Cumulative Effects under ESA

Cumulative effects for the Endangered Species Act include future non-federal actions which may impact this species. Past actions are included in the existing conditions described in the BA (project file) and the beginning of Chapter 3. Mining activities may occur on private lands adjacent to the lease modification, and may include MDWs and grazing in this area which may contribute to vegetation changes on private lands in the area. However, those lands are already modified through long-term human use, and continued grazing is not likely to alter the suitability of lynx habitat in this area from current conditions. Water development in this area (reservoirs and ditches) already exists, and future actions will continue use of existing facilities. Grazing and outfitting impacts are the same as above. Within the past ten years, a total of 2550 acres of vegetation management has occurred in the LAU, with a total of 125 acres (163 acres based on 25% addition in 2016 consultation) of habitat rendered or planned to be rendered unsuitable. Other actions are either of insignificant and discountable impacts to lynx or their habitat (road and trail maintenance) or occur on already disturbed sites (special use permits). Recreational activities are not expected to be substantially altered by this project.

Climate Change

As the climate continues to warm, major changes may occur in ecosystem structure and function, species' ecological interactions, and species' geographic ranges, with predominantly negative consequences for biodiversity. Warmer temperatures and precipitation changes will likely affect the habitats and migratory patterns of many types of wildlife. The range and distribution of lynx may change. Spruce-fir and aspen habitats may be affected as described under Section 3.9.

With regard to fish in the Colorado River System, they may be affected by any number of climate factors and climate scenarios that impact water supply, water temperature, water quality from formations that water flows through if there is a concentration of those minerals/metals. Currently, while conditions are dry they are no longer in drought.

3.10.1.7 Determination

Implementation of the project **"may affect, but is not likely to adversely affect"** the Canada lynx. The "may affect" is based primarily on the loss of suitable habitat in the project. Other impacts such as disturbance during denning or increased mortality risk are insignificant and discountable due to the distance of the project from typical Colorado denning habitat, and the low probability of loss of lynx from traffic or incidental shooting as a result of this project.

When we initially consulted with USFWS, we included in the impacts the reasonably foreseeable mine plan, which includes (in broad terms if not exact location) the surface disturbance associated with the mining, with the intent of not having to consult again when and if mining occurred. Had we not, there would have been no direct or indirect effects at the lease stage (and therefore no cumulative effects), and the consultation would merely have been postponed until there was a plan for surface activity. Both USFWS and GMUG agreed the way we made the most sense. While, LAU boundary and acreage has changed from 49,704 to 37,995 acres between 2010 and 2016 the effects on lynx have not. It is still the same disturbance consulted upon with USFWS in 2010 and the same habitat alteration as discussed in the BA. We have not had any disturbance related to this leasing or post-lease development and therefore the consulted upon acreage (75 acres) still has not been reached or a need found to reinitiate consultation. However, we do not expect to reach 75 acres even if the lease modifications are fully developed.

3.10.1.8 Consistency with Forest Plan and Other Regulations

The NFMA and the ESA require the Forest Service to manage wildlife habitat to maintain viable populations of native and desirable non-native wildlife species and conservation of listed threatened or

Resource Area	Alternative 1 (No Action)	Alternative 3 (Colorado Roadless)	Alternative 4 (COC-1362 only)
		activities. Monitoring, best management practices, permitting and lease stipulations should ensure that impacts are minimized. Exploration activities may have 7 crossings primarily of intermittent streams.	
Vegetation	Ongoing management activities and Sudden Aspen Decline will continue to impact vegetation in the lease modification area.	Subsidence is expected to have minimal disturbance on vegetation. Post-lease surface disturbance is expected to remove vegetation from up to 72 acres. Reclamation requirements will ensure that appropriate species are used to revegetate the area and return it to productivity. Additionally, approximately 63 acres of vegetation may be removed on parent leases and adjacent private lands because of the COC-1362 lease modification. Exploration activities may impact 22.7 acres of vegetation.	Effects would be similar to Alternative 3 except approximately 66 acres of vegetation may be disturbed on the lease modifications. Additionally, approximately 63 acres of vegetation may be removed on parent leases and adjacent private lands because of the COC-1362 lease modification. Exploration activities may impact 18.09 acres of vegetation.
Threatened & Endangered Species	No change over existing conditions and management.	Canada lynx-may affect, but is not likely to adversely affect. Four Big River Endangered Fish-fish not present but water depletions of approximately 4.5 acre feet total for MDWs may affect these species. Water depletion is consistent with existing Programmatic Biological Opinions. Additional MDWs on parent leases and private lands as a result of COC-1362 modification may deplete an additional approximately 4.2 acre-feet of water. Exploration: • May impact 21.16 acres of habitat for Canada lynx (includes acreage	The effects would be similar to Alternative 3 but slightly reduced in scale. Four Big River Endangered Fish-fish not present but water depletions of approximately 4.1 acre feet total for MDWs may affect these species. Water depletion is consistent wih existing Programmatic Biological Opinions. Additional MDWs on parent leases and private lands as a result of COC-1362 modification may deplete an additional approximately 4.2 acre-feet of water. Exploration: • May impact 17.28 acres of habitat for Canada lynx (includes acreage

Resource Area	Alternative 1 (No Action)	Alternative 3 (Colorado Roadless)	Alternative 4 (COC-1362 only)
		on parent lease). This is tiny fraction of habitat that may be removed and still meet the conservation threshold .in the Lynx Analysis Unit. • Is expected to result in up to 0.17-0.26 acre-feet of water depletion consistent with existing Programmatic Biological Opinions.	on parent lease and private lands). This is tiny fraction of habitat that may be removed and still meet the conservation threshold .in the Lynx Analysis Unit. • Exploration is expected to result in up to 0.14-0.21 acre-feet of water depletion consistent with existing Programmatic Biological Opinion.
Sensitive Species	No change over existing conditions and management activities.	American marten, pygmy shrew, northern goshawk, boreal owl, olive-sided flycatcher, flammulated owl, Hoary bat, Monarch butterfly, western bumble bee, American three-toed woodpecker, northern leopard frog, and purple martin-"may adversely impact individuals, but is not likely to result in a loss of viability in the planning area nor cause a trend toward federal listing." Colorado tansy aster-no effect. Rocky Mountain thistle-not known to date in lease modification area, but habitat may be enhanced from disturbance associated with post-lease development.	The effects would be similar to but slightly less than Alternative 3 since less acres would be affected. Each species may experience different effects due to specific location and extent of disturbance.
Management Indicator Species	No change over existing conditions and management activities.	Elk, Merriam's wild turkey, and red-naped sapsucker-negative effects are of short duration and magnitude and do not result in a forest-wide decrease in trends or deter from meeting the MIS objectives in the Forest Plan. (Other MIS species are addressed as Sensitive Species)	The effects would be similar to but slightly less than Alternative 3 since less acres would be affected

3.9.7 Consistency with Forest Plan and Other Laws

All alternatives are consistent with the 1991 GMUG Forest Plan.

3.10 Threatened & Endangered Species

There are numerous wildlife species which occur in the project area which are not special status species and are not addressed in the Biological Assessment, Biological Evaluation, Management Indicator Species Assessment, or in the Migratory Bird evaluation for this project. Specific species that commenters noted including beavers, bears, and deer are not special status species for the USFS. They are not on any species list which triggers analysis. Therefore, they were not analyzed. While these species are not individually addressed herein, they are considered during project planning and evaluation. These species are anticipated to be impacted similarly to species described in the analysis, through habitat loss or alteration (positively or negatively depending on species), through disturbance from noise, light, and human presence from project sites or equipment, and from vehicular traffic associated with the project. None of these species are anticipated to be impacted at the population level, and lease stipulations used for this project will in most cases reduce impacts to those species.

A Forest species list was provided by the US Fish and Wildlife Service on 9 May 2008 (USDI 2008b). A list was collected by the GMUG on May 14, 2015, from the USFWS website, and was checked against the USFWS website on February 19, 2016 to ensure currency. There are no changes to the species originally evaluated for this project.

The Gunnison Sage-grouse, which is now on the GMUG list, does not occur nor is there any habitat for it in the project area. The nearest population is south of Crawford. Information can be found at: https://www.fws.gov/mountain-prairie/species/birds/gunnisonsagegrouse/GUSGFinalListingRule_11202014.pdf

The yellow-billed cuckoo was listed as threatened (Western DPS) effective November 2014 (https://www.gpo.gov/fdsys/pkg/FR-2014-10-03/pdf/2014-23640.pdf). And the cuckoo has critical habitat proposed in the North Fork, but not within the project area, on Aug 15, 2015, but that has not been finalized (https://www.gpo.gov/fdsys/pkg/FR-2014-08-15/pdf/2014-19178.pdf).

Tables have been updated accordingly. There is only one federally listed species that has the potential to be found in the project area, the Canada lynx. Other species considered are shown in Table 3-26. As these species do not occur in the project area and no habitat for them will be impacted by the project, these species were not further analyzed in this document. These species would all have no effect determinations.

Table 3-25. Federally Threatened and Endangered or Candidate Species considered for this project

Species	Scientific Name	Habitat Description and Requirements	Habitat in Project Area?
Gunnison sage grouse & Critical Habitat	*Centrocercus minimus*	Sagebrush and sage-oak habitats in isolated populations in the Gunnison Basin and other parts of southwest CO; nearest known population occurs south of Crawford, CO. There is no designated Critical Habitat in or near the project area.	Species-No Critical Habitat-No
Yellow-billed cuckoo	*Coccyzus americanus*	Analyzed as a sensitive species in the original Biological Evaluation. Breeding habiatat includes riparian habitat along lowgradient (surface slope less than 3 percent) rivers and streams, and in open riverine valleys that provide wide floodplain conditions (greater than 325 ft (100 m)) Known to occur in the North Fork Valley.	Not expected (no additional information which alters that is known at this time) Critical Habitat-No
Canada Lynx	*Lynx canadensis*	Spruce/fir, mixed conifer, lodgepole pine forest (primary), or mixed deciduous/conifer (secondary).	Yes
Mexican spotted owl	*Strix occidentalis lucida*	Desert canyons, ponderosa forests. Not known or expected to occur on the Paonia RD.	No
Uncompahgre fritillary butterfly	*Boloria acrocnema*	Above treeline, closely associated with larval host, snow willow. Not known or expected to occur on the Paonia RD.	No
Debeque Phacelia (candidate)	*Phacelia submutica*	Specific clay-based soils of the Wasatch Formation in Piceance Basin, CO. Not known or expected to occur on the Paonia RD	No
Greenback cutthroat trout	*Oncorhynchus clarki stomias*	Headwater streams and lakes, isolated headwater reaches with less than 30 cfs, gradients > 4%, above 7,500. Require year round stream flows to survive. Not expected in analysis area due to scarcity of perennial water.	No
Bonytail Chub	*Gila elegans*	Habitat not present, but water depletions associcated with MDW drilling may affect this species in the Upper Colorado River Basin.	No*
Colorado Pikeminnow	*Ptychocheilus lucius*	Habitat not present, but water depletions associcated with MDW drilling may affect this species in the Upper Colorado River Basin.	No*
Humpback Chub	*Gila cypha*	Habitat not present, but water depletions associcated with MDW drilling may affect this species in the Upper Colorado River Basin.	No*
Razorback Sucker	*Xyrauchen texanus*	Habitat not present, but water depletions associcated with MDW drilling may affect this species in the Upper Colorado River Basin.	No*

Species	Scientific Name	Habitat Description and Requirements	Habitat in Project Area?
Uinta Basin Hookless Cactus	*Sclerocactus glaucus*	Coarse rocky soils above the current flood plains of the Colorado, Gunnison, and Green River drainages in western Colorado and northeastern Utah. Not known or expected to occur on the Paonia RD.	No

*Habitat not present, but consultation has occurred with USFWS regarding depletions associated with RFMP for post-leasing activities (June 16, 2010; ES/CO: FS/GMUG/Paonia RD; TAILS 65413-2010F-109) based on GMUG's PBO for depletion (ES/GJ-6-CO-99-F-033-CP062). This is a complicated consultation history because it also relies on the umbrella Final Gunnison River Basin Programmatic BO (ES/ GJ-6-090F-001 and Tails 65413-2009-F-0004) which has included all prior consultations in the basin and associated recovery goals the most recent assessment of which had been finalized on December 20, 2016. Information specific to this project can be found in project record and description of the recovery is in Appendix J in response #8419-49.

3.10.1 Canada lynx

The Forest Service vegetation database (R2Veg) data as of 04 Feb 2010 was used in this analysis to describe existing vegetation and habitats within the project area. Sudden Aspen Decline (SAD) is impacting mature aspen stands across the district, and declining stands have been identified in the immediate project area and across the analysis area. The current state of these stands is not reflected in R2Veg due to the rapid change in vegetation condition. It is anticipated that additional aspen stands will decline in 2010 and beyond, and that the affected aspen stands may constitute a much larger portion of the analysis area than they do currently.

3.10.1.1 Methodology

Using the Southern Rockies Lynx Amendment (SLRA) Implementation Guide, Habitat Mapping section, the following model was developed for the West Elk Lease Modification project:

- Using the R2Veg vegetation GIS database as of 04 Feb 2010 (the time of analysis), the area of the existing Mount Gunnison LAU was selected, then buffered out 400 meters. The overall layer was then clipped to this geographic area to facilitate calculations while insuring that the LAU was fully covered.
- Polygons were selected by Cover_Type attributes. Primary habitat included spruce-fir (TSF) polygons, as well as aspen (TAA) polygons containing greater than or equal to 5% conifer (PIEN and/or ABLA). Secondary habitat included the remaining aspen polygons (containing less than 5% conifer) and riparian willow (SWI) polygons.
- All primary habitat polygons were selected. A 300 meter buffer was applied to this selection. All secondary habitat within this buffer was then added to the primary habitat and was used as the final habitat delineated within the LAU. This was clipped to the original LAU boundary to determine final habitat quantity within the LAU, and to the lease modification polygons to determine the habitat within those areas. These values were used the analysis.

The final GMUG LAU boundary adjustments / delineations had not been done at the time of the analysis, so the original boundary was still in effect and was therefore used. Consultation with USFWS was done specifically on this analysis (June 16, 2010; ES/CO: FS/GMUG/Paonia RD; TAILS 65413-2010F-109).

The final GMUG habitat model (later in 2010) closely followed the above process (although conducted with the full forest level data set and including other habitat types that occur elsewhere on the Forest, such as lodgepole pine). However, the process for including secondary habitat in the final selection did

not use a simple distance buffer of the primary habitat as described in the SRLA implementation guide. The final model used a 300 meter buffer, but included entire vegetation polygons of secondary habitat if the geometric centroid of the polygon was within the 300 meter buffer distance, and excluded polygons whose geometric centroid was further than 300 meters from the edge of a primary habitat polygon. This process was used to insure that the polygons used in the habitat model matched, spatially, with habitat polygons in the original vegetation layer, and were not bisected by the buffering distance clipping that I used in my model.

This or any model is used to plan and to estimate impacts from projects. Actual impacts to habitat are determined during or after disturbance and are measured on the ground at that time and reported to the USFWS as required. Habitat may be modeled but may turn out to not actually be suitable.

In 2016, using the habitat model developed in 2010, USFWS consultation occurred forest-wide for vegetation treatments and road construction which established conservation thresholds consistent with the SLRA for all of the LAUs. The 2016 consultation (ES/L-6-CO-08-F-024-GH016; TAILS 06E24100-2016-F-132: Bundle 65413-2009-B-2008) includes the lease modification area in the June 16, 2010, a consultation on for this project.

3.10.1.2 Affected Environment

The analysis area for the Biological Assessment is the Mount Gunnison Lynx Analysis Unit (LAU). Other scales of analysis may be used for other species. Existing Canada lynx habitat conditions at two potential analysis scales (Lease modifications area and LAU) is shown in Table 3-27. Acreages within the lease modification area in this analysis (1718.9) are slightly less than in the proposed action (1720 acres) provided through the BLM office (1721) and represent differences in mapping versus information provided from outside the agency.

The acreage of the LAU has been reduced from the original consultation, and now, comprises 37,995 acres (Table 3-27). Updates to this section of the SEIS have occurred to reflect the 2016 consultation acreage.

Environmental Baseline

The Canada Lynx was listed as threatened in March 2000. In August 2004, the Second Edition of the Canada Lynx Conservation Assessment and Strategy (LCAS) was released, to provide a consistent and effective approach to conserve Canada lynx on federal lands. The Canada Lynx Conservation Agreement (USDA FS, 2005) identifies the Science Report (Ruggiero et al. 2000) and the LCAS (Ruediger et al. 2000) as including the best available science on habitat and conservation measures. Both of these documents, along with local information were to be used for project analyses

Following release of the LCAS, the Forest mapped lynx analysis units (LAUs) and habitat within them, based on Regional direction. Habitat was mapped based on existing vegetation information, including vegetation type, canopy closure and size of trees. Areas outside of mapped LAUs are not considered to be lynx habitat, even though they may contain habitat components or stand similar to those within LAUs. In 2008, the Southern Rockies Lynx Management Direction Record of Decision (SRLA) was published, which supersedes the LCAS, and that direction was incorporated into the GMUG Forest Plan. Lynx habitat was remapped according to this direction, and used for this analysis. LAUs on the GMUG and neighboring forests were remapped in conjunction with USFWS in 2010-2011 to better align with lynx home range sizes and to remove lower elevation non-habitat.

The GMUG Forest Plan includes direction about limiting the amount of currently unsuitable habitat within a LAU to less than 30%. Currently, <1% of lynx habitat within the LAU is unsuitable. The lease modifications and affected surrounding private and parent leases are within the Mount Gunnison LAU, and potential impacts of the project to lynx are limited to that LAU. Existing conditions of the Mount

Gunnison LAU are displayed in Table 3-27. Other standards and guidelines in the SRLA which apply to this project are included in Appendix A, Table 3.8c, in the lease modification Biological Assessment (project record). GMUG's SBEADMR analysis in 2016 updated acres within the Mount Gunnison LAU and established the balance of acres for the 30% conservation limit for lynx within Mt. Gunnison LAU at 6,440 acres (USDA 2016, USDI 2016).

Table 3-26. Mount Gunnison Lynx Analysis Unit Existing Condition (rounded to nearest acre)

LAU Name	Total Acreage	Suitable Habitat Acres	Acres Currently Unsuitable Habitat (% of lynx habitat)	Acres Non Habitat (% of LAU)
Mount Gunnison LAU	37,995**	22,417**	0 (0)*	15,578** (52.2%)
Previous Actions*			163 (<1%)**	
Possible Future Actions (Hazard tree removal)				
Lease Modifications Area Total	1718	1436	0	282
Proposed Modification COC-67232 Area	919	809		
Proposed Modification COC-1362 Area	800	627		
COC-67232 Foreseeable Surface Affected		40		
COC-1362 Foreseeable Surface Affected		35		
Total Foreseeable Surface Affected	75	≤75		
Private Lands		235		
Private Lands Foreseeable Surface Affected		10		
Parent Lease COC-1362		55		
Parent Lease COC-1362 Foreseeable Surface Affected		7		

*Previous mining-related loss of habitat is beneath the scale of R2VEG and does not show up in the current GIS information.

**Habitat remapped in 2010- to better align with lynx homerange sizes and habitat; analysis updated per SBEADMR BA & BO, USDA 2016; this includes a cumulative disturbance which was defined as roads+ 25% of activities .

Lynx breed in March and April in the north, and kittens are born in May and June in the Yukon (Ruediger et al. 2000). Den surveys in May and June 2005 in Colorado found kittens in the dens at that time (CPW 2005a.) All of the 2005 dens were scattered throughout the high elevation areas of Colorado, south of I-70. Most of the dens were in spruce/fir forests in areas of extensive downfall. Elevations ranged from 10,226 to 11,765 feet for 2005 dens (CPW 2005a) with a mean elevation of 3354 meters (11,001 feet) for all dens prior to 2009 (CDOW 2009). However, the project area is all below the elevation where denning has occurred in Colorado.

Lynx have been described as being generally tolerant of humans, including moderate levels of snowmobile traffic (Ruediger et al. 2000). In a lightly roaded study area in northcentral Washington, logging roads did not appear to affect habitat use by lynx. In contrast, a study in the southern Canadian Rocky Mountains found that lynx crossed highways within their home range less than would be expected (Ruediger et al. 2000).

Lynx have been reintroduced to southwestern Colorado, beginning in 1999. Tracking of these lynx indicate that lynx are using or moving through the Forest, but only a few of the relocations lie within or adjacent to the project area (CPW 2005). Of the total 218 adult lynx that have been released in Colorado, there are 115 known mortalities (CPW 2009). The cause of death is unknown for a third of these, but the two leading known causes of mortality are starvation and being hit by a vehicle. Speed has been identified

as the primary factor contributing to vehicle-wildlife collisions (Gunther et al. 1998). Neither is considered to be a factor for this project due to the lack of suitable habitat in the project area. There are no landscape linkage areas in or near the project area or any travel routes associated with the project.

The Recovery Outline (USDI FWS 2005) identifies core areas, secondary areas and peripheral areas, based on historical and current occurrence records, as well as confirmed breeding. The Southern Rockies (Colorado and Wyoming) were identified as a Provisional Core Area. This designation was identified because this area contains a reintroduced population. Reproduction has been documented but it is too early to determine whether a self-sustaining population will result. A total of 37 dens and 116 kittens had been located in Colorado prior to the 2009 breeding season (CPW 2009).

In November 2005, the FWS proposed critical habitat for lynx (USDI FWS 2005a). In 2006 Critical Habitat for the lynx was designated, with none occurring in the Southern Rockies (USDI FWS, 2006). A revised critical habitat designation which does not include lands within Colorado has been proposed (USDI FWS, 2008). On September 12, 2014, the USDI FWS revised Endangered Species Act (ESA) protections for the contiguous United States distinct population segment (DPS) of Canada lynx The Service finalized both a revised critical habitat designation for the lynx DPS and a revised definition for what constitutes the range of the DPS – the portion of the species' North American range in which lynx are protected by the Act.(USDI 2014) None of the critical habitat occurs in Colorado. See bottom of section for reference.

Extensive stands of pure aspen may not provide quality hare (primary prey) habitat due to deficiencies in winter habitat characteristics. However, when mixed with spruce/fir, aspen (especially younger stands) may substantially contribute to prey productivity (Ruediger et al. 2000). Lynx transplanted into Colorado were frequently located in well-developed riparian and valley wetland shrub habitats of the upper montane and subalpine zones. These ecotones may provide quality foraging habitat for lynx.

Lynx Standards and Guidelines from the GMUG Forest Plan are shown in Table 6 of the Biological Assessment found in the Project File.

3.10.1.3 Alternative 1 (No Action) Environmental Effects

The direct and indirect impacts of the no action alternative would not change current habitat or population conditions of Canada lynx in the short term. Long-term changes would continue to be dependent on existing conditions, current succession of vegetative types, and other actions within the project area, as indicated in the cumulative effects tables and discussions in this analysis. The ongoing aspen decline may result in both short- and long-term loss of aspen at a landscape scale in this area.

3.10.1.4 Alternative 3 (Proposed Action) Environmental Effects

WLAU boundary and acreage has changed but the effects have not. Still the same disturbance and habitat alteration as discussed in the BA and still the same not-reaching-threshold-we-consulted-on, even if the acres were revised to reflect a better fit to suitable habitat

Under Alternative 3, the Forest Service would consent to and BLM would modify the leases with stipulations outlined in Section 2.2 including those related to Canada Lynx and TES species. For this analysis, all lease stipulations are considered to be in effect.

Mining may result in subsidence of surface topography as coal is removed from below ground. This subsidence has resulted in landslides and other surface changes on unstable and steep slopes in other portions of the Forest in which such mining has occurred. Such disturbance, however, has been limited to steep and unstable ground and has not been widespread in undermined areas. Most surface subsidence has been relatively uniform across the landscape and in most areas, does not visibly alter surface features or vegetation.