State section) has been closed to protect bighorn as well as another 1.5 miles in various locations along the rims of the canyon. (There is a non-maintained two-track route in Hell Roaring Canyon that is currently subject to review as part of the Labyrinth Rims/Gemini Bridges Travel Management Plan.) All motorized vehicles and mountain bikes are limited to designated roads. There are no designated mountain bike trails within the area and no new mountain bikes trails would be allowed because the area is managed as NSO for all surface disturbing activities. The Moab Resource Management Plan (RMP) directs the BLM to manage lambing areas (46,319 acres - see Map 9) by allowing camping in designated campsites only (WL- 37, page 142). No campsites are designated in Mineral or Hell Roaring Canyons to protect desert bighorn sheep habitats. In addition, no Special Recreation Permits (SRPs) have been permitted in Hell Roaring Canyon or in the upper portion of Mineral Canyon because of wildlife concerns.

This Environmental Assessment is being prepared to analyze the impacts of restricting the activities listed above in Mineral and Hell Roaring Canyons and on the connecting corridor along the Green River (10,044 acres).

1.2. Purpose and Need

Mineral and Hell Roaring Canyons are tributaries of the Green River and are located immediately north of Canyonlands National Park. Because of their steep cliffs and remote nature, they are important occupied habitat for many raptors, including golden eagle and Mexican spotted owl, as well as crucial lambing and rutting habitat for desert bighorn sheep. The desert bighorn sheep herd that inhabits these canyons as well as nearby Canyonlands National Park is the only herd in Utah that escaped extirpation after the arrival of white settlers from unregulated hunting, habitat disturbance and grazing domestic sheep, which spread diseases to native sheep. This particular herd has been used to repopulate other areas throughout the West.

Recreation use in Mineral and Hell Roaring Canyons has historically been low, allowing animals undisturbed use of these important habitats. However, as tourism to the Moab Field Office has increased, recreational activities have expanded into these remote canyon regions that had previously provided crucial wildlife habitats with minimal disturbance. Although canoeing use of the Green River has been a constant, recent years have seen an increase in types of activities deemed to be especially detrimental to both raptors and bighorn sheep. These activities include

those involving ropes (such as climbing, rope swinging and highlining), and aerial delivery such as but not limited to BASEjumping and drone launching.

The need for this action is for the BLM to secure the continued use of important wildlife habitats by developing limitations on recreation activities likely to compromise these habitats. These limitations would inform a management stratagem to address conflicts between recreationists and wildlife in the vicinity of Mineral and Hell Roaring Canyons.

Though both raptors and desert bighorn sheep exist at various levels throughout the Moab Field Office, Mineral and Hell Roaring Canyons offer a habitat with unique opportunity for these species found nowhere else in the field office. The proposed area of limitation was selected from data collected over the past several decades that identified high population levels and successful reproduction coupled with currently low recreational use and high-quality breeding and year-round habitats. The purpose of the action alternatives is to find a balance between recreational uses and wildlife habitat needs in Mineral and Hell Roaring Canyons.

1.2.1. Decision to be Made

The BLM will decide whether to limit roped and aerial activities, as well as temporary structures, in Mineral and Hell Roaring Canyons to avoid expansion of these activities in this area. The reason for this decision would be to benefit raptor, Mexican spotted owl and desert bighorn sheep habitat within the canyons. Following a decision to manage these activities, the BLM would pursue establishment of a supplementary rule in accordance with 43 CFR 8365.1-6.

1.3. Scoping and Issues

The proposal has been discussed internally at the Moab Field Office for at least ten years. Biologists with the Moab Field Office and the Utah Division of Wildlife Resources have identified the habitat in question through collar studies (2002 through the present) and other data gathering techniques dating back to the early 1960s. On April 7, 2020, the proposed project area and an outline of the proposed limitations were presented to the Moab Interdisciplinary Team. The conclusions of this meeting are presented in Appendix A of this document.

The project was posted on the BLM's ePlanning website on April 7, 2020, including a map of the proposed area of limitation. A formal Scoping Period was announced to the public via a Press Release on May 29, 2020. The proposal was the subject of a feature story in the *Salt Lake Tribune* on June 18, 2020 ("Climbers balk as feds seek to shut down roped activity in two popular canyons near Moab"). The proposal also received a great deal of distribution on various non-BLM social media outlets. The formal Scoping Period was held from June 1 to June 30, 2020. As a result of the Scoping process, the BLM received comments from 222 individuals and interest groups, as well as from two agencies (the U.S. Fish and Wildlife Service and the Utah Division of Wildlife Resources.) A summary of the scoping comments and the BLM's responses are displayed in Appendix B of this document.

As a result of both internal and external scoping, the following issues have been identified:

Table 1. Issues Analyzed in Detail

RESOURCE AND ISSUE #	ISSUE STATEMENT

Recreation – Issue 1	Increased use of Mineral and Hell Roaring Canyons by roped and aerial enthusiasts has been impacting various wildlife species. Before such activities spread further into the canyon system, the BLM seeks to manage this area for the benefit of these species. Within the Moab Field Office, 33 areas and over 1,095 climbing routes have been identified by the Mountain Project (2020); the Moab BLM houses data for 212 mapped climbs; limitations on these activities could have an effect on six climbing routes in Hell Roaring Canyon (identified through public scoping) and on the choices that recreationists have to do other aerial and roped activities in the Mineral and Hell Roaring area.
Threatened and Endangered Species: Mexican Spotted Owl - Issue 2	Mexican spotted owls nest in these canyons. This species is particularly sensitive to disturbances. Roped and aerial activities directly impact the environment that they need for survival.
Raptors, including Golden Eagles – Issue 3	Golden Eagles are a species of concern; they nest in these canyons. This species is particularly sensitive to disturbances. Other raptors also utilize the canyons for nesting and foraging habitat. Roped and aerial activities directly impact the environment that raptors need for survival.
Desert Bighorn Sheep – Issue 4	The desert bighorn sheep herd in this area is of particular concern. Roped and aerial activities directly impact the environment that these sheep need for survival.

CHAPTER 2. ALTERNATIVES

2.1. Alternative A

The BLM proposes to limit aerial and roped activities, as well as the construction or installation of temporary or overnight structures, in and along the walls and rims of Mineral and Hell Roaring Canyons, as well as along the canyon walls and rims along the Green River corridor connecting these two canyons. This limitation would be applicable year-round.

The proposed restricted area excludes the Mineral Bottom BASEjumping Focus Area as defined in the 2008 Moab Resource Management Plan (RMP), the Mineral Bottom Airstrip as defined in ROW #UTU-79987, Corner Tower, and the Fruit Bowl, Waterslide and Green River Highlining Areas. The proposed area of limitation (including the specifically excluded areas) is shown on Map 1 in Appendix C. The proposed area of limitation totals 10,044 acres, which represents less than 0.5% of the field office area.

Roped activities are those involving ropes, cables, Vectran, climbing aids, webbing or anchors. Roped activities include, but are not limited to: ziplining, space-netting, high-lining, slacklining, climbing, rappelling and rope swinging. Aerial activities are those which involve air delivery of a person or object from or to BLM land, including but not limited to BASEjumping, skydiving, vaulting, catapulting, paragliding, parachuting and other forms of aerial delivery, including drones.

Following any decision to limit activities, the BLM would pursue establishment of supplementary rules in accordance with 43 CFR 8365.1-6.

2.2. Alternative B

Alternative B is the same as Alternative A, except permits would be issued seasonally for the following climbs (all in Hell Roaring Canyon):

> *Kachina Towers -North and South*: 20 permits (with up to 4 people per permit) would be issued from September 1 – December 31 (that is, no permits would be issued from January 1 – August 31). The permit would be issued by contacting the Moab Field Office by phone; the permit would allow climbing one or both of the towers. No more than one permit per day would be issued for Kachina Towers North and South. Permits could be obtained by commercial permittees as well as by private climbers
>
> *Gollum*: 5 permits (with up to 4 people per permit) would be issued from September 1 – October 15 and from December 15 – December 31 (that is, no permits would be issued from January 1 – August 31 and from October 15 – December 15). The permit would be issued by contacting the Moab Field Office by phone. No more than one permit per day would be issued for the Gollum. Permits could be obtained by commercial permittees as well as by private climbers. Access to the Gollum would be only from the south rim of Hell Roaring Canyon.
>
> *Witch/Warlock/Cauldron*: : 10 permits (with up to 4 people per permit) would be granted from September 1 – October 15 and from December 15 – December 31 (that is, no permits from January 1 – August 31 and from October 15 – December 15). The permit would be issued by contacting the Moab Field Office by phone; it could be used to climb any or all of the three climbs. No more than one permit per day would be issued for this set of climbs. Permits could be obtained by commercial permittees as well as by private climbers. Access to the Witch/Warlock/Cauldron would be only from the south rim of Hell Roaring Canyon.

Throughout the remainder of the management area, there would be no roped or aerial activities, nor installation of temporary structures, allowed on a year-round basis, as outlined in Alternative A.

2.3. Alternative C– No Action Alternative

The BLM would continue to allow unlimited roped and aerial activities in Mineral and Hell Roaring Canyons. No limitations would be imposed and wildlife habitat would be compromised. Permitted activities would continue to be governed by stipulations attached to the permit that disallow use in this area; commercial operations could continue to be disallowed.

2.4. Alternatives Considered but Eliminated from Detailed Analysis

An alternative was considered that would impose limitations on roped and aerial activities on 107,220 acres of crucial bighorn habitats that are also prime habits for raptors, eagles and Mexican spotted owl. (The proposed management area represents about 10,000 acres of this larger habitat area). Stipulations have been imposed on mineral leasing activities on 107,220 acres of habitat ("Drilling operations and permanent facilities would not be allowed within desert bighorn sheep lambing and rutting habitat": *Moab Master Leasing Plan*, page A-22); stipulations also preclude all surface disturbing activities (2008 Moab RMP, WL-36). While the alternative would benefit wildlife by providing a larger area of restriction, the alternative was considered to be too impacting to large numbers of recreationists engaging in roped and aerial activities. The 10,000 acres that is

proposed for limitation in the action alternatives represents the most important and least disturbed habitat within the larger 107,220 acres that is heavily stipulated for mineral leasing.

2.5. Conformance

The Action Alternatives (Alternatives A and B) described above are in conformance with the 2008 Moab Resource Management Plan (RMP). The following decisions are pertinent to the proposal:

REC-2 (page 81): Where unacceptable damage to natural or cultural resources by recreational use is anticipated or observed, BLM will seek to limit or control activities by managing the nature and extent of the activity or by providing site improvements that make the activity more sustainable or by a combination of management controls and facility development. Such management actions will seek to reduce or eliminate the adverse impact while maintaining the economic benefits associated with a wide range of recreation uses.

REC-3 (page 81): BLM will consider and, where appropriate, implement management methods to protect riparian resources, special status species, and wildlife habitat while enhancing recreation opportunities. Management methods may include limitation of visitor numbers, camping and travel controls, implementation of fees, alteration of when use takes place, and other similar actions to be approved through normal BLM procedures.

SSS-3 (page 117): As required by the Endangered Species Act, no management action will be permitted on public lands that will jeopardize the continued existence of plant or animal species that are listed or are officially proposed or are candidates for listing as T and E.

SSS-20 (page 120): Mexican Spotted Owl lists five actions that would be taken to protect this species. These actions include "monitor and protect known Protected Activity Center (PAC) sites according to USFWS recommendations and MSO Recovery Plan", and :manage habitat for MSO according to USFWS and UDWR recommendations and recovery plans.

SSS-29 (page 123): Golden Eagle lists four actions that will be undertaken to protect this species, including the protection of golden eagle nest and habitat.

WL-1 (pag136): Continue to implement and modify three Habitat Management Plans (HMPs) summarized in Appendix U: Hatch Point HMP, Dolores Triangle HMP and the Potash-Confluence HMP.

WL-18 (page 138) Raptors will be managed under the auspices of Best Management Practices (BMPs; see Appendix R), which will include implementation of spatial and seasonal buffers. These BMPs implement the USFWS's Guidelines for Raptor Protection from Human and Land-use Disturbances, with modifications allowed as long as protection of nests is ensured. Seasonal and spatial buffers are also listed in Appendix R. Cooperate with utility companies to prevent electrocution of raptors. Temporarily close areas (amount of time depends on the species) near raptor nests to rock climbers or other activities if the activity could result in nest abandonment.

WL-36 (page 141): **Bighorn Sheep Habitat:** To protect lambing, rutting, and migration habitat (101,897 acres), apply a no surface occupancy stipulation for oil and gas leasing and preclude other surface disturbing activities (see Appendix A).

WL-37 (page 142): **Bighorn Sheep Habitat**: Manage lambing areas with the following prescriptions: camping is allowed only in designated campsites.

Appendix A (page A19): In Desert Bighorn Sheep Lambing Grounds and Migration Corridors (101,897 acres), no surface disturbing activities are allowed. (*Note: this stipulation applies to all surface disturbing activities, not just to oil and gas – see introduction to Appendix A*).

The Moab Master Leasing Plan (2016) expanded the prohibition on surface disturbing activities from mineral operations in desert bighorn sheep habitat to 107,220 acres.

In addition, The Federal Land Policy and Management Act mandates multiple use of Public Lands, including recreation use and wildlife habitats.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

This chapter defines the scope of analysis contained in this EA, describes the existing conditions relevant to the issues presented in Table 1 in Section 3.2, and discloses the potential direct, indirect and cumulative impacts of the action and no action alternatives. Issues have been presented in Chapter 1; for a discussion of issues not brought forward, see the Interdisciplinary ID Team Checklist (Appendix A).

General Setting

The Mineral and Hell Roaring canyon bottoms are tributaries of the Green River; they are located just north of Canyonlands National Park. The canyons are somewhat difficult to access by vehicle. A maintained road descends from the plateau to the river bottom, accessing the Mineral Bottom Boat Ramp, the Mineral Bottom Airstrip and the White Rim Road in Canyonlands National Park. A less maintained road travels 1.5 miles up Mineral Canyon to a dead-end. Past the Mineral Bottom airstrip, the primary access road along the Green River becomes increasing difficult. A very difficult track goes up Hell Roaring Canyon, but it receives very little use due to its condition. On the plateau above the canyons, there are several two-track roads that access the edges of the canyons. The lack of travel access has provided remote, undisturbed habitats for various wildlife species.

In the past decade, tourism in the Moab Field Office has increased over 58%; in 2019, the field office hosted 1.9 million visitors, and over 3 million visitor days. During the same period, visitation has increased by over 72% in nearby Canyonlands National Park. As a result of increased human pressure, recreational activities are expanding into very remote canyon regions, such as Mineral and Hell Roaring Canyons. These canyons provide crucial habitats with minimal human disturbances for several unique and sensitive wildlife species in the Moab Field Office. Species frequenting these two canyon systems include desert bighorn sheep, Mexican spotted owls, golden eagles, peregrine falcons and several other raptor species. Due to the often unpredictable and inconsistent nature and unpredictable locations of roped and aerial activities, these activities result in a greater potential to be perceived as predation by wildlife than do more traditional recreation activities that occur in predictable locations. Thus, recreational activities that involve ropes and aerial components have a greater potential to directly impact these species than do the traditional recreation activities of driving, hiking or canoeing, as they are predictable to wildlife.

Analysis Assumptions

Wildlife Assumptions

The analysis assumes that there would continue to be an increase in tourism, visitation and associated recreation activities to the Moab area and Grand County. This analysis also assumes

that roped and aerial activities would continue to expand into backcountry areas surrounding Moab that currently do not see many roped and aerial activities. There is extensive peer reviewed and scientific research that investigates the impacts of various recreational activities to numerous ungulate and avian wildlife species that occupy remote canyon regions of the world. Though activities such as slacklining, highlining, BASEjumping, climbing, and human catapulting have not been the subject of extensive specific reviews, it will be assumed that individual wildlife would have similar responses to human activities studied in the cited research studies, with a potential for greater adverse responses due to the juxtaposition of these aerial and roped activities to these sensitive habitats.

It will also be assumed that impacts from roped and aerial activities are similar in size and intensity to off-trail hiking. Roped and aerial activities have similar impacts to wildlife, including unpredictability, the lack of consistency in behavior, and the potential for wildlife to perceive the activities as predation threats. Roped and aerial activities in the proposed management area can occur at random, at unpredictable and inconsistent times and locations, and with varying group size and intensity. Impacts from roped and aerial activities are also similar in size and intensity of driving and hiking as roped and aerial activities require driving and hiking to the often remote site, and directly or indirectly occupying the canyon rims, walls and canyon bottoms where prime habitats for desert bighorn sheep, raptors, eagles and Mexican spotted owl are found.

The analysis further assumes that impacts identified in cited peer reviewed and scientific research documents, though not specific to roped and aerial activities, reflect applicable direct or indirect impacts for the reasons mentioned above.

These important canyons currently are functional source habitats (high quality areas where birth rates are greater than death rates, causing the population to grow, and resulting in emigration to other areas). It can also be assumed that as habitat fragmentation and human disturbances increase, these areas could become a sink habitat (very low-quality habitat that, on its own, would not be able to support a population). As a result, species may become reduced or locally extirpated.

These assumptions are based on extensive peer reviewed and scientific research that has found that human disturbance results in alteration in ungulate and raptor behavior and has been associated with avoidance behavior (Frid and Dill 2002), physiological stress (Hayward et al. 2011, Strasser and Heath 2013), and impaired sensory perception (Mason et al. 2016), changes in habitat use (Gill and Sutherland 2000, Webber et al. 2013), interference with foraging behavior (Ferna´ndez-Juricic and Teller´ıa 2000), alteration of self-maintenance regimes (Kight and Swaddle 2007), and reduction in parental care to young (Ferna´ndez and Azkona 1993, Steidl and Anthony 2000). Human disturbance has been associated with reduced breeding success (Buick and Paton 1989, Brambilla et al. 2004, Watson et al. 2014), which may lead to population declines (Palacios and Mellink 1996, Wiedmann and Bleich 2014, Pauli et al. 2017). The level of impacts by alternatives will be further discussed in the analysis that follows.

Recreation Assumptions

This analysis also assumes the roped and aerial activities would occur in canyon and cliff type areas that offer topographic features similar to those found in the vicinity the current 212 known climbing locations found in the database housed by the Moab Field Office. These 212 climbing locations occur on geologic formations within 225,700 acres. Table 1 shows the number of known climbs by acreage and by geologic formation (age) within the Moab Field Office.

Table 1: Known Climbs by Formation and Acreage

Formation Age	Number of known climbs	Acreage
Permian age Formations (Cutler)	14	12,691
Jurassic age Formations (Wingate, Kayenta, Navajo, Carmel, Entrada, Morrison, Curtis)	143	198,228
Triassic age Formations (Moenkopi, Chinle)	42	9,844
Holocene & Pleistocene age Formations (talus slopes)	14	4,944
Total	**212**	**225,700**

Jurassic age formations appear to be the most suitable for roped activities, as evidenced by the percentage of known climbs within them. Thus, it is assumed that the greatest opportunities to expand roped and aerial activities occur on the 198,228 acres that provide the highest concentration of known climbing routes. Map 2 in Appendix C provides a depiction of Moab database climbing routes, Mountain Project climbing areas and associated geology.

3.1. Issue 1: Recreation

Recreation – Issue 1	Increased use of Mineral and Hell Roaring Canyons by roped and aerial enthusiasts has been impacting various wildlife species. Before such activities spread further into the canyon system, the BLM seeks to manage this area for the benefit of these species. Within the Moab Field Office, 33 areas and over 1,095 climbing routes have been identified by Mountain Project (2020). The Moab BLM houses data for 212 mapped climbs; limitations on these activities could have an effect on six climbing routes in Hell Roaring Canyon (identified through public scoping) and on the choices that recreationists have to do other aerial and roped activities in the Mineral and Hell Roaring area. Two known highlining areas of fewer than 100 acres total are also within the project area. All other known highlining areas are excluded from the project area.

3.1.1. Affected Environment

The project area is within the Labyrinth Rims/Gemini Bridges Special Recreation Management Area (SRMA). This 300,000 acre SRMA has Recreation Management Zones, or Focus Areas, that are managed for particular types of recreation activity.

The portion of the project area that is directly adjacent to the Green River is within the Labyrinth Canyon Canoe Focus Area (7,709 acres). In 2019, 4,864 private boaters and 910 commercial passengers floated the river. Some people debark at the Mineral Canyon Boat Ramp; others

continue on to float through Stillwater Canyon, which is largely within Canyonlands National Park. Stillwater Canyon float trips usually embark at Mineral Bottom; all but four miles of that 60 mile trip are within Canyonlands National Park.

The Mineral Bottom BASEjumping Focus Area (762 acres) is adjacent to, but not within, the area proposed for limitations on roped and aerial activities. This focus area emphasizes aerial activities, primarily BASEjumping. It is excluded from the project area.

The remainder of the project area is not within a specific focus area. However, in recent years, the cliffs of both Mineral and, to a lesser extent, Hell Roaring canyons have become increasingly popular with climbers, rope swingers, space netters, highliners, BASEjumpers and other roped or aerial enthusiasts. These canyons have great verticality and are relatively close to Moab with good access via SR 313 and the heavily maintained Mineral Bottom Road. While the exact level of this type of use is unknown, observational evidence indicates that roped and aerial use has grown in recent years and has expanded to more locations.

A very popular area with roped and aerial enthusiasts is known as the "Fruit Bowl". This area is partially on State of Utah (SITLA) lands and partially on lands managed by the BLM. To facilitate unified management of the activity, the BLM has entered into a Cooperative Management Agreement (CMA) with SITLA for the parcel containing the Fruit Bowl. This CMA allows the BLM to better manage the area, as BLM regulations are enforceable, and to permit an annual highlining festival, hosted by Slackline US in November of each year. The proposed area of limitation does not contain the Fruit Bowl area permitted to the festival *per se*, but lands below and adjacent to the Fruit Bowl are included in the project area. Map 3 in Appendix C illustrates the proposed area of limitation surrounding the excluded Fruit Bowl.

The Moab BLM maintains a climbing database that has mapped approximately 212 climbing sites in the Moab Field Office area. Mountain Project (2020) maps approximately 1,095 routes in this area. Although the BLM database is not an exhaustive list, it does provide a representation of the extent of climbing locations in the area and is useful in determining geological potential for various roped and aerial activities; it provides a baseline for analysis. Using this data, it was determined that at a minimum, there are over 225,700 acres of canyon and red rock formations within the Moab Field Office that provide the rock formations where various roped and aerial type activities may occur (see Map 2 in Appendix C for climbs and their associated geology). Of the 212 known climbs in the Moab Field Office area, six known climbs are located within the project area and are used by an unspecified, but small number of climbers per year (information received during scoping identified fewer than 50 small groups per year use these climbs). These climbs are approximately 18-20 miles from the town of Moab and include the Witch and the Warlock, the Cauldron, the Gollum and North and South Kachina Spires. No climbs were identified in Mineral Canyon during the Scoping Period, nor by any of the climbing advocates, groups or individuals who commented during that period.

Other recreation uses in the project area include canoeing, bicycling and driving on designated roads. There is some very limited hiking use of the canyons and their rims. People who enjoy viewing wildlife have an excellent chance of viewing desert bighorn sheep, one of Utah's most iconic native big game species, in the project area.

The State of Utah manages a hunting season for desert bighorn sheep, annually permitting three to five tags within the entire unit (over 300,000 acres). This is a once-in-a-lifetime hunt, and only rams are harvested, typically rams older than seven years of age. The sale of these tags typically

generates over $57,000 and is matched with other federal funds to total approximately $225,000. These funds are then used to protect and improve bighorn habitats, often directly within the Moab area. Hunters who wish to pursue one of the most sought-after big game animals in North America have opportunities to fulfill their tags in the project area. The project area offers one of the best venues for this hunt, given its remote and backcountry nature.

3.1.2. Environmental Impacts

3.1.2.1. *Impacts of Alternative A to Recreation– Year Round Management*

Those canoeing the Green River would not be negatively impacted by Alternative A. Canoeists who value serenity could gain positive benefits by not being impacted by the activities of those engaged in roped and aerial activities and delivery.

Recreationists who enjoy roped and aerial activities would continue to enjoy these activities on over 1,000 climbing routes within over 215,000 acres of canyon areas in the Moab Field Office. Alternative A would limit roped and aerial activities on 10,044 acres in the Mineral-Hell Roaring area. These recreationists could still use the BASEjumping Focus Area for roped and aerial activities, as well as the Waterslide, the Green River Bowl and the Fruit Bowl, but roped and aerial activities would not be allowed to continue to expand to areas in Mineral and Hell Roaring outside those polygons. These limitations would apply to both private and commercial users, although there is currently no commercial use in the area covered by Alternative A. The primary impact would be to those private users who wish to expand roped and aerial activities outside the areas set aside for them. These users often identify themselves by their activity; their chosen activity is of prime importance to them.

There are over 225,700 acres of canyon and red rock formations within the Moab Field Office that host over 1,000 climbing routes (212 known climbs and 1,095 routes identified on Mountain Project). These 225,700 acres are where various roped and aerial activities already occur and may readily expand. This is especially true on the 198,228 acres of Jurassic age Formations that host 143 of the 212 known climbs. While Mineral and Hell Roaring canyons are partially in the Navajo and Kayenta formations, they also offer approximately 4,000 acres of Wingate and other formations that present the best opportunities for roped and aerial activities (primarily in the Kayenta and Chile Formations). Limiting roped and aerial activities on the 10,044 acres in Alternative A would remove only about 4.5% of future "climbing opportunity area" in the Moab Field Office.

Of the 212 known climbing routes on BLM lands available in the Moab area, six remote climbs, the Witch and the Warlock, the Cauldron, the Gollum, and North and South Kachina Spires would no longer be available to the unknown but small number of climbers who enjoy them each year (fewer than 50 small parties per year, or possibly fewer than 25 per year according to scoping comments received from the Access Fund). Making these six climbs unavailable to the public is expected to impact climbers by reducing available known climbing locations by less than 2%. Over 200 database-mapped climbing areas and well over 1,100 climbing routes total in the Moab area would remain available to the public if Alternative A were to be chosen. Limiting roped and aerial activities in Alternative A would remove 0.6% of climbing routes in the Moab Field Office.

Four highlining areas (Colorado Bowl, Highlander Bowl, Waterslide and Green River Bowl) were identified within the proposed management area. Two of these (Waterslide and Green River Bowl) have been excluded from the proposal; thus, out of the 10,044 acres, only two small highlining

areas (Colorado Bowl and Highlander Bowl with fewer than 100 acres) would be unavailable to aerial recreationists.

Those who enjoy biking or driving on the designated roads and trails in the area would not be impacted by Alternative A. In addition, hikers in the canyons or on the rims would not be impacted by this alternative. Those bicyclists, drivers or hikers who value serenity could gain benefits from the absence of roped or aerial activities.

Those recreationists who value seeing desert bighorn sheep, other wildlife and raptors in their natural environment would benefit from Alternative A because the herd would be protected and would not seek escape terrain farther into the backcountry as a result of roped or aerial activities. As a result, these visitors may have a better opportunity to view desert bighorn sheep, other wildlife and raptors typically not visible in higher recreational use areas.

Hunters who wish to pursue prime trophy hunting opportunities for desert bighorn sheep (a once-in-a-life hunt) would benefit from Alternative A because the viability of the herd would be protected and the herd could possibly increase. Mineral and Hell Roaring canyons provide the primitive, remote and undisturbed habitat that is conducive to this trophy hunting experience. Alternative A would enhance the herd and thus the experience for those hunters.

3.1.2.2. *Impacts of Alternative B to Recreation– Year Round Management with the Issuance of Seasonal Climbing Permits for Selected Climbs*

The impacts of Alternative B to Recreation would be the same as those in Alternative A except that a limited number of climbers would retain access to the Witch, the Warlock, the Cauldron, the Gollum and Kachina Towers. This access would be by permit; permits would be issued seasonally and group size would be limited; a limited number of permits would be issued.

Recreationists who enjoy roped and aerial activities would continue to enjoy these activities year-round on over 1,000 climbing routes within over 215,000 acres of canyon areas and continue to enjoy the BASEjumping Focus Area for roped and aerial activities as well as Corner Tower, the Waterslide, the Green River Bowl and the Fruit Bowl, but roped and aerial activities would not be allowed to continue to expand to areas in Mineral and Hell Roaring outside those polygons. These limitations would apply to both private and commercial users.

Alternative B would remove only about 4.5% of future "climbing opportunity area" in the Moab Field Office and seasonally remove 0.6% of climbing routes in the Moab Field Office.

3.1.2.3. *Impacts of Alternative C to Recreation – No Action Alternative*

Under the No Action alternative, roped and aerial activities would continue in the project area. Recreation activities that have been primarily undertaken in the Mineral Bottom BASEjumping Focus Area and more recently at the Fruit Bowl would likely continue to expand to adjoining areas in Mineral and Hell Roaring canyons. There would be no limitations imposed on climbers, rope swingers, space-netters, highliners, drone operators or BASEjumpers along the rims of Mineral and Hell Roaring canyons or on other aerial or roped uses that have the potential to directly impact crucial wildlife habitats.

Established climbs, including the Witch and the Warlock, the Cauldron, the Gollum, and North and South Kachina Spires, would continue to be available to the climbing community without any limitations, as would several user-developed highlines/rope swing/basejumping areas. The

expansion of existing areas and the establishment of new areas for aerial and roped activities may be require additional management to ensure that public lands are managed appropriately. Users who enjoy the natural and quiet landscape may have reduced experience as existing and new areas become more popular.

Those canoeists, drivers, bicyclists or hikers who enjoy a more natural and quiet landscape would be required to co-exist with roped and aerial enthusiasts and there could be reduced opportunity to view wildlife such as bighorn, eagles and raptors.

Hunters wishing to pursue opportunities for trophy hunting of desert bighorn rams (in a once-in-a-lifetime hunt) would have fewer opportunities if game populations were reduced due to undue human disturbance in the Mineral-Hell Roaring area. If desert bighorn sheep populations were reduced to a significant degree, the hunting opportunity might be lost altogether due to expanding recreation use.

3.1.2.4. *Cumulative Impact*

Cumulative impacts are those impacts resulting from the incremental impact of an action when added to other past, present, or reasonably foreseeable actions regardless of what agency or person undertakes such other actions.

Cumulative Impact Area (CIA) for Recreation and Wildlife (Same for all Alternatives)

The cumulative impact area (CIA) for Recreation and Wildlife is the cliffs and canyon country found west of Moab where prime Mexican spotted owl and high value golden eagle habitats as well as crucial bighorn lambing and rutting habitats have been identified. Within the CIA there are numerous areas that offer a variety of recreational opportunities, including aerial and roped activities, camping, trails for backcounty touring with OHVs, motorcycles, and mountain bikes, hiking and viewing opportunities and other activities. (See Map 4 in Appendix C for the Cumulative Impact Area).

The CIA is defined by large topographic features of similar ecological and economical values to the project area; the project area totals 9 percent (10,044 acres) of the CIA's 112,519 acres. The CIA offers approximately 52,000 acres of suitable geological and topographical structure to support roped and aerial activities, 23 percent of the Moab Field Office with the project area containing 12 percent of the suitable geological and topographical structure found in the CIA Those seeking additional roped and aerial activities could also travel outside of the CIA, but the CIA offers a unique red rock canyon experience with long history of remote outdoor opportunities. The majority of the Potash bighorn sheep herd is not expected to move outside the CIA for lambing and rutting activities and local eagles and raptors currently nesting in the Project Area are not expected to nest outside of the CIA.

The CIA consists of approximately 94,090 acres (84%) of BLM lands, 13,336 acres (12%) of SITLA and State park lands and 5,093 acres (5%) of privately owned lands.

Past and Present Actions (Same for All Alternatives and all Issues)

Past and present activities in this area have included grazing and mineral exploration, and, more recently, recreation activities. A developed boat ramp, toilet and parking area is found at Mineral Bottom, and a toilet facility is located at the top of the switchbacks on the Mineral Bottom Road. Roped and aerial activities are currently restricted on a total of 36 acres in the CIA (the areas

around Gemini Bridges and Corona Arch). Special recreation permit holders have also been subject to limitations on roped and aerial activities.

Past or present actions that affect the same components of the environment as the project area in the CIA include livestock grazing, exploratory drilling for oil and gas, minerals exploration, past uranium and copper mining, geophysical surveys for oil and gas, and exploratory drilling for potash (potassium salts) and lithium, wildlife use, and recreational activities.

Livestock grazing has taken place in the CIA for more than 100 years. Both cattle and sheep have been grazed within the CIA; currently only cattle are grazing in the CIA. (Domestic sheep permits have not been issued since the 1970's to protect desert bighorn sheep.) Fence lines have been in place for decades and surface disturbances from them has had ample time to re-vegetate, so forage availability is not affected.

There has been exploration and development for leasable minerals, including oil and gas, in the CIA since at least the 1920's. All BLM lands within the CIA are currently available or under lease with 93,747 acres (99.6 %) under a stipulation that applies no surface occupancy limitations, meaning that any development must not result in surface disturbance or permanent structures. This stipulation was developed in the 2008 RMP and updated in the 2016 Master Leasing Plan to protect crucial lambing, rutting and year-round use in the highest quality habitats in the Moab Field Office. Additionally, the 2008 RMP precluded all surface disturbing activities, structure, or permanent occupancy of the surface by all other resources and uses in this same area. Potash, a leasable mineral, is found in the CIA. The Intrepid Potash Mine is an active potash development facility operating on the east side of Canyonlands National Park on state and private lands. There has been no development of potash operations on BLM lands.

Mineral exploration and development have occurred throughout this area historically, especially for uranium. The activity associated with uranium exploration and mining was particularly intense in the 1950s and 1960's. There are hundreds of abandoned mining claims and developments throughout the CIA. There is a current interest in lithium that is found in the CIA.

The entire CIA offers nesting and foraging habitats for Mexican spotted owls, golden eagles and a variety of other raptors, with the greatest concentration of raptors and eagles at the heads of Mineral, Spring, and Hell Roaring canyons and along the rims of the Shafer Basin. The entire CIA supports crucial lambing and rutting habitats for the desert bighorn Potash herd. In 1964, there were approximately 100 desert bighorn sheep remaining in the park and on the adjacent BLM lands. To protect these animals BLM lands that border the park limited grazing leases to cattle only to reduce disease transmission to native bighorn sheep. Currently there are roughly 130 desert bighorn sheep on BLM lands (Potash herd) where the CIA is located.

In the past decade, tourism in the Moab Field Office has increased over 58% to 1.9 million visitors in 2019, and over 72% in Canyonlands National Park. Past recreational use throughout the CIA area has included primitive motorized experiences (touring the backcountry using four wheel drive vehicles, dirt bikes, and OHVs), hiking and canoeing. Currently the CIA sees very high levels of recreation, including use of recreation facilities, established mountain bike, hiking and motorcycle trails, canoeing, hot-air balloon tours, BASEjumping, climbing, ziplining, space-netting, high-lining, slacklining, climbing, rappelling, rope swinging and other roped and aerial activities. Seven and a half miles of State Scenic Byway 313 pass through the eastern portion of the CIA, 41 miles of maintained non-paved roads provide easy access by car to the world class views and scenery in the CIA, and 272 miles of unmaintained roads offer an wide variety of experiences to OHVers and

four-wheel drivers. Within the CIA, there are remote, isolated areas that are difficult to access or where road access is not available; these areas receive minimal recreational use.

Reasonably Foreseeable Action Scenario (Same for All Alternatives and all Issues)

The following RFAS identifies reasonably foreseeable future actions that would cumulatively affect the same resources in the CIA as the two action and the No Action alternatives.

Livestock grazing for cattle within the CIA area is not expected to change. Exploration and development for leasable minerals in the CIA would continue, but the No Surface Occupancy stipulation that is in place on over 99% of the CIA would limit the majority of development in the CIA. The Intrepid Potash Mine on private and state land would remain active but no mining expansion is expected.

Apart from within the Wild and Scenic River designation along the Green River, there is no limitation on locatable minerals, although demand for these minerals is currently low. Abandoned uranium mines in Mineral and Hell Roaring canyons are scheduled to be closed in 2020 or 2021, resulting in short term and transient disturbances in the immediate area. The demand for lithium is unknown at this time.

Recreational growth in the Moab Field Office over the next decade is likely to increase, but the exact rate of increase is unknown. There is evidence that recreation growth is leveling off from the rate of increase seen in the 2009-2019 decade. However, there may be an increase in certain niche activities, such as roped and aerial activities, as more people discover Moab as a venue for this type of recreation. This could result in expansion of this type of use into outlying areas. Within the CIA, remote, isolated areas that are typically difficult to access or where road access is not available could see increased use as people pioneer new venues for roped and aerial activities.

Recreation

Recreation activities in the area are expected to increase as the popularity of Moab continues and as people seek recreation alternatives to the more crowded areas surrounding Moab. As the project area is particularly suitable for roped and aerial activities, these activities are also expected to increase primarily because of the presence of good access roads and the needed geological and topographical structure.

Under Alternative A, roped and aerial enthusiasts would be denied an area of just over 10,000 acres (12% of CIA), on which to expand their chosen activities. However, as there are no current plans to further restrict these activities, other venues would remain open to roped and aerial activities throughout the Moab Field Office; there are over 215,000 acres of canyon and red rock formation that offer needed geological and topographical structure for the development of new locations for roped and aerial activities. Alternative A would reduce roped and aerial opportunity by 4.5% in suitable areas and reduce existing climbing by 2.8% (0.6% of routes identified on Mountain Project) within the Moab Field Office.

Under Alternative B, climbers would retain limited, seasonal access to climbing venues as well as to over 215,000 acres of canyon and red rock formation to expand roped and aerial activities. Alternative B would reduce the potential for expansion of roped and aerial opportunity by 12 percent in the CIA, 4.5 percent in suitable areas and seasonally limit climbing on 2.8 percent of the mapped climbs (0.6% of routes identified on Mountain Project) within the Moab Field Office.

Under Alternative C (No Action), the cumulative effect of reduced wildlife populations on wildlife viewers and hunters would continue to increase as animals would be increasingly difficult to locate. Opportunities for the once-in-a-lifetime desert bighorn ram sheep hunt would be lessened.

The cumulative effect upon those who engage in roped and aerial activities from the loss of six known climbs (3% of mapped climbs) and limitations on 10,044 acres which includes 12 percent of the CIA and only 6 percent of desirable climbing geology of BLM lands in remote canyon areas would be small and confined to one area.

3.2. Issue 2: Mexican Spotted Owl

Threatened and Endangered Species: Mexican Spotted Owl - Issue 2	Mexican spotted owls nest in these canyons. This species is particularly sensitive to disturbances. Roped and aerial activities directly impact the environment that they need for survival.

3.2.1 Affected Environment – Mexican Spotted Owl

Currently various animal species residing in the upper portions of Mineral and Hell Roaring canyons have minimal potential for human disturbance. However, the growing interest in recreation activities that occur on the canyon walls and along the rims of these canyons has the potential to negatively impact species relying on the remote nature of this area for survival.

The Mexican spotted owl (MSO) was listed as a threatened species in 1993. Immediately following its listing, a team was appointed to develop the Mexican Spotted Owl Recovery Plan. The Recovery Plan was completed in 1995.

The Endangered Species Act (ESA) makes it unlawful for a person to take a listed animal without a permit. "Take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Through regulations, the term "harm" is defined as "an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."

Protecting Mexican spotted owls and their habitats is consistent with BLM policy; BLM Manual 6840.02 Objectives - A. *To conserve and/or recover ESA-listed species and the ecosystems on which they depend so that ESA protections are no longer needed for these species*. 6840.1A. Section 2 (Findings, purposes, and policy). *The BLM shall, consistent with Section 2 of the ESA, seek to conserve endangered and threatened species and shall utilize its authorities in furtherance of the purposes of the ESA.*

The Mexican Spotted Owl Recovery Plan (Recovery Plan) described owl habitat as deep, steep-walled canyons and hanging canyons. Nesting and roosting in Utah occurs in caves and on ledges in this canyon habitat. These canyons are typically surrounded by terrain that does not support breeding owls. The Recovery Plan recognizes two Mexican spotted owl habitat models and recommends a multi-tool approach, using these models for large scale planning efforts and to identify possible areas that may provide nesting and roosting habitat where nests may be located (USFWS 1995).

According to these MSO habitat models, 1,502,600 acres (1,432,390 acres on federal lands) of potential habitat can be found within the Moab Field Office. In 1999, the Moab Field Office

initiated an extensive habitat assessment program and to date the entire field office has had some level of habitat evaluations; most areas with suitable habitats have had multiple surveys over the past 20 years. This extensive habitat evaluation and survey schedule has allowed the Moab Field Office to identify and manage approximately 395,000 acres of suitable habitats, reducing modeled projection by 73%. Within the Moab Field Office, 20 years of extensive protocol surveys on over 350,000 acres has identified three nest sites; the Big Chief nest which has been active every year since 1999, the Hell Roaring nest which has been active since 2012, and was active in 2019, and a third nesting area detected in 2013, the Lions Mesa nest. Current 2020 status is not yet known.

The Hell Roaring nest is within the project area and the Big Chief nest is nine miles to the southeast, protected by a locked gate on private property. The entire project area is considered prime, high quality nesting habitat for the Mexican spotted owl and is on a protocol survey schedule that consists of four surveys per year for two years followed by one survey per year for two years; this schedule is then repeated.

In areas that contain suitable habitat for MSO or designated Critical Habitat, the Moab RMP (2008) directs the Moab BLM that actions will be avoided or restricted that may cause stress and disturbance during nesting and rearing of their young. The direction includes the preclusion of activities that would 'harm' essential behavioral patterns, including breeding, feeding, or sheltering during the nesting season, which is from March 1 through August 31.

Human disturbance is a primary threat to raptor populations that may generate a range of adverse impacts to the fitness, occupancy, and population rates of golden eagles, Mexican spotted owls, and other raptors depending on the type of disturbance (Hansen et al. 2017, Romin and Muck 2002). It is documented that rock climbing activities impact cliff-nesting raptors when activities are in close proximity to nests because of shouting and other noises involved with the activity, and the high sensitivity of birds to human activities occurring above them (Hansen et al. 2017). Other roped and aerial activities likely impart a similar level of impact to raptors when these activities occur in close proximity to nests (USFWS 2020).

Additionally, most radio-marked adult Mexican spotted owls have been found to remain on or near their breeding territory throughout the year, although some territorial owls migrated during winter. Migrating radio-marked owls typically left study areas [breeding area] in November or December and returned from January to April. Distances moved typically range from 5 to 50 km (3 to 31 miles) (Willey 1998a, Ganey and Block 2005). Winter is a period of energetic stress for many birds (e.g., Greenwood and others 1992, Newton 1998) and may be a critical period for these owls as well. For example, 9 of 11 mortalities documented in studies of radio-marked spotted owls in Arizona and New Mexico occurred from November through February (J. L. Ganey, unpublished data).

3.2.2 Environmental Impacts

3.2.2.1 Impacts of the Alternative A – Year Round Management

Alternative A would utilize proactive management strategies, as directed in the 2008 RMP (REC-3), to implement management methods to protect special status species, including the Mexican Spotted Owl. Alternative A would also support the BLM Mission by sustaining the health, diversity and productivity of the ESA threatened Mexican spotted owl on 10,044 acres of prime and crucial habitats in Mineral and Hell Roaring canyons. Alternative A would further the enjoyment of wildlife among present and future generations of people.

Recreational activities may affect owls directly through disturbances caused by human activity or indirectly through alteration of habitats such as damage to vegetation, soil compaction, illegal user created trail tracks, and increased risk of wildland fires. Whether managed or unmanaged, development of new recreational facilities, destinations, and expansion of existing facilities may alter owl habitat. (USFWS 2012).

Currently, Hell Roaring Canyon is home to one nesting pair of Mexican spotted owls; the entirety of Mineral and Hell Roaring canyons offers prime expansion areas available for future nesting pairs as they disperse from one of the two nests in the area. With juvenile survival rates as low as 11%, it is vital to have suitable expansion habitats in the area.

According to Swarthout (2000), owl responses to hikers depend on a complex interaction of variables associated with the encounter and are most likely influenced by their previous experience with humans. Perch height, however, largely explained whether or not owls flushed in response to an approaching hiker; as owls perched higher, they were less likely to flush, a relationship identified in other raptors (Holmes et al. 1993, Steidl and Anthony 1996) and largely determined the distance at which adults flushed and the duration of their response as each of these responses increased with higher perch heights. Higher perches afford greater visibility of approaching disturbances at greater distances, which has been shown to increase flush response rate and flush distance in bald eagles (Steidl and Anthony 1996). Furthermore, female owls that nested in higher locations changed their activity budgets in response to hikers, more so than females that nested in lower locations (Swarthout 1999). Roped activities would be expected to create more frequent response and possible great distances of movement and longer periods of displacement as these activities bring human encroachment closer to roosts and nesting sites located high on the cliff walls where owls would otherwise not be directly impacted.

There are direct costs associated with responding to disturbance, such as energy demands of avoidance flight and time lost that would be allocated to other activities, such as incubation and tending to young. Mexican spotted owls have a narrow thermal neutral zone (Ganey et al. 1993) and consequently are found in cool microclimates (Rinkevich and Gutierrez 1996). Energetic demands of avoidance flights increase heat production, which may be exacerbated by flying during the day, and which could increase heat-related stresses. Flushed owls vacate their selected roosts and nest sites that likely meet their thermoregulation requirements, perhaps forcing them to occupy roosts that may not meet these demands as effectively or leaving eggs and juveniles unprotected and susceptible to exposure and predation.

Alternative A would create positive direct impacts to Mexican spotted owl by eliminating the potential for roped and aerial delivery activities to disturb Mexican spotted owl that occupy the area, ensuring their energetic demands are met and their eggs and young remain protected and energetic stress does not increase during the winter months when the known pair and their juveniles may further utilize this area. Indirect impacts would result in ensuring over 10,000 acres of prime Mexican spotted owl nesting habitats are managed so that recreation growth would not negatively impact the potential for Mexican spotted owls to expanded into suitable habitats in Mineral and Hell Roaring canyons.

3.2.2.2 Impacts of Alternative B – Year Round Management with the Issuance of Seasonal Climbing Permits for Selected Climbs

The impacts under Alternative B would be similar to those found in Alternative A, except some limited climbing use would be allowed seasonally in Hell Roaring Canyon.

As discussed in Alternative A, recreational use is limited in the project area; it is reasonable to assume that without proactive management, recreational use would expand into Mineral and Hell Roaring canyons.

Implementing seasonal climbing restrictions that limit permit location, numbers and group size to six specific climbing locations (Witch, Warlock, Gollum, Cauldron, North and South Kachina Spires) would create positive direct impacts to nesting Mexican spotted owls by eliminating the potential for climbing activities to disturb nesting Mexican spotted owl (because no permits would be issued during nesting season). Alternative B would eliminate additional or new roped and aerial delivery activities that also impact nesting Mexican spotted owls, as discussed in Alternative A. Alternative B does not preclude energetic stress during the winter months when the known pair and their juveniles may utilize this area.

Alternative B would reduce the potential for expansion of additional activities that could directly and indirectly impact nesting Mexican spotted owl habitats and the active nest, as discussed in Alternative A.

Alternative B would create positive direct impacts to nesting Mexican spotted owl by eliminating the potential for roped and aerial delivery activities to disturb nesting Mexican spotted owl that occupy the area, but does not preclude potential energetic stress from existing climbing activity during the winter months when the known pair and their juvenile may utilize this area. Given that the Mexican spotted owl juvenile survival rate can be as low as 11%, and high mortality is known to occur during the winter months, Alternative B provides less overall proactive management strategies then Alternative A and may result in direct and indirect impacts from the continuation of climbing use that may result in energetic stress during the winter months to the known pair or their juveniles that may remain in the area after fledging.

3.2.2.3 Impacts of the Alternative C – No Action Alternative

The No Action alternative would not facilitate proactive management strategies, as directed in the 2008 RMP (REC-3), for special status species and wildlife habitat. The project area currently receives minimal use except for the Green River corridor. It is reasonable to assume that the No Action alternative would result in the expansion of roped and aerial activities into Mineral and Hell Roaring canyons and thus into prime MSO habitats.

The No Action alternative would allow the continuation and expansion of roped and aerial activities into an area that currently sees relatively low levels of human pressure. Due to the minimal human activity in the area, habitats for Mexican spotted owls remain largely intact, which has resulted in occupied nesting of one Mexican spotted owl pair. This occupied nest is in the direct vicinity of several climbing locations (the Witch and the Warlock and Gollum). Human activity involving roped and aerial activities is expected to increase and expand into other areas that are also near the MSO nest.

As discussed in Affected Environment above, owl responses such as increased flush response rate and distance is likely influenced by their previous experience with humans and perch. Direct costs associated with responding to disturbance may result in decreased time incubating and tending to young, leaving eggs and juveniles unprotected and susceptible to exposure and predation as well as to increases in heat-related stresses from being flushed from cool microclimates to roosts that may not meet thermoregulation needs (Holmes et al. 1993, Steidl and Anthony 1996, Ganey et al. 1993, Rinkevich and Gutierrez 1996). The No Action alternative allowing roped and aerial

activities would be expected to create more frequent response and possibly greater distances of movement and longer periods of displacement as these activities bring human encroachment closer to roosts and nesting sites on cliffs and canyon walls where owls might otherwise not be directly impacted.

The No Action alternative would allow the continuation of several climbs and allow for the expansion of additional activities that would directly impact an active nest, resulting in a 'take' of an endangered species. Direct impacts to nesting Mexican spotted owl would include increasing avoidance flights in response to human activities, resulting in increased energetic demands, increased heat-related stresses, and increases in potential for nest failure due to exposure and predation. Given that the Mexican spotted owl juvenile survival can be as low as 11%, limiting nest success further reduces potential population growth. Winter is a period of energetic stress for many birds (e.g., Greenwood and others 1992, Newton 1998); the No Action alternative would allow for increased potential of energetic stress to the known pair or their juveniles that may remain in the area after fledging.

Indirect impacts of the No Action alternative would result in over 10,000 acres of prime Mexican spotted owl nesting habitats managed with no limitations on roped or aerial activities. Thus, human encroachment as a result of growing recreation activities would impact the potential for Mexican spotted owls to expand into the suitable habitats found in Mineral and Hell Roaring canyons.

The No Action alternative would not secure sensitive wildlife habitats in an area that currently functions as source habitat (high quality habitat that on average allows the population to increase). These important canyons currently are functional source habitats (high quality areas where birth rates were greater than death rates, causing the population to grow, resulting in emigration to other areas), but as habitat fragmentation and human disturbances increase, these areas could become a sink habitat (very low quality habitat that, on its own, would not be able to support a population). As a result, the species may become reduced or locally extirpated.

The No Action alternative does not support BLM policy directing the BLM to conserve ESA-listed species and the ecosystems on which they depend by utilizing its authorities in furtherance of the purposes of the ESA.

3.2.1.1. *Cumulative Impact*

Cumulative Impact Area (CIA) for Recreation and Wildlife (Same for all Alternatives)

The cumulative impact area (CIA) for Recreation and Wildlife is identified in Section 3.1.2.4 and the map is Appendix C (Map 4)

Past and Present Actions (Same for All Alternatives)

Past and present activities in the CIA for area is identified in Section 3.1.2.4.

Reasonably Foreseeable Action Scenario (Same for All Alternatives)

Section 3.1.2.4 identifies reasonably foreseeable future actions that would cumulatively affect the same resources in the CIA as the two action and the No Action alternatives.

Mexican Spotted Owl

As noted above, aerial and roped activities are expected to increase as proponents seek less crowded and novel alternatives. The entire CIA supports prime Mexican spotted owl nesting and foraging habitats.

Within the CIA, Alternative A would limit the expansion of roped and aerial activities on about 10,000 acres, where there is known nesting of Mexican spotted owls. Under Alternative A, vigilance and flight responses of Mexican spotted owls would be expected to be reduced; rates, energy budgets and caloric consumption would improve population fitness within the project area, resulting in continued genetic connectively and population dispersal throughout the CIA.

Within the CIA, Alternative B would seasonally allow climbing use at six specific locations and limit the expansion of roped and aerial activities outside of these climbing areas on about 10,000 acres. As discussed above, this area supports Mexican spotted owls. Under Alternative B, vigilance and flight responses of Mexican spotted owls would be expected to continue at current rates, energy budgets and caloric consumption would maintain population fitness resulting in continued genetic connectively and population dispersal throughout the CIA.

The No Action alternative would allow for roped and aerial activities to continue and expand into the remote areas of these two canyons. Extensive research, discussed previously, indicates that human activities increase vigilance and flight of Mexican spotted owls. As these activities expand into the remote areas of these two canyons, vigilance and flight response is expected to increase energy expenditures and reduce potential for caloric consumption, potentially reducing population fitness resulting in a loss of genetic connectively and population dispersal throughout the CIA.

3.3 Issue 3 - Golden Eagles and other Raptors

Raptors, including Golden Eagles – Issue 3	Golden Eagles are a species of concern; they nest in these canyons. This species is particularly sensitive to disturbances. Other raptors also utilize the canyons for nesting and foraging habitat. Roped and aerial activities directly impact the environment that raptors need for survival.

3.3.1 Affected Environment- Golden Eagles and Other Raptors

Each raptor nest, offspring, and supporting habitats are considered important to the long-term viability of raptor populations and are vulnerable to disturbance by many human activities (Romin and Muck 2002). The steep canyon walls, remote nature, and increased prey potential due to the proximity to the Green River make this area prime nesting and year-round habitat for a variety of raptors, including the golden eagle. Over 40 nests belonging to golden eagle, peregrine and prairie falcon, red-tailed hawk and great horned owl have been identified in the project area since 1998. Map 5 found in Appendix C illustrates nesting habitat within the Project Area. Beginning in 2008, additional monitoring efforts through the Raptor Inventory Nest Survey (RINS) program identified 70 additional raptor nest sites in Mineral Canyon; Hell Roaring has not yet had intensive RINS inventories but similar results are expected.

Overall, raptors display a high degree of fidelity to nest sites and nesting territories (Newton 1979). Certain physiographic features such as elevation, slope, aspect, habitat diversity, prey availability, nest height, and nest substrate have been measured in attempts to characterize site selection by nesting raptors (Murphy et al. 1969, Apfelbaum and Seelbach 1983, MacLaren 1986, Kirmse 1994). The majority of raptor species are firmly fixed on a special type of nest site according to a narrow genetical disposition (Kirmse 1994). There is a large body of evidence that supports

negative impacts to golden eagle productivity and nesting success from multiple type of recreational activities in occupied habitats.

In the spring 2016, a new golden eagle nest with one chick was identified in Mineral Canyon, approximately 759 yards across a small side canyon adjacent to the Fruit Bowl. The nest was monitored several times during the spring, with noticeable increased visitor and highlining activity at the Fruit Bowl as the weather warmed into spring on the rims across from the nest. In a mid-May monitoring visit, the chick appeared dead on the ledge near the nest and the adult birds were not seen tending to the nest. The nest was monitored for several days until the chick had been scavenged. Adults were not seen at the nest site, or on past perching areas near the nest; the chick appeared to have succumbed to exposure and starvation as the parents avoided the increased activity near the Fruit Bowl

Based on evidence from various studies that will be further discussed in the Environmental Impacts section below, increased visitation to the canyon rims approximate 0.25 miles across from the nest and in direct line of sight resulted in adults reducing attendance and feeding behaviors which led to excessive exposure and starvation of the eaglet.

Golden eagles and their habitats are protected under the Bald and Golden Eagle Protection Act (1963) (16 U.S.C. 668-668d) (Eagle Act) and the potential for human activities to violate Federal law by taking eagles exists under the prohibitions of the Eagle Act. The Eagle Act defines the ''take'' of an eagle to include a broad range of actions: ''pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.''

''Disturb'' is defined in regulations at 50 CFR 22.3 as: ''to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.'' (*Federal Register* /Vol. 74, No. 175 / Friday, September 11, 2009 /Rules and Regulations). Taking action to reduce disturbance to breeding and nesting eagles would help reduce likelihood that BLM, via actions that it allows, would cause a "take" of golden eagles as protected under the Eagle Act. This would include avoiding actions that might "disturb" eagles, as defined at 50 CFR 22.3.

Protecting golden eagle nesting habitat is consistent with BLM policy (BLM Manual 6500). Goal 4 – Raptor Habitat Management of BLM Manual 6500 directs the agency to "provide suitable habitat conditions for birds of prey through the conservation and management of essential habitat components, including habitat for prey species, especially in areas where birds of prey concentrate during some period of the year, or in important habitats where populations are suppressed."

Golden eagles are long-lived raptors that maintain nesting territories that may be occupied for a century or longer. Within occupied nesting territories there is one nest in which eagles lay their eggs in a given year (i.e., the used nest), but there are usually other nests within the area (i.e., alternative nests) (Millsap 2014).

Assessments of golden eagle populations in the western United States suggest stable or declining populations (Kochert and Steenhof, 2002; Hoffman and Smith, 2003; Millsap et al., 2013). Maintaining the quality of existing habitat has been deemed important to long-term population viability (Kochert et al., 2002). Golden eagles are considered to be sensitive to human disturbance (Kochert & Steenhof, 2002; Whitfield et al., 2004). Human disturbance has been implicated in

reduced eagle nesting productivity (Boeker & Ray, 1971). Maintaining habitat and populations in areas free from human disturbance is considered an important component of golden eagle conservation (Kochert & Steenhof, 2002).

Besides habitat loss and modification, human activities and development have frequently resulted in disturbances at wintering locations and aborted or reduced nesting attempts. Studies of human disturbances at winter roosting areas have mostly concerned bald eagle responses. Human disturbances may constitute a threat to wintering eagle populations by causing displacement to areas of lower human activity (Shea 1973, Servheen 1975, Stalmaster 1976, Stalmaster and Newman 1978, Brown and Stevens 1997). Human disturbances may also interfere with foraging behavior of eagles (Mathiesen 1968, Stalmaster 1976).

Human disturbance is a primary threat to raptor populations that may generate a range of adverse impacts to the fitness, occupancy, and population rates of golden eagles, Mexican spotted owls, and other raptors depending on the type of disturbance (Hansen et al. 2017, Romin and Muck 2002). It is documented that rockclimbing activities impact cliff-nesting raptors when activities are in close proximity to nests because of shouting and other noises involved with the activity, and the high sensitivity of birds to human activities occurring above them (Hansen et al. 2017). Other roped and aerial activities likely impart a similar level of impact to raptors when these activities occur in close proximity to nests (USFWS 2020).

In the Moab Field Office, golden eagles and other raptors commonly nest on canyon walls near areas that also attract various roped and aerial types of recreational activities. Steenhof et al. (2014) showed that the number of young eagles produced per nesting was significantly lower in areas with relatively higher trail density and off-road vehicle traffic compared to areas with fewer trails or less off road vehicle traffic.

Due to the current low recreational use in Mineral and Hell Roaring canyons, golden eagle and raptor habitats remain highly suitable for current and future use by these birds. The Utah Field Office of the U.S. Fish and Wildlife Service provides guidelines for raptor protection from human and land use disturbances (Romin and Muck, 2002). These guidelines recommend seasonal protective buffers for golden eagles from January 1 through July 31 and for most other raptors from March 1 through August 31. Furthermore, these guidelines indicate that protection of nesting, wintering and foraging activities are considered essential, and recommend spatial buffer zones for activities occurring proximal to raptor winter concentration areas from November through March.

3.3.2 Environmental Impacts

3.3.2.1 Impacts of the Alternative A – Year Round Management

Alternative A would utilize proactive management strategies, as directed in the 2008 RMP (REC-3), to implement management methods to protect golden eagles and other raptors during the nesting season and throughout the winter months, as recommended by U.S. Fish and Wildlife Service.

Golden eagles are considered to be more sensitive to human disturbance than many other raptor species. Maintaining habitat and populations in areas free from human disturbance is considered an important component of golden eagle conservation (Kochert & Steenhof, 2002). Protection of both occupied and unoccupied nests is important since not all raptor pairs breed every year or

utilize the same individual nest within a nesting territory (Scott 1985). Individual raptor nests left unused for a number of years are frequently reoccupied. For instance, non-use may occur over one prey fluctuation period (7 ± years) for species such as golden eagles or ferruginous hawks. Successful habitat management should be complemented by efforts to attain natural or pre-development nesting success of local raptor populations and protection of winter roosting activities. (Romin and Muck 2002)

Alternative A would create direct positive impacts to eagle and raptor habitats by ensuring the continuation of nesting opportunities for golden eagles and other raptors by precluding roped and aerial recreation, as well as precluding the installation of temporary structures or facilities. Outside of the Mineral Bottom BASEjumping Focus Area and the Fruit Bowl, no well-known climbing routes exist in Mineral Canyon. In Hell Roaring Canyon there are six climbing routes that are minimally used. Precluding roped and aerial activities, as well as temporary structures or facilities would eliminate current, low levels of human impact and allow to the Moab BLM to adequately manage an area that provides suitable, remote nesting, rearing and foraging areas for golden eagles and a variety of raptors. As other backcountry habitats for these species undergo growing human pressure, Mineral and Hell Roaring canyons would be able to maintain current nesting, foraging and winter and habitat potential that would secure populations of these species into the future.

The Tolerance in Raptors and the Associated Impacts of Leisure Sports (TRAILS) is an Individual-based models (IBMs) that offers a way to assess population-level, aggregate effects of disturbance on wildlife. IBM model that simulates interactions between recreationists and nesting raptors, assesses the effect of human disturbance on raptor populations and tests if changes in tolerance to disturbance could mitigate negative consequences. TRAILS modeling results suggests that human disturbance from increased recreational activity across the U.S. could have long-term, population-level effects on golden eagles in the absence of significant management actions to control disturbance (Pauli et al 2016). In Pauli et al (2016), a 1% annual increase in recreation resulted in negative population growth rates and substantially decreased eagle population size compared to no annual increases in recreation; a 3% annual increase in recreation resulted in the local extinction of eagles within 100 years in most simulations. Alternative A would create indirect impacts over time by insuring 10,044 acres of prime raptor habitats are managed so that recreation growth in the Moab area would not negatively impact current habitats and nesting territories.

3.3.2.2 Impacts of Alternative B- Year Round Management with the Issuance of Seasonal Climbing Permits for Selected Climbs

Alternative B would utilize seasonal proactive management strategies, as directed in the 2008 RMP (REC-3) and would also support the BLM Mission by sustaining the health, diversity and productivity of the golden eagles and other raptors in Mineral and Hell Roaring canyons.

As discussed in Alternative A, recreational use is currently limited in the project area and it is reasonable to assume that without proactive management, recreational use would expand into Mineral and Hell Roaring canyons.

Implementing seasonal climbing restrictions that limit permit location, numbers and group size to six specific climbing locations (Witch, Warlock, Gollum, Cauldron, North and South Kachina Spires) would create positive direct impacts to nesting eagles and raptors by eliminating the potential for climbing activities to disturb nesting eagles and raptors. Alternative B would also eliminate additional or new roped and aerial delivery activities, therefore reducing additional or new impacts to nesting eagles and raptors, as discussed in Alternative A. Alternative B does not

preclude climbing use at the aforementioned locations near nesting territories during the winter months when wintering and young of the year eagles and raptors may utilize this area.

Alternative B would reduce the potential for expansion of additional activities that could directly and indirectly impact nesting eagles and raptors habitats, as discussed in Alternative A.

Alternative B would create positive direct impacts to nesting eagles and raptors by eliminating the potential for new roped and aerial delivery activities and restricting current use to outside the nesting season, but does not preclude climbing activity at those six locations during the winter months. Alternative B provides fewer overall proactive management strategies then does Alternative A and may result in direct and indirect impacts from the continuation of climbing use during the winter months in permitted areas.

The impacts of Alternative B would be similar to the direct and indirect impacts discussed in Alternative A during the seasonally restricted periods. Outside of the seasonally restricted period the impacts would be similar but smaller in size, duration, and type than those discussed in the No Action Alternative.

3.3.2.3 Impacts of the Alternative C – No Action Alternative

The No Action alternative would not facilitate proactive management strategies, as directed in the 2008 RMP (REC-3), for special status species and wildlife habitat. The project area currently supports minimal recreation use except for the Green River corridor, the Mineral Bottom BASEjumping Focus Area and more recently at the Fruit Bowl. It is reasonable to assume that the No Action alternative would result in the expansion of roped and aerial activities into Mineral and Hell Roaring canyons.

The No Action alternative would allow the continuation and expansion of roped and aerial activities and delivery into an area that currently receives low levels of human pressure. Due to the minimal human activity in the area, habitats for golden eagles and other raptors remain largely intact. As recreation activities increase, major consequences to golden eagle and raptor populations are expected.

Within occupied territories, visitation by pedestrians during the early portion of the breeding season negatively influenced the likelihood of golden eagles laying eggs, resulting in some territories being occupied by eagles that made no detectable breeding attempt. Adverse responses to pedestrians and nonmotorized riders before the mean egg-laying date support the hypothesis that large raptors may be particularly vulnerable to disturbance at this crucial time (Watson, 2010).

At occupied territories in the Owyhee BLM Field Office, early season pedestrian use and other nonmotorized use reduced the probability of egg-laying. Pedestrians, who often arrived via motorized vehicles, were associated with reduced nest attendance, an important predictor of nest survival. (Spaul and Heath 2016). Nest–cliff height and the nest–trail height did not influence nest survival. This suggests that cliffs lying on lower rock outcrops are not less productive nesting sites than those lying on high cliffs or canyons. Furthermore, nesting sites that are vertically further from trails may be as susceptible to human disturbance as sites with less vertical separation. (Spaul and Health 2016).

In Spaul and Heath (2016), at occupied territories, pedestrian and other non-motorized traffic were negatively associated with the probability that an eagle pair would lay eggs. At territories where eagles laid eggs, nest survival was negatively associated with short-term peaks in motorized traffic.

Adult nest attendance during the incubation and brood rearing periods, an important predictor of nest survival, was negatively associated with pedestrian use (Spaul and Heath 2017). Studies of other eagle species suggest that type of human activity, season, and proximity may all influence the flushing probability and distance at which flushing occurs (Grubb and King 1991, Steidl and Anthony 1996, Gonazales et al. 2006). Taken together, these results suggest that disturbance from several forms of recreation may impact nesting success.

In Spaul and Heath (2017) three eagles in the study area flushed from nests due to recreational activity where no adult returned to the nest for more than 90 minutes, long enough to potentially contribute to reproductive failure because of reduced egg viability (Driscoll et al.1999), heat exposure (Beecham and Kochert 1975) or increased predation risk (Stien and Ims 2016). At one of these three nests, where the flushed eagle was feeding a nestling, that nestling subsequently died, though it is unclear whether disturbance was the direct cause of nest failure. Flushing in response to recreationists is consistent with a negative association between Golden Eagles' nest attendance and pedestrian activity, which could lead to reduced nest survival (Spaul and Heath 2016) or reduced productivity (Steenhof et al. 2014).

Golden eagles were more likely to flush when perched away from their nests than when at their nests (Spaul and Heath 2016). Previous studies suggest this trend occurs in many avian taxa (Livezey et al. 2016), and results are consistent with bald eagles in Arizona and Alaska that were less likely to flush while at the nest than while away from the nest (Grubb and King 1991, Steidl and Anthony 1996). If displaced from key hunting areas, the ability of golden eagles to forage effectively and provide for an incubating mate or nestlings may be negatively affected. The increased likelihood of eagles flushing when perched away from nests suggests that recreation disturbance occurs throughout eagle territories and not just at nest sites (Tarjuelo et al. 2015).

The Tolerance in Raptors and the Associated Impacts of Leisure Sports (TRAILS), an IBM model that simulates interactions between recreationists and nesting raptors, assesses the effect of human disturbance on raptor populations and tests if changes in tolerance to disturbance could mitigate negative consequences. TRAILS modeling suggests that human disturbance from increased recreational activity across the U.S. could have long-term, population-level effects on golden eagles in the absence of significant management actions to control disturbance (Pauli et al 2016). In Pauli et al (2016), a 1% annual increase in recreation resulted in negative population growth rates and substantially decreased eagle population size compared to no annual increases in recreation. Furthermore, a 3% annual increase in recreation resulted in the local extinction of eagles within 100 years in most simulations. Thus, even moderate growth in recreation activity can have major consequences on eagle populations. The No Action alternative would readily facilitate a 4% annual increase in recreation use in the project area; therefore, it is expected that local extinction of golden eagles within 100 years could occur in Mineral and Hell Roaring Canyons.

3.2.1.2. *Cumulative Impacts*

Cumulative Impact Area (CIA) for Recreation and Wildlife (Same for all Alternatives)

The cumulative impact area (CIA) for Recreation and Wildlife is identified in Section 3.1.2.4 and the map is Appendix C (Map 4)

Past and Present Actions (Same for All Alternatives)

Past and present activities in the CIA for area is identified in Section 3.1.2.4.

Reasonably Foreseeable Action Scenario (Same for All Alternatives)

Section 3.1.2.4 identifies reasonably foreseeable future actions that would cumulatively affect the same resources in the CIA as the two action and the No Action alternatives.

Golden Eagle and Raptors

As noted above, aerial and roped activities are expected to increase as those engaged in these activities seek less crowed and novel alternatives. The entire CIA supports high quality eagle and raptor nesting areas. Within the CIA, Alternative A would limit the expansion of roped and aerial activities on about 10,000 acres, where there is known nesting of eagle and raptors. This area also supports a large concentration of successfully productive eagles and raptors that provide population dispersal throughout the area. Under Alternative A, vigilance and flight responses of eagle and raptors would be expected to be reduced; rates, energy budgets and caloric consumption would improve population fitness within the project area, resulting in continued genetic connectively and population dispersal throughout the CIA.

Alternative A would ensure that Mineral and Hell Roaring canyons continue as a functional source population (high quality areas where birth rates are greater than death rates, causing the population to grow, and resulting in emigration to other areas), and allow for emigration into the CIA as well as throughout eagle and raptor habitats in the Moab Field Office. This emigration would support sink population areas where human activities may or have reduced habitat quality and small populations are facing local extirpation.

Within the CIA, Alternative B would seasonally allow climbing use at six specific areas and limit the expansion of roped and aerial activities outside of these climbing areas on about 10,000 acres. As discussed above, this area prime supports eagle and raptors habitats, facilitates genetic connectivity between subpopulations, and supports a large concentration of successfully productive eagles and raptors. Under Alternative B, vigilance and flight responses would be expected to continue at current rates, energy budgets and caloric consumption would maintain population fitness resulting in continued genetic connectively and population dispersal throughout the CIA.

The No Action alternative would allow for roped and aerial activities to continue and expand into the remote areas of these two canyons. Extensive research, discussed previously, indicates that human activities increase vigilance and flight to all mentioned species. As these activities expand into the remote areas of these two canyons, vigilance and flight response is expected to increase energy expenditures and reduce potential for caloric consumption, potentially reducing population fitness, resulting in a loss of genetic connectively and population dispersal throughout the CIA.

The No Action alternative would not ensure Mineral and Hell Roaring canyons would continue as a source population. Without emigration from this area, sink populations where human activities may or have reduced habitat quality and small populations may face local extirpation.

3.4 Issue 4 – Desert Bighorn Sheep

Desert Bighorn Sheep – Issue 4	The desert bighorn sheep herd in this area is of particular concern. Roped and aerial activities directly impact the environment that these sheep need for survival.

3.4.1 Affected Environment

Desert bighorn sheep (*Ovis canadensis nelson*) are a subspecies of bighorn sheep that are specifically adapted to an arid environment. Native American rock art dating back 2,000 to 4,000 years ago records the presence of desert bighorn sheep in the project area. European explorers in the late 1600s estimated more than two million desert bighorn once roamed the southwest. By the late 1800s however, bighorn sheep had almost disappeared in their historical habitats. Extremely vulnerable to diseases from European livestock, wild sheep populations were decimated by pathogens like scabies (an ear mite) and anthrax (a bacterial disease) introduced by domestic sheep. Bighorns were also hunted by early explorers, settlers and trophy hunters. Increased competition with domesticated livestock for food and water resources exacerbated the situation.

Through 1940s and 1950s, Utah's desert bighorn sheep populations struggled to survive as uranium exploration on the Colorado Plateau opened access to remote areas and drove desert bighorns from their traditional ranges. By the 1960s, only a small population of desert bighoms remained along the most remote portions of the Colorado and Green Rivers. This herd is known by two names: the Canyonlands herd (those animals within the National Park) and the Potash herd (those animals on BLM land north and east of the Park). This group of desert bighorn sheep is the only remaining native herd (that is, non-transplanted) in Utah and one of just a few throughout the west. Although the two herds have different names, they intermingle freely. Not only do these herds provide important genetic contributions to science and wildlife management, but they have persisted through the onslaughts of disease, competition with domestic livestock, and unregulated hunting over the past 100 years, thus resulting in superior genetics and providing today's recreationalist and wildlife enthusiast the rare treat of viewing the magnificent animals that have occupied the red rock canyons long before our ancestors explored these public lands.

When Canyonlands National Park was established in 1964, there were approximately 100 desert bighorn sheep remaining in the park and on the adjacent BLM lands. To protect these animals, grazing allotments within the park were phased out during the 1970s and BLM lands that border the park limited grazing leases to cattle only (cattle do not transmit diseases to native sheep). This was probably the most important step in preserving bighorn populations in the area at the time. In the early 1980s, biologists began relocating desert bighorn sheep from the growing population in Canyonlands National Park in order to establish new herds in areas such as the Arches National Park, Capitol Reef National Park, Glen Canyon National Recreation Area and the BLM's San Rafael Swell. Today desert bighorn populations in Utah are estimated at 3,000 animals and local bighorns have spread out from Canyonlands to over 300,000 acres of public lands in the Moab Field Office area to the north and east of the park. Currently there are roughly 350 desert bighoms in Canyonlands National Park (Canyonlands herd) and another 130 bighorns on adjoining BLM lands (Potash herd). In addition, over 214 desert bighorn sheep have been relocated from the Canyonlands herd and 91 have been relocated from Potash herd to other areas in Utah to help reestablish desert bighorn population within the state. These relocations started in 1984 with the most current relocation occurring in 2008.

Desert bighorn sheep herd distribution is associated with steep, rugged terrain as bighorn use their climbing abilities to escape predation and perceived threats. Evasion behavior of bighorn is dependent on escape terrain and the ability to visually detect danger at a distance. Therefore, preferred habitats include areas with high visibility, low vegetative density and within 300 meters (or bordered on both sides by 1,000 meters) of 27-85 degree slopes that they utilized as escape

terrain. Escape terrain provides desert bighorn sheep with the ability to evade predation, seek refuge from disturbances and offers thermal cover from summer heat and winter weather. Though historically bighorn utilized valley floors, mesa tops and other areas that provide nutritious and higher protein lower elevation grasses, bighorn now tend to reside and forage solely in escape terrain habitats due to human activity and domestic livestock pressures.

The talus slopes and cliffs of the canyon county in the Moab area provide preferred habitats and escape terrain and the canyon bottoms and mesa tops adjacent to this escape terrain offer valuable foraging grounds. There is a large body of evidence that desert bighorn sheep need remote habitats and genetic connectivity to persist. Studies have indicated behavior, movements, recruitment and lamb survival can be negatively affected by humans (Duncan 1960, DeForge 1972, MacArthur et al. 1982, Miller and Smith 1985) and bighorn habitats negatively altered (Schoenecker 2002).

When bighorn sheep are exposed to people at predictable locations and times, they are often able to tolerate some level of disturbance (Hicks and Elder 1979, Goodson et al. 1999, Papouchis 2001). However, when bighorn sheep are approached closely, at random times or in irregular locations, even sheep that are habituated to humans may flee and vacate the area (Papouchis et al. 2001). Bighorn sheep may respond to human disturbance by a temporary or permanent abandonment of the area (Wilson et al. 1980, DeForge 1981, Legg 1998, Papouchis et al. 2001, Keller and Bender 2007). These movements may displace bighorn to less optimal habitats, thereby decreasing foraging efficiency (Horejsi 1976, Hicks and Elder 1979, Legg 1998, Bailey 1999), increasing energy expenditures (MacArthur et al. 1982, Legg 1998), and increasing their risk of predation (DeForge 1981, Papouchis 2001). Human disturbance may also increase stress levels in bighorns (Legg 1998) and lower the resistance of sheep to disease (Spraker 1977, Foreyt and Jessup 1982, Spraker et al. 1984, Schwantje 1986). Disturbance can also interfere with breeding activities (Legg 1998, Papouchis et al. 2001). The net impacts of human disturbance could result in a decrease in survival and reproduction of bighorns (Campbell and Remington 1981, Miller and Smith 1985, Cassirer et al. 1992, Caslick 1993, Papouchis etal. 2001, Keller and Bender 2007).

In summary, increased human activity near bighorn herds causes these animals to become wary and flee, interrupting their daily activities, such as foraging, watering and resting. This behavior elevates stress levels, making them more susceptible to disease and predation. Ultimately, if disturbance levels become great enough, desert bighorn sheep will abandon an area. For the remaining herds to prosper, intensive management and conservation measures are necessary. The protection of undeveloped land is key to the species' survival.

From 2002 to 2010, the Moab Field Office, together with the Utah Division of Wildlife Resources (UDWR), Brigham Young University, the Wild Sheep Foundation, and Canyonlands National Park, implemented three 2-year GPS collar projects that tracked over 40 individual bighorn. These GPS collaring efforts have provided the Moab Field Office with valuable information that has facilitated mapping of critical habitats, migration corridors, and lambing grounds. These collars have also provided insights on the functioning importance of Mineral and Hell Roaring Canyons, as they provide corridors for genetic connectivity and dispersal of animals between the Canyonlands Herd and the Potash Herd. Data from these collars have also informed several unpublished master theses including the most recent research paper; *Desert bighorn sheep responses to human activity in south-eastern Utah and Alteration of Behavior by Desert Bighorn Sheep from Human Recreation (Sproat et al 2019)* and the recently published *Desert Bighorn Sheep Survival in Canyonlands National Park: 2002 – 2010* (Sproat et al 2012). In the winter of

2019, the UDWR collared 15 animals the same areas, fitting them with GPS collars that allow daily online tracking. Currently, Colorado State University is in the process of developing additional research work investigating recreational impact to these animals. Past radio collar projects that included the Potash Herd conducted in 1993 and 1994 resulted in the research paper *Responses of Desert Bighorn Sheep to Increased Human Recreation* (2001 Papouchis, Singer, Sloan).

Valuable information from the past collaring projects and the resultant research papers have allowed the Moab Field Office to develop and implement management measures to reduce the impacts of human activities in these specific crucial habitats. This information has also provided insight on how these animals expanded into other small bands throughout the area, how rams migrate to various ewe groups during the rut both in and outside of the Mineral and Hell Roaring Canyon areas, and the values of this population of desert bighorn in connecting the Canyonland herd with the Potash Herd (see Map 6 in Appendix C). Currently, expansion of extreme recreational uses may threaten the existence of this valuable native desert bighorn sheep herd.

Mineral and Hell Roaring Canyons offer local desert bighorn remote areas, fairly undisturbed by human activities, that provide ample foraging grounds surrounded by high quality escape terrain with four constructed and maintained water developments well-spaced throughout the area. These two canyons offer a unique situation, as the middle to upper reaches of these canyons have abundant thermal cover and escape terrain, foraging opportunity, springs that offer natural water source and no access from the canyon heads. Human activities at the mouths of the canyons and along the Green River seldom make their way up into the upper reaches of the canyons. However, any disturbance in or above the canyons becomes amplified due to the restrictive nature of the canyons.

From 2002 through 2012, UDWR surveys conducted in the fall of each year indicated that over 20% of the desert bighorn in the Potash Herd resided in Mineral and Hell Roaring canyons. In 2008, over 42% of the entire herd resided within these two canyons. From 2014 through 2017 there has been a slight decrease in the use of Mineral and Hell Roaring Canyons, with 14% to 18% of the animals residing in an area amounting to less than 8% of the crucial lambing and rutting habitat. This results in an area with concentrated, successful lambing, rearing of young and rutting activities. During lambing and rearing of young bighorn, ewes are more sensitive to disturbances that interrupt their daily foraging, watering and resting activities or cause them to flee. During the rutting season, as rams move through the area to various ewe groups, new disturbances may alter their seasonal routes. In the Moab area, lambing occurs early April through late June and the rutting season begins in early September and continues through December. Ewes with lambs at their heels are extremely sensitive during the extreme summer heat in areas where water sources are limited.

Unlike many bighorn herds throughout the west that seasonally migrate from winter to summer ranges, the mild winters and remote dissected canyons in the Moab and Canyonlands area allow the desert bighorn to remain in the area year-round. In areas with minimal human disturbances, some small movements or dispersal may occur within the canyon areas as bighorn groups seek seasonal thermal cover, water and more protected lambing area, as rams move through different ewe groups during the rut, or as groups of ewes expand into unoccupied suitable habitats.

3.4.2 Environmental Impacts

3.4.2.1 Impacts of the Alternative A- Year Round Management

Alternative A would utilize proactive management strategies, as directed in the 2008 RMP (REC-3), to implement management methods to protect wildlife habitat while enhancing recreation opportunities. Alternative A would also support the BLM Mission by sustaining the health, diversity and productivity of a variety of wildlife, including the native Potash bighorn herd on 10,044 acres of prime and crucial habitats in Mineral and Hell Roaring canyons. Alternative A would further the enjoyment of wildlife among present and future generations of people.

Between 1979 and 2000, human recreation has increased over 300% in areas occupied by desert bighorn sheep in southeastern Utah (Spoart et al 2012). There has been extensive research on impacts of human activities on bighorn; many studies have found that human disturbance can alter habitat use and activity patterns of bighorn sheep (Van Dyke et al. 1983, Miller and Smith 1985, King and Workman 1986, Etchberger et al. 1989, Papouchis et al. 2000). Population declines (Van Dyke et al. 1983, Etchberger et al. 1989, Harris 1992), shifts in habitat use (Van Dyke et al. 1983), and interruption of seasonal migration routes (Ough and deVos 1984), has been linked to human disturbance.

Human activities, including recreation, near bighorn sheep result in increased group and individual vigilance and flight, as bighorn equate humans as potential predator risk. Vigilance refers to an animal's examination of its surroundings in order to heighten awareness of predator presence and is an important behavior during foraging, as animals must often venture away from the safety of escape terrain to find food and water. Vigilance often leads to increased flight response, depending on the individual or group assessment of a perceived risk. However, being vigilant comes at the loss of time spent feeding and resting, resulting a trade-off between the two behaviors. The length of time animals devote to vigilance is dependent on many factors including predation risk and hunger. The more vigilant an individual is, the more time they spend in scanning their environment and the less time they spend foraging and resting. The more often that vigilance leads to flight further increases energy expenditures and reduces foraging and resting time. For example, if a 110 pound ewe flees 300 meters upslope, she burns an additional 132 calories in a few minutes (1 kg of body mass to move 1 meter on an incline of 21.5% increases expenditures of energy by 37 J/kg (Dailey and Hobbs, 1989)).

Several recent studies focusing exclusively on Moab's Canyonlands and Potash herds have concluded that desert bighorn sheep spent less time grazing (32%) and more time scanning (21%) in high human use areas (22% grazing, 29% scanning) than in low human use areas (54% grazing, 8% scanning) (Spoart et al 2012). This result is consistent with those of Papouchis et al (2001) who observed stronger reactions of bighorn sheep to disturbance in high-use areas than to the same types of disturbance in low-use areas. Papouchis (2001) found the higher sensitivity of sheep to hikers was due to the greater unpredictability of the locations of hikers because, unlike road traffic, nearly all hiker disturbances of sheep were off-trail and variable locations. Similarly, roped assisted and aerial activities and delivery occur in many new and non-predictable locations, on, in and above talus slopes, steep rock walls and cliffs, thus penetrating habitats that bighorn rely on for perceived safely within in their escape terrain.

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There is conflicting evidence as to whether human activity disturbs bighorn sheep. In some studies sheep become acclimated to human activity (Hicks and Elder 1979, Hamilton et al. 1982) resulting in habituation. In other studies, behavior, movements, recruitment and lamb survival were negatively affected by humans (Duncan 1960, DeForge 1972, MacArthur et al. 1982, Miller and Smith 1985). Data from the Pusch Ridge Wilderness (PRW) in Arizona suggest that bighorn sheep habitat in PRW has been negatively altered by humans (Schoenecker 2002). Bighorn sheep coexist best with people when human activity in sheep habitat is predictable (Hamilton 1982). Although some bighorn may habituate to human presence (Papaouchis et al. 2001), even bighorn that demonstrate no outward response to human presence may still be under physiological stress (MacArthur et al 1979, Deforge 1981), resulting in reduced potential for caloric consumption. As noted in Spoart 2012, animals in high use areas, where habituation occurs, spent more on vigilance and flight from perceived threat (expending more calories) and less time grazing (consuming fewer calories); habituation results in lower fitness due to low overall caloric intake than in animals not impacted by human activities.

Alternative A would create direct beneficial impacts to desert bighorn sheep and their crucial habitats in Mineral and Hell Roaring canyons, by ensuring bighorn sheep populations continue to graze more and scan less, resulting in maintaining population fitness, high levels of individual and group energetics and overall good health. Alternative A would also ensure bighorn can continue to access water developments that have been installed; securing uninterrupted daily use during lambing and the hot summer months that follow. Precluding roped and aerial activities, as well as temporary structures or facilities would maintain the quality of year-round, lambing and rutting habitat. No high-use climbing routes exist in Mineral and in Hell Roaring Canyon there are only six climbing routes that are minimally used. Precluding these roped and aerial activities, as well as temporary structures or facilities would eliminate current, low levels of human impact in Hell Roaring Canyon and allow the BLM to adequately manage an area that provides high quality year-round, lambing and rutting habitats that is important to both genetic connectivity and population dispersal for the entire Canyonlands and Potash populations. As other backcountry habitats for these species incur growing recreational pressure, the Mineral and Hell Roaring canyons would be able to maintain bighorn habitats that would secure the Canyonlands and Potash bighorn herds into the future.

Alternative A would create indirect beneficial impacts over time by insuring 10,044 acres of crucial bighorn year-round, lambing and rutting habitats are managed so that recreation growth would not negatively impact crucial habitat and would continue to provide genetic connectivity and population dispersal to other bands of desert bighorn in both the Potash and Canyonlands areas as well as reliably protect lambing and rearing grounds.

3.4.2.2 Impacts of Alternative B – Year Round Management with the Issuance of Seasonal Climbing Permits for Selected Climbs

Alternative B would utilize seasonal proactive management strategies, as directed in the 2008 RMP (REC-3) and would also support the BLM Mission by sustaining the health, diversity and productivity of bighorn in Mineral and Hell Roaring canyons.

As discussed in Alternative A, recreational use is limited in the project area and it is reasonable to assume that without proactive management, recreational use would expand into Mineral and Hell Roaring canyons.

Implementing seasonal climbing restrictions that limit permit location, numbers and group size to six specific climbing locations (Witch, Warlock, Gollum, Cauldron, North and South Kachina Spires) would create positive direct impacts to bighorn by seasonally limiting climbing activities, thus limiting human disturbance to local bighorn. Alternative B would eliminate other known, additional or new roped and aerial delivery activities, therefore reducing additional or new impacts to bighorn in crucial habitats. Alternative B does not preclude climbing use at the aforementioned locations during the winter months when wintering bighorn may utilize this area.

Alternative B would reduce the potential for expansion of additional activities that could directly and indirectly impact bighorn habitats, as discussed in Alternative A.

Alternative B provides less overall proactive management strategies than does Alternative A and may result in direct and indirect impacts from the continuation of climbing use during the winter months in permitted areas.

Seasonal climbing activities in desert bighorn sheep habitats would lead to increased vigilance and flight response when permitted climbs occur. Seasonal permits would be allocated to ensure current climbing activity does not increase or expand and will not occur during the lambing, hot summer months and late winter. Papouchis (2001) found the higher sensitivity of sheep to off-trail hikers was due to the greater unpredictability of the locations of hikers because, unlike road traffic, nearly all hiker disturbances of sheep were off-trail and variable locations. Similarly, permitted climbing activities may result in sporadically increased vigilance and flight response.

Alternative B would seasonally create direct beneficial impacts to desert bighorn sheep and their crucial habitats in Mineral and Hell Roaring canyons, by ensuring bighorn sheep populations continue to graze more and scan less, during eight to ten months each year. Alternative B would also ensure that desert bighorn could continue to access water developments during the hot summer months. Seasonally precluding roped and aerial activities and delivery, as well as temporary structures or facilities, would ensure current, low levels of human impact in Mineral and Hell Roaring canyons to continue.

The impacts of Alternative B would be similarly to the direct and indirect impacts discussed in Alternative A during the seasonally restricted periods. Outside of the seasonally restricted period, the impacts would be similar but smaller in size, duration, and type then the No Action Alternative.

3.4.2.3 Impacts of the Alternative C – No Action Alternative

The No Action alternative would not facilitate needed proactive management strategies, as directed in the 2008 RMP (REC-3), for desert bighorn sheep habitat. The project area currently supports very minimal recreation use except for the Green River corridor. It is reasonable to assume that the No Action alternative would result in the expansion of roped and aerial activities into Mineral and Hell Roaring canyons. Expansion of these activities could result in extensive consequences to several important charismatic and native wildlife species, including desert bighorn sheep.

The No Action alternative would allow the continuation and expansion of roped and aerial activities into Mineral and Hell Roaring canyons, where current levels of human pressure are very minimal and where approximately 20% to 40% of the Potash herd resides. Currently desert bighorn sheep bands in this area are able to graze more and scan less, resulting in high levels of caloric consumption, individual and group energetics, population fitness and overall good health, due to the minimal human activity in the area. As roped and aerial activities expand into Mineral and Hell Roaring canyons behavior, movements, recruitment and lamb survival may be negatively

affected or altered as discussed above and according to Duncan 1960, DeForge 1972, MacArthur et al. 1982, Miller and Smith 1985 and Schoenecker 2002. Research also show that although some bighorn may habituate to human presence (Papaouchis et al. 2001), even bighorn that demonstrate no outward response to human presence may still be under physiological stress (MacArthur et al 1979, Deforge 1981), resulting in reduced potential for caloric consumption.

As noted in the Spoart 2019 study, animals in high use areas in the Moab area, where habituation occurs, spent more on vigilance and flight from perceived threat (expending more calories) and less time grazing (consuming fewer calories); habituation results in lower fitness due to low overall caloric intake than in animals not impacted by human activities.

As discussed in the section above, human activities, including recreation, near bighorn result in increased group and individual vigilance and flight, as bighorn equate humans as a potential predator risk. The No Action alternative would result in vigilance and flight increases, decreases in time spent feeding and resting, resulting in increased energy expenditures and decreased caloric consumption. As human activities increase and expand onto the remote regions of these two canyons, resident bighorn will experience increasing pressure that would result in increased vigilance and flight.

This conclusion is supported by several recent studies that have focused exclusively on Moab's Canyonlands and Potash herds. Spoart (2012) found that Moab's desert bighorn sheep spent less time grazing and more time scanning in high human use areas (22% grazing, 29% scanning) than in low human use areas (54% grazing, 8% scanning) (Spoart 2012). Results of Spoart (2019) are consistent with those of Papouchis et al. (2001), who observed stronger reactions of bighorn sheep to disturbance in high-use areas than to the same types of disturbance in low-use areas. In Spoart (2019), the results on the local bighorn sheep herd indicated differences in activity budgets of bighorn sheep occupying areas of high- and low-human activity, with animals in high-use areas expending more time being vigilant and less time grazing than those in low-use areas.

Papouchis (2001) found the higher sensitivity of desert bighorn sheep to hikers was due to the greater unpredictability of the locations of hikers because, unlike road traffic, nearly all hiker disturbances of sheep were off-trail and in variable locations. In MacArthur et al. 1982 bighom sheep responses were most severe when exposed to hikers travelling cross-country, but animals also react in ways that are not readily apparent and detection of subtle differences in activity patterns requires specific investigatory methods. In Spoart (2019) the results pointed to differences in activity budgets of Moab's bighorn sheep occupying areas of high- and low-human activity, with animals in high-use areas expending more time being vigilant and less time grazing than those in low-use areas.

Given that the Moab desert bighorn responded to an increase in the level of human activity by spending more time being vigilant and less time foraging, Spoart (2019) indicated that a ban on off-trail hiking activity in core bighorn habitat as recommended by Papouchis et al. (2001) seems warranted. The unpredictability associated with off-trail hikers, a lack of consistency in hiker behavior, and the potential for such activity to be perceived as less than benign by bighorn sheep encountered by hikers may account for such responses in bighorn sheep. While off-trail hiking in the project area is not common, unpredictable activity associated with roped and aerial activities and delivery is increasing in this area.

Extensive research throughout numerous areas in the western United States, as discussed in the section above, has documented that human disturbance can alter habitat use and activity pattems

of bighorn sheep (Van Dyke et al. 1983, Miller and Smith 1985, King and Workman 1986, Etchberger et al. 1989, Papouchis et al. 2000). Population declines (Van Dyke et al. 1983, Etchberger et al. 1989, Harris 1992), shifts in habitat use (Van Dyke et al. 1983), and interruption of seasonal migration routes (Ough and deVos 1984), has been linked to human disturbance. Chronic disturbance by humans can also affect habitat use; responses can vary from temporary avoidance to abandonment of habitat (Creel and Christianson 2008) and ultimately, disruption of metapopulation dynamics (Epps et al. 2005). Increases in human activity would reduce grazing time and increase vigilance and flight response, as bighorn react and move away from new and increasing human pressure. This in turn would result in decreases in individual caloric intake and reduced population fitness. Energetic cost of a standing bighorn is 26% greater than that for one lying down. For every one kg of body mass to move one meter on a slope of 21.5%, increases expenditures of energy by 37 J/kg (Dailey and Hobbs 1989). That is, if a 110 pound ewe flees 300 meters upslope she burns an additional 132 calories in a few minutes. If an animal flees multiple times a day rather than rests, caloric demands increase while foraging and resting opportunities decrease. Long-term, intense disturbance stimuli, such as increase vigilance and flight response, may cause habitat shifts that are often not detected until after habitat is lost (Longshore et al. 2013).

Water scarcity, often combined with heat stress, is a common challenge for many wildlife species in arid climates. Bighorn sheep typically range within two miles of free water (Geist 1971, Van Dyke et al. 1983) and are highly dependent upon reliable water sources especially during the hot season. Constant or frequent human use at or near water sources, particularly during the summer months, may adversely affect sheep and may cause them to abandon the water source in favor of less disturbed areas (Blong 1967, DeForge 1972, Cunningham 1982, Miller and Smith 1985). As aerial and roped activities increase in Mineral and Hell Roaring canyons, it is expected that consistent use of four developed water systems within the project area by desert bighorn may be negatively impacted, especially by lactating ewes with lambs during the hot, dry summer months.

As indicated in Spoart (2012), there may be a biological threshold that has not yet been crossed, allowing for desert bighorn to sustain themselves as a population in areas of increased human activity. As other backcountry habitats for these species incur growing recreational pressure, the No Action alternative would not adequately manage an area that not only provides high quality year-round, lambing and rutting habitats but a large concentration of animals that supports needed genetic connectivity and population dispersal for the entire Canyonlands and Potash populations. The No Action Alterative would not support BLM policy for sensitive species or ESA recommendations.

The No Action alternative would create indirect impacts over time, as indicated above, by allowing roped and aerial activities to expand into 10,044 acres of crucial desert bighorn year-round, lambing and rutting habitats. The expansion of these activities would negatively impact crucial habitat and future genetic connectivity and population dispersal to other bands of desert bighom in both the Potash and Canyonlands areas. The No Action alternative would not secure crucial protection of lambing and rearing grounds for a unique desert bighorn sheep herd.

3.2.1.3. *Cumulative Impacts*

Cumulative Impact Area (CIA) for Recreation and Wildlife (Same for all Alternatives)

The cumulative impact area (CIA) for Recreation and Wildlife is identified in Section 3.1.2.4 and the map is Appendix C (Map 4)

Past and Present Actions (Same for All Alternatives)

Past and present activities in the CIA for area is identified in Section 3.1.2.4.

Reasonably Foreseeable Action Scenario (Same for All Alternatives)

Section 3.1.2.4 identifies reasonably foreseeable future actions that would cumulatively affect the same resources in the CIA as the two action and the No Action alternatives.

Desert Bighorn Sheep

As noted above, aerial and roped activities are expected to increase as those engaged in these activities seek less crowed and novel alternatives. The entire CIA supports crucial bighorn lambing and rutting habitats. Within the CIA, Alternative A would limit the expansion of roped and aerial activities on about 10,000 acres, where there is a high consideration of year-round use by bighorn. This project area also provides invaluable genetic connectivity between the two groups of desert bighorn (Canyonland and Potash herds). Under Alternative A, vigilance and flight responses would be expected to be reduced; rates, energy budgets and caloric consumption would improve population fitness within the project area, resulting in continued genetic connectively and population dispersal throughout the CIA.

Alternative A would ensure that Mineral and Hell Roaring Canyons continue as a functional source population (high quality areas where birth rates are greater than death rates, causing the population to grow, and resulting in emigration to other areas), and allow for emigration into the CIA and throughout bighorn habitats in the Moab Field Office. This emigration would support sink population areas where human activities may or have reduced habitat quality and small herds are facing local extirpation.

Within the CIA, Alternative B would seasonally allow climbing use at six specific areas and limit the expansion of roped and aerial activities outside of these climbing areas on about 10,000 acres. As discussed above, this area supports bighorn habitats, facilitates invaluable genetic connectivity between subpopulations, and supports a large concentration of successfully productive desert bighorn. Under Alternative B, outside of the seasonal permitted uses, vigilance and flight responses would be expected to continue at current rates, energy budgets and caloric consumption would maintain population fitness resulting in continued genetic connectively and population dispersal throughout the CIA.

The No Action alternative would allow for roped and aerial activities and delivery to continue and expand into the remote areas of these two canyons. Extensive research, discussed previously, indicates that human activities increase vigilance and flight. As these activities expand into the remote areas of these two canyons, vigilance and flight response is expected to increase energy expenditures and reduce potential for caloric consumption, potentially reducing population fitness resulting in a loss of genetic connectively and population dispersal throughout the CIA.

The No Action alternative would not ensure Mineral and Hell Roaring Canyons would continue as a source population. Without emigration from this area, sink populations where human activities may or have reduced habitat quality and small herds may face local extirpation.

CHAPTER 4. PUBLIC INVOLVEMENT, CONSULTATION AND COORDINATION

4.1. Public Involvement

During preparation of this EA, the public was notified of the project by posting on the BLM's ePlanning website on April 7, 2020. A formal Scoping Period on the project was announced in a Press Release issued on May 29, 2020. The project was featured in a full page newspaper story in the *Salt Lake Tribune* on June 18, 2929. As a result, the BLM received 222 scoping comments. These comments are summarized in Appendix B.

A formal comment period on the EA was offered and announced in a Press Release issued on XX.

3.5 Consultation and Coordination

The BLM informally consulted with the U.S. Fish and Wildlife Service as well as the Utah Division of Wildlife Resources. These agencies provided input on the development of the EA.

4.2. List of Preparers

4.2.1. BLM Preparers

Name	Title	Responsible for the Following Section(s) of this Document
Katrina Diemer	NRS	Soil, Air Quality, Wastes,
Gabe Bissonette	Ecologist	Wetlands, Riparian, Floodplains,
Bill Stevens	Outdoor Recreation Planner	Socioeconomics, BLM Natural Areas, Wilderness/WSA, Lands with Wilderness Characteristics, Environmental Justice, Wild and Scenic Rivers
Pamela Riddle	Wildlife Biologist	T&E Animals, Wildlife, Migratory Birds, Utah BLM Sensitive Species, T & E Plants
Lori Hunsaker	Archeologist	Cultural, Native American
Katie Stevens	Outdoor Recreation Planner	Team Lead, Recreation, VRM, ACECs
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Josh Relph	Fuels	Fuels
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APPENDICES

Appendix A: Interdisciplinary Team Analysis Record Checklist

Appendix B: Scoping Comments and BLM Responses

Appendix C: Maps:

Map 1: Proposed Restriction Area in Mineral and Hell Roaring Canyons

Map 2: Named Climbs within the Project Area

Map 3: Detailed Map of Proposed Exclusion Area at the Fruit Bowl

Map 4: Cumulative Impact Area

Map 5: Nesting areas of Raptors, including the Mexican Spotted Owl within the Proposed Restriction Area

Map 6: Crucial Lambing and Rutting Habitat for Desert Bighorn Sheep

Appendix A: Interdisciplinary Team Analysis Record Checklist

Project Title: Limiting Roped and Aerial Activities in Mineral and Hell Roaring Canyons

NEPA Log Number: DOI BLM-UT-Y010-2020-0068-EA

Project Leaders: Pam Riddle/Katie Stevens

DETERMINATION OF STAFF: ***(Choose one of the following abbreviated options for the left column)***

NP = not present in the area impacted by the proposed or alternative actions

NI = present, but not affected to a degree that detailed analysis is required

PI = present with potential for relevant impact that need to be analyzed in detail in the EA

The following elements are not present in the Moab Field Office and have been removed from the checklist: Farmlands (Prime or Unique), Wild Horses and Burros.

Determi-nation	Resource	Rationale for Determination*	Specialist	Date	Initials
RESOURCES AND ISSUES CONSIDERED (INCLUDES SUPPLEMENTAL AUTHORITIES APPENDIX 1 H-1790-1)					
NI	Air Quality Greenhouse Gas Emissions		Katherina Diemer	4/15/20	KD
NI	Floodplains	There are floodplains within the project area. The action alternatives would not negatively impact floodplain morphology, function, or connectivity.	Gabe Bissonette	4/15/20	GJB
NI	Soils	There are some soils in the project area, though much of the area is hard rock. The action alternatives would not negatively impact soils.	Katherina Diemer	4/15/20	KD
NI	Water Resources/Quality (drinking/surface/ground)		Dave Pals	4/14/2020	DP
NI	Wetlands/Riparian Zones	There are riparian areas within the project area. The action alternatives would not negatively impact these habitats.	Gabe Bissonette	4/15/20	GJB
NP	Areas of Critical Environmental Concern	There are no ACECs within the project area. See 2008 Moab Resource Management Plan.	Katie Stevens	4/7/20	KS
PI	Recreation	The proposal would negatively impact certain types of recreation activity in the project area; these impacts are analyzed in full in the EA.	Katie Stevens	4/7/20	KS
NI	Wild and Scenic Rivers	The adjacent Green River is a designated Wild and Scenic River. The proposed restrictions would not impact the Outstandingly Remarkable Values for which it was designated.	Bill Stevens	4/7/20	BS
NI	Visual Resources	The project area is largely managed as VRM Class II. The activities proposed for restriction are temporary. While limiting roped and aerial activity could benefit visuals, there would also be fewer people present to enjoy the visual resources of the area.	Katie Stevens	4/7/20	KS
NP	BLM Natural Areas	See 2008 Moab Resource Management Plan.	Bill Stevens	4/7/20	BS

Determi-nation	Resource	Rationale for Determination*	Specialist	Date	Initials
NI	Socio-economics	Minimal impact on local area economy. Although almost every visitor to Grand County makes some contribution to the local economy, the marginal impact of any one visitor or even a large group of visitors is small compared to the overall County economy. BLM does not have exact visitation numbers to the project area, making it impossible to quantify this minor impact.	Bill Stevens	4/14/20	BS
NP	Wilderness/WSA	See 2008 Moab Resource Management Plan.	Bill Stevens	4/7/20	BS
NI	Lands With Wilderness Characteristics	Portions of the proposed restriction area are in lands identified by BLM as possessing wilderness characteristics. The prosed restrictions could enhance the wilderness characteristics of solitude and primitive recreation and help maintain naturalness.	Bill Stevens	4/14/20	BS
NI	Cultural Resources	The proposed closures would not negatively impact cultural resources.	Lori Hunsaker	4/13/20	LAH
NI	Native American Religious Concerns	The proposed closures would limit or restrict access to areas of cultural or traditional significance.	Lori Hunsaker	4/13/20	LAH
NI	Environmental Justice	There are no identified EJ populations in the planning ears who would be disproportionately adversely impacted by the action alternatives.	Bill Stevens	4/14/20	BS
NI	Wastes (hazardous or solid)	There are no wastes in or associated with the action alternatives	Katherina Diemer	4/15/20	KD
PI	Threatened, Endangered or Candidate Animal Species	Suitable habitats and known occupancy for Mexican spotted owls in project area with potential for relevant positive impacts that will be analyzed in detail in the EA	Pamela Riddle	4/7/20	PR
PI	Migratory Birds	Suitable habitats and known occupancy for several raptor species in project area with potential for relevant positive impacts that will be analyzed in detail in the EA	Pamela Riddle	4/7/20	PR
NI	Utah BLM Sensitive Species	Suitable habitats and known occupancy for several BLM sensitive species in project area. The action alternatives would not negatively impact habitat or occupancy potential; therefore, sensitive species would not be affected to a degree that detailed analysis is required	Pamela Riddle	4/22/20	PR
PI	Fish and Wildlife Excluding USFW Designated Species	Crucial desert bighorn sheep lambing, rutting, migration and year-round habitats in project area with potential for relevant positive impacts that will be analyzed in detail in the EA	Pamela Riddle	4/7/20	PR
NI	Threatened, Endangered or Candidate Plant Species	Suitable geology associated with seeps/spring habitats is found in the project area; Navajo sedge occurrences not known in the area. The action alternatives would not negatively limit habitat potential; Navajo sedge potential would not be affected to a degree that detailed analysis is required	Pam Riddle	4/7/20	PR

Determi-nation	Resource	Rationale for Determination*	Specialist	Date	Initials
NI	Livestock Grazing	Actions would not diminish current livestock grazing resources	Aaron Vollmer	4/28/20	AV
NI	Rangeland Health Standards	Would not impact rangeland health standards	Aaron Vollmer	4/28/20	AV
NI	Invasive Species/Noxious Weeds	No impact on the spread of noxious weeds and invasive species.	Logan Lefevre	5/4/20	LL
NI	Vegetation Excluding USFW Designated Species	The action alternatives would limit recreational activity; thus, the impact to adjacent plant groups is minimal to no impact.	Aaron Vollmer	4/28/20	AV
NI	Woodland / Forestry	No trees would be harmed by the action alternatives.	Aaron Vollmer	4/28/20	AV
NI	Fuels/Fire Management	The action alternatives would not impact fire/fuels to the degree that would require a detailed analysis.	Josh Relph	4/29/20	JR
NI	Geology / Mineral Resources/Energy Production	The area is managed as NSO under the Moab RMP.	Dave Pals	4/14/2020	DP
NI	Lands/Access	Subject to valid, existing rights.	Lisa Wilkolak	4/9/2020	LW
NI	Paleontology	Not surface disturbing	Dave Pals	4/14/2020	DP

FINAL REVIEW:

Reviewer Title	Signature	Date	Comments
Environmental Coordinator			
Authorized Officer			

Appendix B: Scoping Comments Received on the Proposal

The BLM received 222 comment letters during the Scoping Period on the proposal, which was held from June 1 to June 30, 2020. The chart below lists the comment, the number of persons making that comment, and the BLM response to the comment. (Commenters often submitted more than one comment). Organizations and agencies commenting on the proposal are listed by name; private individuals are not listed by name.

# of Comments	Scoping Comment	BLM Response
Comments Generally Opposing Any Restrictions		
144	State general disagreement with the Proposed Action; includes those comments stating that minerals, cattle, vehicles and other recreational uses are the problem and that roped and aerial activities are not the problem. Includes those comments asserting that the BLM has no scientific evidence for this proposal. Many commenters state the importance of their recreation activity to their well-being and how minimal their impacts are.	Other uses in the proposal area are already restricted, including minerals, grazing and motorized and non-motorized vehicle use. The EA delineates these restrictions in Section 1.1. The scientific literature regarding wildlife disturbance is detailed in the EA in Sections 3.2.2, 3.3.2 and 3.4.3. The BLM acknowledges the importance of these activities to the communities that participate in them. This importance is detailed in Section 3.1.2.2.
5	Aerial activities have no impact on wildlife	The scientific literature regarding wildlife disturbance is detailed in the EA in Sections 3.2.2, 3.3.2, and 3.4.2.
1	Mexican spotted owl, Golden Eagles and bighorn sheep are very abundant species and need no protection.	The Mexican spotted owl is listed as a threatened species under the Endangered Species Act by the U.S. Fish and Wildlife Service. Golden eagles are in decline across the west due to habitat loss. The desert bighorn sheep herd in question is unique in that it is the only herd that has survived the introduction of domestic sheep. More information concerning these species is found in Sections 3.2.1, 3.3.1 and 3.4.1
1	While paragliding (in fall) above the space net, birds were not disturbed.	Fall is not the nesting season for raptors, so the observation may not be typical of

		the behavior of raptors during nesting season.
1	Paragliding should not be targeted as it has no impacts.	Disturbances to wildlife are detailed in Section 3.2.2, 3.3.2 and 3.4.2.
1	Drones should not be included in the restricted activities. Any restrictions on launching drones from the canyon rims or flying them from the canyon floors would therefore be utterly ineffective at preventing drones from being flown over the canyons in question, as all a drone operator would need to do to avoid violating the restriction is launch and operate the drone a few hundred feet back from the rim on the Mineral Point or Deadman Point plateaus, where the restriction does not apply. The BLM does not control airspace, and would have no authority to prevent people from flying over the restricted canyons when operating from outside the restricted zone. Cites case law from NPS attempts to restrict drones To ban drones from a broad area of general BLM land that is neither Wilderness nor a Wilderness Study Area would be utterly unprecedented and unjustified by any claimed environmental impact. It would also be extremely difficult to enforce, given widespread motorized access to both the rim areas and the canyon floors and the difficulty of having rangers patrol such large areas looking for people flying drones. There is no evidence of drones causing stress to wildlife. If BLM wishes to adopt a rule that drones cannot harass wildlife, that would be considered. Motorized travel is allowed in the study area – drones are less annoying to wildlife than are motorized vehicles. The BLM cannot just assume that drones harm wildlife.	The BLM understands that the Federal Aviation Administration, and not the BLM, controls the airspace. The restriction would apply only to those drones that would have been launched from or land within the proposed limited area. The impacts to wildlife from human disturbance are detailed in Sections 3.2.2, 3.3.2 and 3.4.2. Drone disturbance is similar to other human disturbances. The BLM acknowledges the difficulty of enforcement. However, as the commenter notes, if aerial and roped activities are not to occur in the area, filming activities would also not be allowed, and drone use would most probably lessen. The Proposed Action restricts drones from taking off or landing within the proposed limitation area. The roads that people might wish to photograph using a drone include the Mineral Bottom switchbacks and the road along the Green River; both of these locations are not within the proposed restriction area.

	There is simply no evidence that drones are causing any serious impacts to wildlife in the canyons in the Hell Roaring Rim area, and broad restrictions on their use are unjustified and unnecessary, not to mention impractical and unenforceable. It seems to me drones are simply getting lumped in with other uses which the BLM is actually worried about impacts from, and that this harmless activity will suffer because of it. In truth, the vast majority of drones being operated in this area are likely being flown to film people engaging in the other activities this proposal is primarily concerned with (base jumping, slacklining, rope swings, etc.). If those activities are restricted, associated drone use will naturally decrease as well without the need for any specific restrictions on drones. The few remaining people flying drones in this area would likely be photographers filming vehicles driving on the roads or just flying to capture the beauty of this incredible area. Any specific problems drones are causing after other activities are restricted could be dealt with on a case by case basis using general rules against disturbing wildlife, etc. without the need for specific restrictions on drone flying within the broad areas outlined in this proposal.	
1	Restricting Mineral and Hell Roaring will mean more activity at the excluded areas (like the Fruit Bowl) and in other canyons (like Spring Canyon). Use will not diminish, but will rather be concentrated.	The purpose and need for the Proposed Action is to maintain currently low recreational use in high-quality breeding and year-round habitats. This area offers less than 4.5% of the desirable geology in the field office and currently supports less than 0.6% of the known climbs in the field office; increases in use concentration is not expected due to limited use and opportunity.

1	The established climbs (like the Witch and the Warlock) should be grandfathered in and not restricted.	These areas contain 0.6% of the 1,095 climbing routes in the Moab Field Office (listed on Mountain Project). A vast array of alternative climbing areas are available. The BLM has crafted an alternative that establishes a permit system with timing limitations for the established climbs, including the Witch and the Warlock
4	State the importance of the Fruit Bowl and asks that it be kept available.	The Fruit Bowl area, as permitted for GGBY in 2017, is excluded from the proposal.
1	Mineral Bottom is a favored spot for BASEjumping.	The Mineral Bottom BASEjumping Focus Area (which includes the Sweet Spot) is excluded from the proposal.
6	Suggests that enthusiasts be asked to voluntarily limit their presence during certain nesting times at certain locations. BLM should provide more educational information about potentially affected wildlife.	The BLM appreciates the suggestion of voluntary limitations and more information about wildlife.
9	The economy of Moab would suffer were this restriction on roped and aerial activities to occur	The BLM acknowledges that every visitor to Moab contributes to the economy. Information concerning the economic impact of visitation is detailed in the Checklist (Appendix A). Without exact visitation numbers to the restricted area, it is impossible to calculate the exact economic contribution of climbers and aerialists utilizing Mineral and Hell Roaring Canyons.
Comments Suggesting Specific Types of Possible Restrictions/Splitting Restrictions on Climbers vs. Aerialists/Excluding Some Specific Areas from Restrictions		
16	Mineral and Hell Roaring Canyons should be kept open for climbers, as they do not have the same impacts as aerialists. Climbers are quieter and recreate in smaller groups resulting in fewer impacts both to wildlife and other people. The numbers of climbers in these two canyons is small and very backcountry in nature. Their impacts are not the same as those of the aerialists.	The BLM acknowledges that there are differences between the two groups. Both aerialists and climbers, however, favor the talus slopes and cliffs that are the escape terrain for desert bighorn sheep and in which raptors nest. The scientific literature regarding wildlife disturbance is detailed in the EA in Sections 3.2.2, 3.3.2 and 3.4.3 and analysis assumptions as they relate to

		climbing activities can be found in Chapter 3.
2	If there must be restrictions, allow certain days of the week for activities to occur. For example, allow "X number of permits per day/week/month with a few blacked out months (perhaps around any breeding seasons)".	Restriction schemes that offer varying days of the week generally focus on impacts to other people. If, for instance, a person dislikes hiking on a trail with dogs, excluding dogs for two days of the week allows that person to choose a day for hiking a trail when dogs will not be on it. Animals are resident and the impacts upon animals will not be addressed by limiting certain activities to a set of days. The scientific literature regarding wildlife disturbance is detailed in the EA in Sections 3.2.2, 3.3.2 and 3.4.3 and analysis assumptions can be found in Chapter 3 .
10	Suggests seasonal limitations for climbers and aerialists as an alternative to a total ban.	These climbs constitute 0.6% of the 1,095 climbing routes in the Moab Field Office listed on Mountain Project; a vast array of alternative climbing areas are available. The BLM has presented an alternative that provides seasonal limitations (through a permit system) for the established climbs in Hell Roaring Canyon, including the Witch, the Warlock, the Cauldrons, the Gollum and Kachina Spires. See Section 2.3 for this alternative.
23	Suggest that seasonal limitations be imposed on climbers to protect nesting birds and/or bighorn lambing.	The BLM has presented an alternative (Alternative B) that provides seasonal limitations (through a permit system) for the established climbs in Hell Roaring Canyon, including the Witch, the Warlock, the Cauldrons, the Gollum and Kachina Spires. See Section 2.3 for this alternative.
3	Suggest that seasonal limitations *and* group size limits be imposed on climbers and other enthusiasts to protect wildlife.	The alternative offering seasonal limitations (through a permit system) for established climbs also sets a group size limit. See Section 2.2 for this alternative.

1 Access Fund, FOIC, SL Climbers' Alliance	States that the proposal is too broad. Gives reasons why climbers and highliners are two different types of user groups, especially when concerning backcountry "trad" climbs like the ones in question. "The BLM should not lump rock climbing into the general category "Roped Activities" because it is abundantly clear that different activities (that happen to use ropes) necessitate different management strategies and restrictions with regard to wildlife". Known climbs are in Hell Roaring Canyon: Witch, Warlock, North and South Kachina Spires, Gollum and Cauldron and Corner Tower. State that seasonal limitation are sufficient to protect raptors. Asks for any research that shows that desert bighorn sheep are susceptible to impacts from climbers. "With this in mind, we believe that the BLM should 1) not prescribe a blanket prohibition without a scoping period and draft Environmental Assessment, 2) conduct a site specific scientific analysis of wildlife and social conditions, and 3) develop management alternatives as per the National Environmental Policy Act before promoting an unsubstantiated management prescription without public input. As climbing advocacy and stewardship organizations, we strive to balance recreation access with resource protection. We encourage you to follow the 5 standards that have been in place for many years by following a science-based approach that protects sensitive habitat during sensitive times, versus a blanket closure."	These climbs constitute 0.6% of the 1,095 climbing routes in the Moab FO listed on Mountain Project; a vast array of alternative climbing areas is available. This area also supports important year-round, breeding and winter use for the species analyzed. The scientific literature regarding wildlife disturbance is detailed in the EA in Sections 3.2.2, 3.3.2, and 3.4.2. The Corner Tower has been excluded from the proposed restricted area. An alternative has been crafted that imposes seasonal limitations on the known climbs in Hell Roaring Canyon, including the Witch, the Warlock, the Cauldron, the Gollum and the two Kachina Spires. This alternative requires that climbers obtain a permit from the Moab Field Office; the permit would impose group size limits within the climbing season. The alternative is detailed in full in Section 2.2. Research on the effects of human activity on desert bighorn sheep are detailed in Section 3.4.2. The BLM has conducted a Scoping Period (June 1 – June 30, 2020) and presents this Environmental Assessment for public review. As a result of information received during Scoping, the BLM has crafted an alternative with seasonal restrictions on known climbs rather than a "blanket closure" on these climbs.
1	Suggest that seasonal limitations be imposed on all recreationists, if they are to be imposed for climbers.	Other recreation uses in Mineral and Hell Roaring canyons are very sparse. There are no designated routes in the majority of Mineral Canyon; the route in

		Hell Roaring Canyon is being considered as part of the Labyrinth Rims Travel Management Plan, which is on-going.
3	Suggest a permit system for climbers and/or aerialists.	The permit system comprising Alternative B is explained in Section 2.2.
2	Suggests allowing climbing as day-use only in Hell-Roaring Canyon.	The permit system comprising Alternative B is explained in Section 2.2.
15	Suggest seasonal limitations for aerial activities.	While known climbs are specific points, aerial activities are more far ranging. Seasonal limitations (with permits and a group size limit of 4) was formulated for six climbs in Hell Roaring Canyon. The highlining areas were not seen as amenable to this solution for Alternative B.
1	Suggests group size limitations on aerialists; do not allow dogs or the collection of firewood. Portable toilets should be required. Violations of rules should mean confiscation of gear.	The enactment of group size limits for aerialists was considered, but not seen as a viable alternative.
1	Supports the Access Fund's compromises on the proposal.	Alternative B attempts to represent the compromises proposed by the Access Fund.
1	Please find another way to protect the wildlife – see what other areas have done.	Protecting wildlife can take many forms. The BLM has already reduced grazing in the two canyons; oil and gas leasing is subject to a No Surface Occupancy Stipulation, and motorized users must stay on the designated roads (which are few). The current proposal attempts to proactively manage a relatively new form of recreation that is increasing in a very important wildlife area.
1	Allow climbing on the Kachina Towers, Witch, Warlock and Cauldrons unless it directly conflicts with nesting birds. Try to strike balance between needs of wildlife and climbing access. There are also some little known climbs in Mineral Canyon.	An alternative has been crafted that imposes seasonal limitations on the known climbs in Hell Roaring Canyon, including the Witch, the Warlock, the Cauldron, the Gollum and the two Kachina Spires. This alternative requires that climbers obtain a permit from the Moab Field Office; the permit would impose group size limits within the

		climbing season. The alternative is detailed in full in Section 2.2. The BLM received no specific information about climbs in Mineral Canyon.
1	Consider excluding 5 additional highlining areas in Hell Roaring Canyon and "several" in Mineral Canyon (no exact locations given).	Two highlining areas (Green River and Waterslide) have been excluded from the restriction area.
1 (Slackline US)	Institute needed seasonal closures in cooperation with the slacklining community. If this is not possible, at the very least please exclude the Highlands Bowl, the Green River area, the Colorado Bowl and the Waterslide from the proposed restrictions (maps provided. Slackline US understands that access is not guaranteed, but would like consideration given to the areas listed above. Our organization understands the importance of balance and wishes to work on the solution.	The Green River Area and the Waterslide were excluded from the proposed restrictions. The Highlands Bowl and the Colorado Bowl pose wildlife concerns that are not soluble with seasonal closures due to their location, size and the numbers of people who wish to use them.
1	Suggests closing the road along the Green River so that aerialists and climbers have to work harder to access their locations.	The road along the Green River is outside the restricted area; the BLM has been told that climbers access the climbs in Hell Roaring Canyon from the rim on the top. Aerialists also access their activities from the top, not from the road along the Green River.
Comments Generally Supporting Restrictions		
22	States general support for the Proposed Action. Many applaud the "proactive management proposal." Wildlife should be protected from the encroachment of impacting activities. Wildlife need protection and space. Recreationists do not have to inhabit every bit of wildlife habitat. Many commenters note the increase in recreation use and its encroachment into wildlife habitat. Cite the present effort as a good attempt to provide balance.	The impacts to various wildlife species as a result of the alternatives are detailed in sections 3.2.2, 3.3.2 and 3.3.4.

1 (USFWS)	Details the impacts of human disturbance on raptors, including golden eagles and Mexican spotted owls. Summarizes the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, as well as the Mexican Spotted Owl Recovery Plan. States that: "*Human disturbance is a primary threat to raptor populations that may generate a range of adverse impacts to the fitness, occupancy, and population rates of golden eagles, Mexican spotted owls, and other raptors depending on the type of disturbance (Hansen et al. 2017, Romin and Muck 2002). It is documented that rock climbing activities impact cliff-nesting raptors when activities are in close proximity to nests because of shouting and other noises involved with the activity, and the high sensitivity of birds to human activities occurring above them (Hansen et al. 2017). Other roped and aerial activities likely impart a similar level of impact to raptors when these activities occur in close proximity to nests".* The Service concludes: "*The proposed action would help reduce the threat of roped and aerial recreational activities to Mexican spotted owls, golden eagles and raptor populations in the action area. The proposed action is also consistent with recovery actions (6.7.2 and 6.7.3) in the Mexican spotted owl 3 recovery plan (USFWS 2012). We believe the proposed action will maintain or improve the status of the Mexican spotted owl in the action area.*"	The BLM appreciates the research references provided by the U.S. Fish and Wildlife Service. In addition, the consistency of the proposal to the Mexican Spotted Owl Recovery Plan is noted.
1 -Utah Div. of Wildlife Resources via PLPCO	Desert bighorn are an iconic species. The area proposed for closure is within the UDWR's LaSal/Potash/South Cisco desert bighorn sheep management unit, which is at 74% of its population objective. Human disturbance results in habitat degradation and displacement; stress is especially impactful when ewes are giving birth to lambs or when combined with disease events. The State recommends no roped or	The BLM has noted the adherence of the proposal to the UDWR's statewide bighorn sheep plan, as well as to Utah's Wildlife Action Plan as Species of Greatest Conservation Need.

	aerial activities during lambing season. Working with federal agencies to protect bighorn habitat is recommended in UDWR's statewide bighorn sheep plan. The area also provides nesting habitat for multiple raptor species included in Utah's Wildlife Action Plan as Species of Greatest Conservation Need. These species include the Golden Eagle, Mexican Spotted Owl and Peregrine Falcon. The USFWS has documented the effects that human activities have on raptors. The State recommends no roped or aerial activities during critical nesting months, which go from January through July.	
1 (Wild Sheep Foundation)	Despite over 40 years of restoration efforts, Utah bighorn populations fall well short of historic numbers. In this fashion, bighorn sheep within the La Sal, Potash/South Cisco desert bighorn sheep management unit are currently at 74% of the desired population objective. The adverse impacts associated with human disturbance is well documented in the literature.	The BLM has acknowledged that the population objective of the desert bighorn sheep herd in the area has not been met.
2	These canyons are a stronghold for desert bighorns in our Potash herd. Many ewes will have and raise lambs in this area. This bighorn herd harbors a variety of pathogens including *M.ovi*, and has experienced respiratory disease events in the past. Considering the rapid increase in human recreation in this area, the UDWR supports the proposed restriction to reduce stress and displacement of the bighorns in this area.	The impacts to desert bighorn sheep from this type of activity are detailed in Section 3.4.2.
1 (Raptor Inventory Nesting Survey)	Notes that RINS has performed surveys for raptors in the project area. RINS as found 84 nest locations in Mineral and Hell Roaring Canyons (map provided). Nests have been recorded from the following species: Golden Eagle, Peregrine Falcon, Prairie Falcon, Great Horned Owl, and Red-tailed Hawk. RINS surveyors have witnessed the adverse effects of human presence on these nests. Most notable among these adverse impacts is the problems with	The BLM acknowledges the impacts of such activities to raptors. See Section 3.3.2.

	Golden Eagle nests in the vicinity of the Fruit Bowl. Human disturbance, even at a significant distance, can have a devastating impact on nesting raptors. It should be noted that the Golden Eagles that were nesting in the side canyon near the Fruit Bowl have never returned to the nest. Finally, the impact of human disturbance is not limited to the nesting season and human disturbance can disrupt raptor activity resulting in the total abandonment of an area. This proposal offers the BLM and opportunity to manage the Mineral and Hell Roaring Canyons with wildlife as the priority. There are many other areas that are suitable for recreation and entertainment and fewer and fewer that provide for wildlife. Statewide, we are witnessing the decline of raptor populations as a result of habitat loss. The impacts of visitors who come for the extraordinary landscapes, including the opportunity to view wildlife and specifically these magnificent birds, requires careful management or these opportunities will be lost.	
1 (SUWA)	Provides research on disturbances to bighorn sheep from recreation activities. Notes the importance of the genetic diversity of the desert bighorn herd in question. Research shows that increased human activity causes bighorn populations to decline (research provided). Bighorn display increased vigilance when activities are present, leading to stress and decreased productivity.	The BLM appreciates the research provided by the commenter.
1 (SUWA)	Cites decisions in the 2008 Moab RMP that support the Proposed Action: • *Habitat Management Plans- WL-1:* Continue to implement and modify three Habitat Management Plans (HMPs) summarized in Appendix U: Hatch Point HMP, Dolores Triangle HMP, and the Potash-Confluence HMP. • • *WL-18:* Raptors will be managed under the auspices of Best Management Practices (BMPs; see Appendix R), which	The BLM acknowledges the guidance of the Moab Resource Management Plan (2009) in Section 2.5.

	will include implementation of spatial and seasonal buffers. These BMPs implement the USFWS's Guidelines for Raptor Protection From Human and Land-use Disturbances, with modifications allowed as long as protection of nests is ensured. Seasonal and spatial buffers are also listed in Appendix R. Cooperate with utility companies to prevent electrocution of raptors. Temporarily close areas (amount of time depends on the species) near raptor nest to rock climbers or other activities if the activity could result in nest abandonment. • • *Bighorn Sheep Habitat- WL-29:* Follow the recommendations found in the BLM Bighorn Sheep Rangeland Management Plan, as revised (1993b); the Utah BLM Statewide Desert Bighorn Sheep Management Plan, as revised (1986a); and the Revised Guidelines for the Management of Domestic Sheep and Goats in Native Wild Sheep Habitats (BLM 1998a). • • *Bighorn Sheep Habitat- WL-30:* Support the current bighorn sheep population and manage to increase desert bighorn population (prior stable numbers) on 330,892 acres… • • *REC-48:* All SRPs will contain standard stipulations appropriate for the type of activity and may include additional stipulations necessary to protect lands or resources, reduce user conflicts, or minimize health and safety concerns. • • *WL-18:* Raptors will be managed under the auspices of Best Management Practices, which will include implementation of spatial and seasonal buffers. These BMPs implement the USFWS's Guidelines for Raptor Protection From Human and Land-use Disturbances, with modifications allowed as long as protection of nests is ensured... Temporarily close areas (amount of time depends on the species) near raptor nest to rock climbers or other activities if the activity could result in nest abandonment.	

	• • *SSS-10:* As required by the Endangered Species Act, work with UDWR to implement the Utah Wildlife Action Plan (UDWR 2005a) to coordinate management actions that will conserve native species and prevent the need for additional listings. • • *SSS-15:* As required by the Endangered Species Act, plan and implement assessment and monitoring plans for T&E and BLM Sensitive species. • • *Mexican Spotted Owl (MSO)- SSS-20*: If BLM determines that a proposed action may affect MSO or its habitat, consultation with the USFWS will be initiated. Monitor and protect known Protected Activity Center (PAC) sites according to USFWS recommendations and MSO Recovery Plan. Manage habitat for MSO according to USFWS and UDWR recommendations and recovery plans. Develop cooperative agreements with other agencies and entities to inventory and monitor existing potential habitat and annually schedule assessment plans of MSO habitat to determine quality of habitat and presence of species. Protect occupied and potential habitat, including designated critical habitat for the MSO, by applying the standard terms and conditions developed in consultation with the USFWS for oil and gas leasing and other surface-disturbing activities (see Standard Terms and Conditions [Lease Notices] which are Required to Protect Special Status Species and to Comply with the Endangered Species Act, Appendix A). These stipulations will preclude temporary activities within designated critical habitat from March 1 through August 31. Permanent actions are prohibited year-round within 0.5 miles of a PAC. • • *Golden Eagle- SSS-29*: Known golden eagle nest sites will be protected according to the Bald and Golden Eagle Protection Act amended in 1978. Acquire lands with nest and roost sites through land	

	exchange or acquisition. Conduct assessments of wintering golden eagle habitat. Protect golden eagle nest sites and habitat (12,902 acres) by applying the standard terms and conditions developed in consultation with the USFWS for oil and gas leasing and other surface-disturbing activities (see Standard Terms and Conditions [Lease Notices] which are required to Protect Special Status Species and to Comply with the Endangered Species Act, Appendix A). These stipulations will preclude surface-disturbing activities within 0.5 miles of documented nest sites from February 1 to July 15. *Moab RMP, Appendix R*: Best Management Practices for Raptors and Their Associated Habitats in Utah	
1 (SUWA)	BLM must also consider these actions in the Range of Alternatives: • Prohibit takeoff and landing completely at the Mineral Bottom airstrip during rutting and lambing season to protect bighorn sheep. Closes Mineral and Hell Roaring Canyons and their rims to motorized use. Controls, restricts, or seasonally closes dispersed camping in Mineral and Hell Roaring Canyons and along their rims to protect bighorn sheep, raptors, and Mexican spotted owl nesting sites.	The Mineral Bottom Airstrip is not within the area of the Proposed Action. Motorized use in the area is under consideration in the court-mandated Travel Management Planning process that is currently underway. Dispersed camping in the Proposed Area is restricted to designated sites in the Supplementary Rules accompanying the 2008 Moab RMP. The BLM acknowledges that the on-the-ground marking could be improved.
1 (SUWA)	NEPA requires that BLM take a hard look at the impacts resulting from its proposal, including impacts to wilderness-quality lands; impacts to lands proposed for wilderness in America's Red Rock Wilderness Act; impacts to natural and cultural resources; and impacts to other users within the vicinity of areas subject to use under the proposal. This includes noise and visual impacts and the potential for harm to BLM's target outcomes for the Labyrinth Rim/Gemini Bridges SRMA—	The proposal would not impact visual resources or lands with wilderness characteristics. The beneficial impacts of the proposal on other types of recreation users are acknowledged in Section 3.1.2. The EA acknowledges that visitation is likely to grow, although it is impossible to project by how much; additionally, predicting the growth in any one type of recreation use is not possible without extensive survey data.

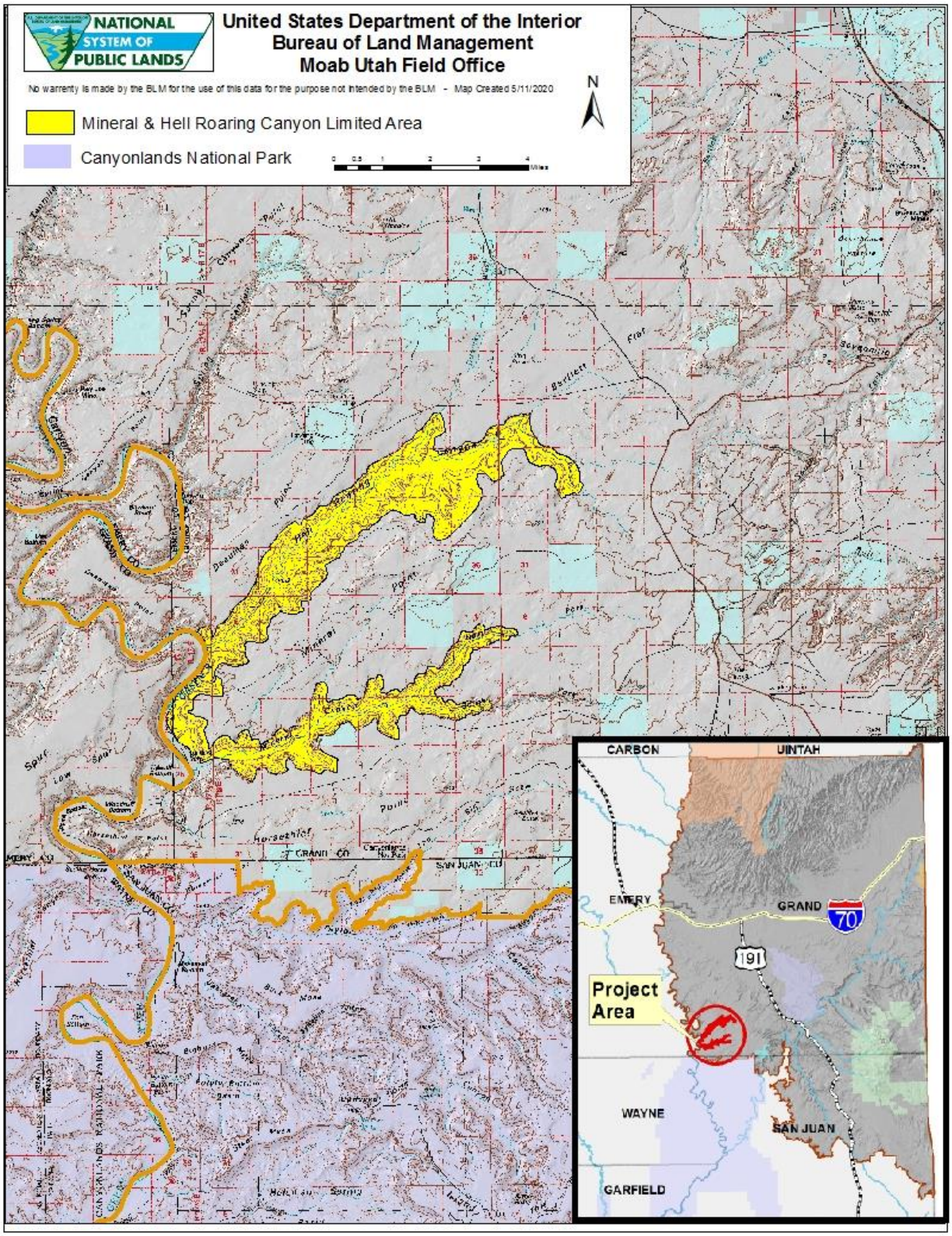
	which include quality experiences for visitors engaging in river recreation, camping, hiking, scenic driving, mountain biking and backcountry driving. Pursuant to NEPA, BLM must analyze indirect effects such as the growth in visitation, recreational impacts and use by both individual visitors and SRP holders, and future SRPs in the area. This analysis must include the potential for growth-inducing impacts—for example, that ongoing or future permitted activity in Mineral and Hell Roaring Canyons and on their rims will open the door to additional, similar use in the future by other commercial operators. BLM must take a hard look at other past, present, and reasonably foreseeable uses and management actions that may impact the environment, and analyze these impacts in light of the proposal. BLM must take a hard look at the adverse impacts to wildlife resulting from all manner of human recreational impacts, including motorized use, in an area that includes critical rutting, breeding, and migration habitat for several sensitive species including desert bighorn sheep, raptors, and Mexican spotted owl.	
1	Cites research done by Idaho Department of Fish and Game regarding impacts to bighorn. Provides long list of research studies. States importance of this particular bighorn herd, and notes that activities that herds habituate to are not as impactful as unexpected activity in their "space". Concludes by stating: "Mineral and Hell Roaring Canyons currently provide important, largely undisturbed, lambing and rutting habitat for the native Potash bighorn sheep herd. Based on an extensive literature, some of it cited in the passages above, it is clear that increased human activity in the canyon would likely impact bighorn survival	The BLM thanks the commenter for the research studies provided.

	and reproduction, negatively impacting the viability of the Potash herd. The current proposal to restrict roped and aerial activities in the two canyons, limiting additional disturbance of the bighorn sheep that use the canyon, is an important step in ensuring the long-term survival of this irreplaceable herd."	
1	Provides evidence and photographs of bighorn being disturbed by aerialists on rim above Mineral Canyon. Especially noteworthy because it was evident that the ewes in question were pregnant. States results of disturbance to bighorn pregnancy. Notes importance of this bighorn herd.	The BLM thanks the commenter for the anecdotal evidence provided of bighorn disturbance by aerialists.
1	Provides two scientific peer reviewed papers on bighorn population viability and aerial activities. One paper is in the journal *Conservation Biology* and the second in the journal *Biological Conservation*.	The BLM thanks the commenter for the research studies provided.
3	It is well known that both canyons provide many nesting sites for various species of raptors and a very important piece of habitat for a unique desert bighorn herd. There are other areas that recreationists can use for roped and aerial activities, but this area is THE habitat of this remnant herd of bighorn sheep.	Comment acknowledged.
1	Limiting use on only 10,000 acres (the best of the wildlife habitat) still leaves plenty of space for recreational activities.	Comment acknowledged.
1	As a RINS volunteer, I have found bolts in obscure locations that are very near raptor nests. I've observed that highlining often involves loud music, noise and other disturbances to wildlife. Allowing nearly every use everywhere diminishes the quality of experience for everyone. Limiting high angle/extreme sports to designated areas within Mineral and Hell Roaring Canyons, such as the original Fruit Bowl highline area and the Sweet Spot base jumping area makes sense.	The BLM acknowledges the comment.

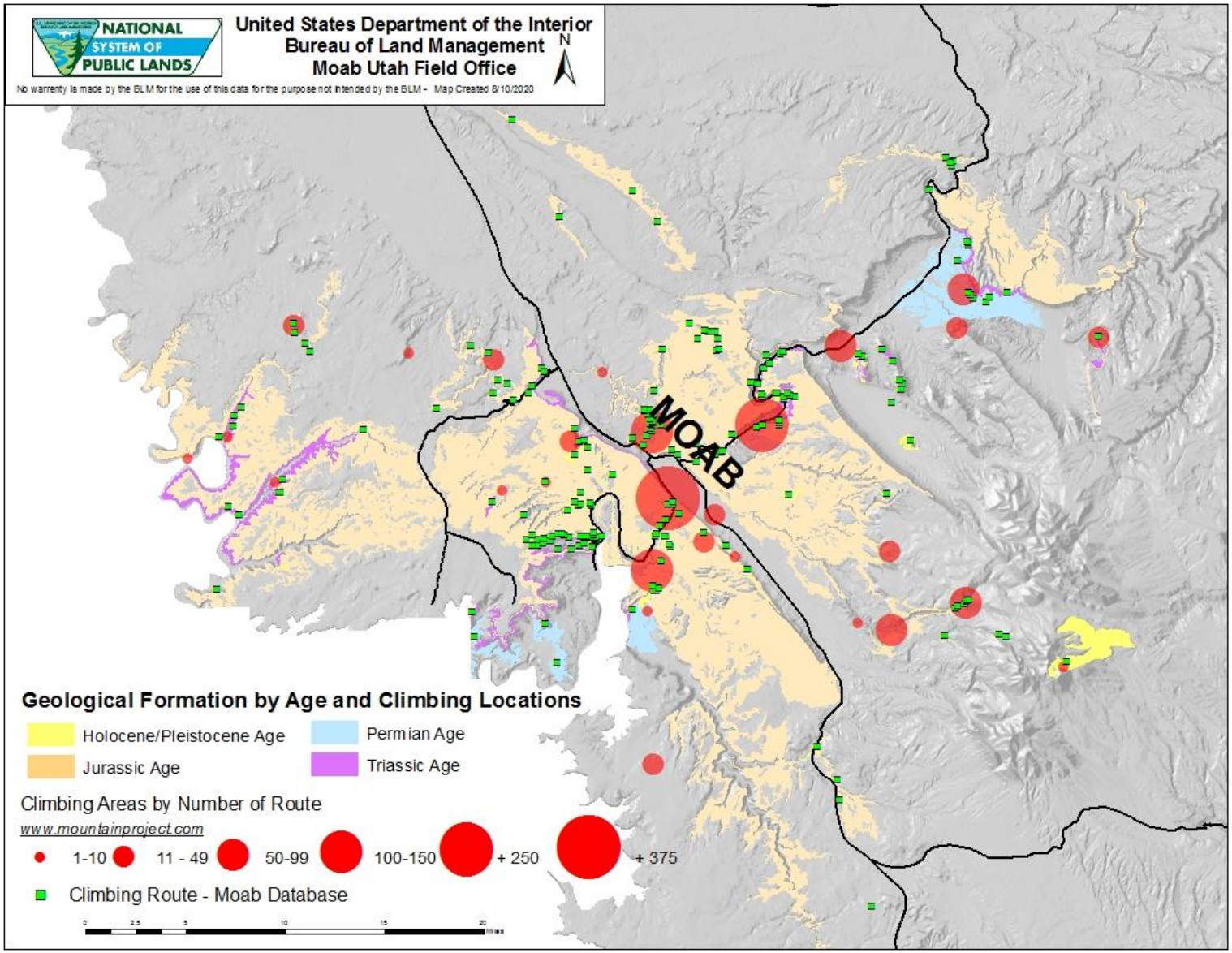
1	Climbing within these two canyon systems is not particularly popular. The routes are lesser-known and seldom used compared to others in the area. Mountain Project maintains lists of climbing routes throughout the US on their website (mountainproject.com). There are two climbing areas shown in Hell Roaring Canyon with a total of 6 routes (Witch/Warlock/Cauldrons and the Kachina Spires). There are none listed in Mineral Canyon. While a climber might be disappointed about 6 routes in these two canyons being closed to climbing, there are many other routes available nearby. Mountain Project lists a total of 2,846 climbing routes in the "Moab area" as well as 1,347 at Indian Creek, 60 in Castle Valley, and 52 at Fisher Towers. There are many other places on public lands in the Moab area where various roped and aerial activities are already taking place and are available for public use.	The six routes provided by the commenter have been noted in the EA. The BLM acknowledges the many other climbing opportunities available in the Moab area.
2	Limiting these activities would also benefit other quiet users such as hikers. Cites discovering "50 to 100 large, shiny slack-lining bolts spread out along roughly 50 yards of canyon rim -- a sort of mini "fruit bowl". This was an ugly mess and definitely detracted from my attempts to try to enjoy the natural scenery." Also cites the multiple trailing found around this and other highlining areas. Cites the need to close more roads in the area – including the road up Hell Roaring, in Mineral and along the Green River north of the airstrip.	The beneficial impacts to other recreation users is stated in Section 3.1.2. The issue of designating roads in the area is being considered in a court-mandated Travel Plan process for the entire Labyrinth Rims/Gemini Bridges SRMA. This process is on-going and should be concluded by the end of 2021.
1	Slacklining, ziplining, high-lining, rope swinging and aerial activities (including drone flying) should be restricted in the entire MFO, and allowed only in designated areas.	The BLM did consider an alternative restricting such activities in a larger area (110,000 acres),but did not carry this alternative forward. See Section 2.4.
1	Users should be required to clean up after themselves – and to pay for all their impacts to habitat.	Clean-up of use is already required by law.

Appendix C - Maps:

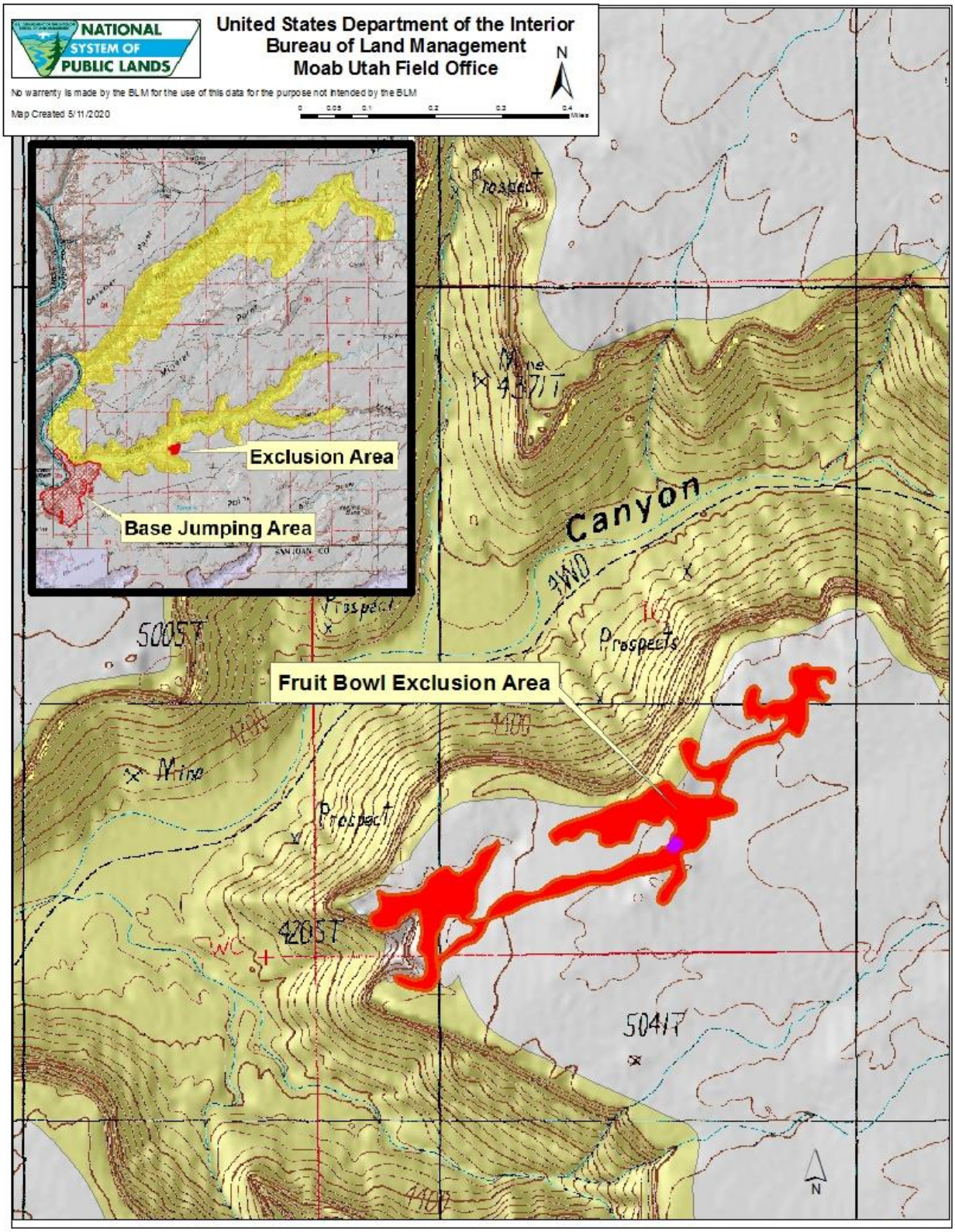
Appendix C: Map 1: Proposed Restriction Area in Mineral and Hell Roaring Canyons



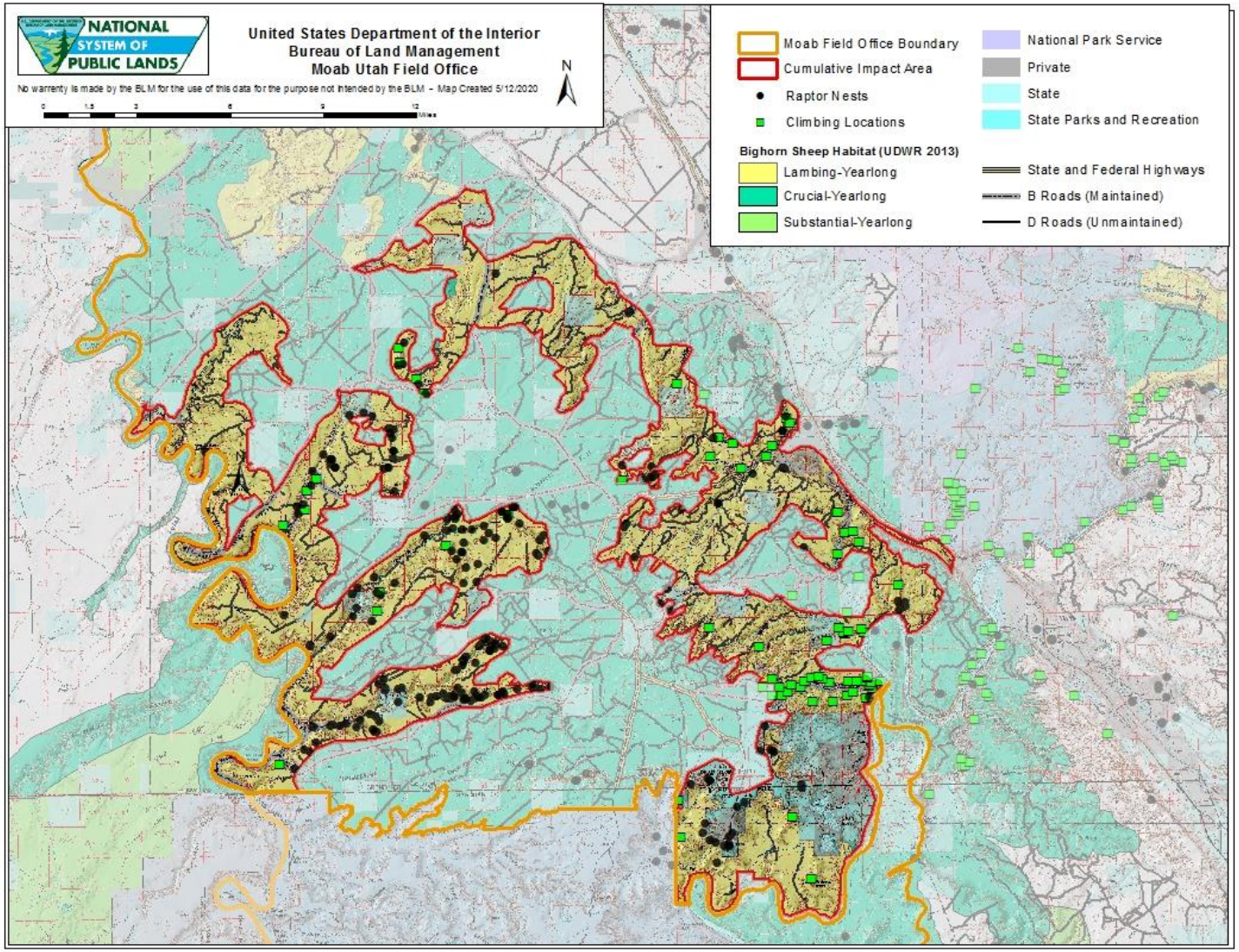
Appendix C: Map 2: Climbing areas and supporting Geology



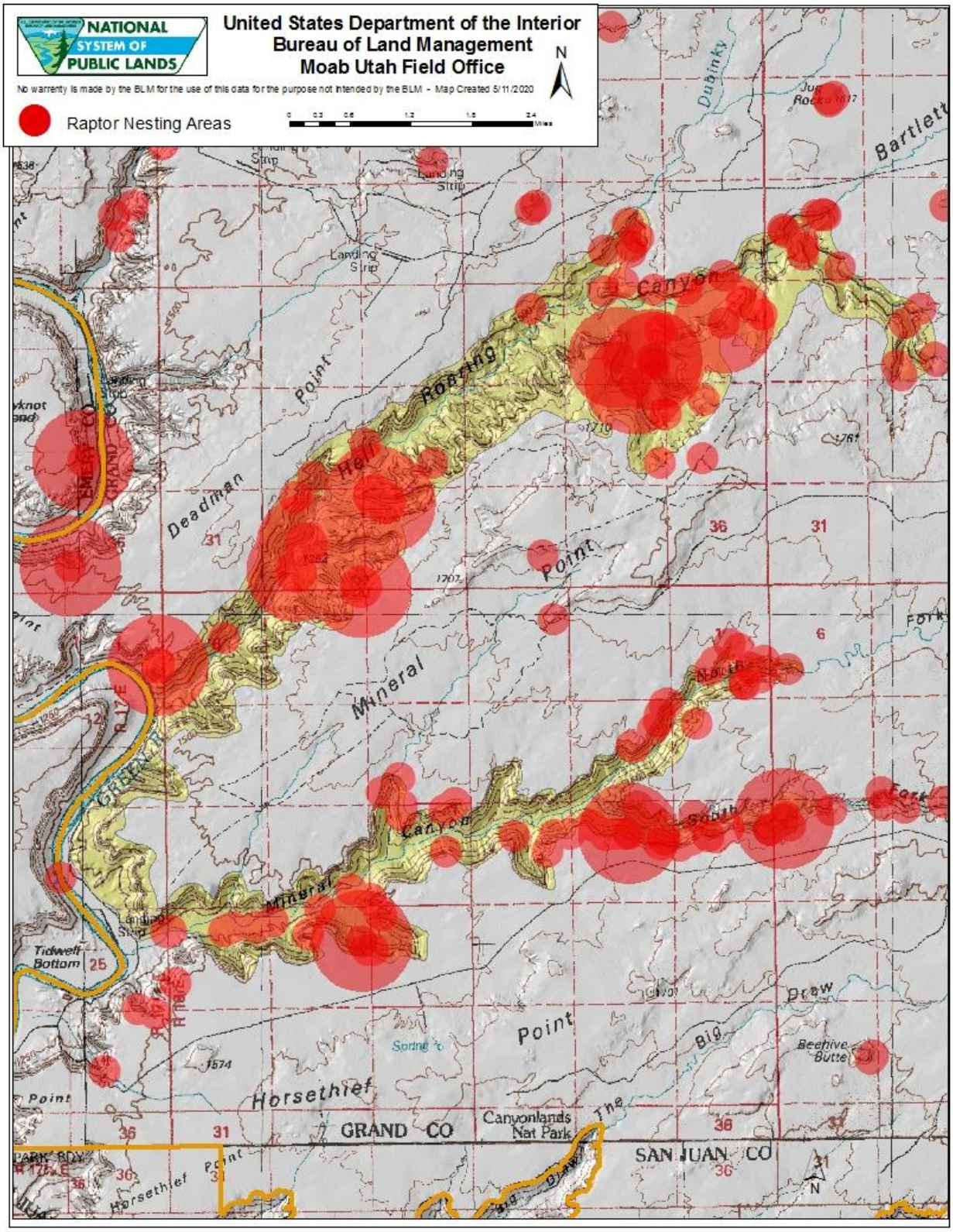
Appendix C: Map 3: Detailed Map of Proposed Exclusion Area at the Fruit Bowl



Appendix C: Map 4: Cumulative Impact Area



Appendix C: Map 5: Nesting areas of Raptors, including the Mexican Spotted Owl within the Proposed Restriction



Appendix C: Map 6: Crucial Lambing and Rutting Habitat for Desert Bighorn Sheep