Rangeland Management in the Black Mountain Planning Area
Environmental Assessment

Black Mountain mixed conifer and subalpine meadow, summer 2014.

United States Department of Agriculture, Forest Service
Medicine Bow - Routt National Forests and Thunder Basin National Grassland
Hahns Peak/Bears Ears Ranger District
Moffat County, Colorado
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The Hahns Peak/Bears Ears Ranger District has prepared this environmental assessment (EA) to determine whether implementation of each of the three Alternatives could significantly affect the quality of the human environment. This EA serves as compliance with the National Environmental Policy Act (NEPA) and provides the analysis and information to determine whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI).

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Chapter 1 – Purpose and Need for Action

1.1 Background

The Black Mountain Planning Area consists of the Black Mountain, Fortification, and Quaker Knob Allotments, all of which are currently designated allotments for sheep grazing. A brief history of the rangeland management practices, as well as other known management actions within the Black Mountain, Fortification, and Quaker Knob Allotments, are catalogued in Appendix A: A Brief History of the Black Mountain Planning Area, and Cumulative Actions.

In this EA, three alternatives for management are considered: 1) No Action – No Permitted Livestock Grazing, 2) Continuation of Current Livestock Management, and 3) the Proposed Action – Adaptive Management. Under either of the two action alternatives, the Hahns Peak/Bears Ear (HPBE) Ranger District of the Medicine Bow - Routt National Forests would reauthorize sheep grazing and issue new Allotment Management Plans (AMPs). Upon completion of compliance with the National Environmental Policy Act (NEPA), and if grazing is reauthorized, AMPs would be prepared for these allotments based on the decision. Terms and conditions of Term Grazing Permits would be modified or re-issued to conform to the NEPA decision. For more details about each alternative, see Chapter 2 - Alternatives, in this EA.

1.2 Planning Area

Land Description

This planning area is located entirely on US Forest Service (USFS) administered lands which are managed under the Routt National Forest Land and Resource Management Plan 1997 Revision (hereafter, Forest Plan), to which this EA is tiered. The planning area is located within the Little Snake and Yampa River Basins, in Moffat County, Colorado, approximately 23 miles northeast of Craig, Colorado (Figure 1), within the US Geological Survey Freeman Reservoir Quadrangle topographic map. The Black Mountain Planning Area consists of approximately 11,000 acres and includes three allotments: Black Mountain, Fortification, and Quaker Knob (Figure 2). The allotments are located in all or a portion of sections 5 and 6 in T9N, R89W; section 1 in T9N, R90W; sections 6, 7, 8, 9, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31 and 32 in T10N, R90W; and sections 13, 14, 23, 24, 25, 26 and 36 in T10N, R90W of the 6th Principle Meridian.

Conformance with Existing Management Directives

The planning area is further defined by the Management and Geographic Areas in which it occurs. Direction for management within these areas, including desired conditions, and standards and guidelines, can be found in the Forest Plan (Chapter 2 pp.13-15, 36-41, 44-46 and Chapter 3 pp.45-46, 61-62). The portions of these Management and Geographic areas within the planning area are displayed in Figure 2 and are as follows:

- Management Area 1.32-Backcountry Recreation Non-motorized with Winter Limited Motorized Recreation
- Management Area 4.3-Dispersed Recreation
- Management Area 5.11-General Forest and Rangelands-Forest Vegetation Emphasis
- Management Area 5.13-Forest Products
- Elkhead Mountain Geographic Area
- Slater Creek Geographic Area

The planning area overlaps with the Black Mountain Colorado Roadless Area (CRA). However, because no road construction, reconstruction, or tree cutting activities are being proposed or considered under this EA, no additional review or analysis of the CRA has or will occur for this project.
Figure 1. Black Mountain Planning Area vicinity map.
Figure 2. Black Mountain Planning Area with details of land use and designations.
Figure 3. Suitable rangeland in the Black Mountain Planning Area.
Vegetation Composition
Elevations within the analysis area range from 8,240 feet to 10,800 feet. According to the FSVeG Spatial Geographic Information System (GIS) database (updated August 2, 2013), the majority of the Black Mountain Planning Area has vegetative cover type of coniferous trees (42%) including Engelmann spruce, lodgepole pine, and subalpine fir; and deciduous trees (40%) including aspen and birch; with the remaining area consisting of grass and forb openings (16%), shrublands (1%), rock outcrops (<1%), and water (<1%).

Rangeland Suitability
Suitable acres of rangeland are those acres accessible to domestic livestock, with inherent forage producing capabilities, and which can be grazed on a sustained yield basis with proper grazing management. Suitable acres in the planning area have not been field verified but are based on computer GIS modeling which took into account geological hazards, soil types, percent slope (up to 40-50% slope were considered suitable), and vegetation cover types, with the acreage of the Freeman Reservoir removed from consideration. This analysis is consistent with the criteria identified in Appendices A-J and L Final EIS for the Forest Plan (Appendix B, pp.31-32). There are approximately 5,000 suitable acres of rangeland in the planning area (Figure 3).

1.3 Purpose and Need for Action
The purpose of this planning effort is to fulfill section 504(a) of the 1995 Rescission Act (Public law 104-19), which requires the Forest Service to complete National Environmental Policy Act compliance for all allotments. AMPs, implemented through grazing permits and supplemented with Annual Operating Instructions (AOIs), are currently in place. However, this existing direction for rangeland management pre-dates the 1997 Forest Plan Revision and the 1995 Rescission Act, and has not previously been assessed for consistency with these mandates. Additionally, the AMPs which are currently in place do not document compliance with NEPA.

More specifically, this environmental assessment considers whether sheep grazing will continue to be authorized on all, some portion, or none of the Black Mountain, Fortification and Quaker Knob Allotments, and if so, under what conditions.

Management of rangeland resources should consider ecosystem needs, including maintaining all rangelands in satisfactory condition and managing for sustained yield of forage for both livestock and wildlife. Livestock grazing can maintain plant communities in or moving toward a desired condition. However, there are some relatively small areas within the planning area which have received repetitive use over several years, resulting in degradation of plant cover, vegetation species composition, and riparian areas. Such areas would benefit from restoration. For example, during field surveys which were conducted in conjunction with this EA, a need was identified to better protect vegetation, soil, and riparian resources within the Black Mountain Allotment (particularly in the Billy George Creek area).

Additionally, there is the opportunity to continue contributing to the economic and social wellbeing of people by providing for economic diversity and by promoting stability for communities that depend on rangeland resources for their livelihood (FSM 2202.1).

In general, more flexible rangeland management would allow response to changes in environmental and social conditions such as climate, permittee requests, and other resource concerns or opportunities.

The following are Forest Plan and site specific desired conditions. If livestock grazing is authorized, it would be managed in a manner which maintains or moves resources toward desired conditions, including but not limited to the following:
Rangeland vegetation occurs in a mix of seral stages but predominantly in upper mid seral to late seral stages of development (MA 1.32, 4.3, 5.11 and 5.13; Forest Plan pp.2-13, 2-36, 2-39, 2-40 and 2-44).

Long-term riparian and stream health are maintained in all riparian areas within the planning area. Therefore, for this planning effort, conditions need to improve in the northern tributary of North Fork Fortification Creek, locally known as the Billy George Creek area (Forest Plan p.1-3).

Long-term levels of organic matter and nutrients on all lands are maintained or improved (Soil Standard #6; Forest Plan p.1-6).

Protect, maintain, and perhaps enhance habitat for threatened, endangered and sensitive species (consistent with MA 5.11, and 5.13 and includes threatened and endangered species; Forest Plan pp.2-40, and 2-44).

Forage for livestock and wildlife is available and abundant in meadows, created openings, and forested stands with less dense overstories (MA 5.11; Forest Plan p.2-39).

Suitable acres for livestock grazing exist within the Black Mountain, Fortification, and Quaker Knob Allotments (Figure 3). Continued authorization of livestock grazing could be allowable within these allotments consistent with the following policies and mandates:

- The allotments contain lands identified as suitable for domestic livestock grazing in the Forest Plan Final Environmental Impact Statement (Appendix B pp.B-31 through B-40). Continued domestic livestock grazing is permissible, contingent upon meeting Forest Plan goals, objectives, standards, and guidelines (Chapter 1). It is USFS policy to make forage (on lands suitable for grazing) available to qualified livestock operators, consistent with land management plans (FSM 2203.1 [USDA 2003]; 36 CFR 222.2 [c]).

Chapter 2 – Alternatives for Management

2.1 Alternatives

Three alternatives were considered. These alternatives are consistent with the range of alternatives required for livestock management projects found in FSH 2209.13, section 94.1. References to “permitted livestock” apply to animals authorized under a Term Livestock Grazing Permit.

2.2 Alternative 1 – No Action – No Permitted Livestock Grazing

Under the No Action alternative, no livestock grazing would be permitted on the Black Mountain, Fortification, or Quaker Knob Allotments. The current permits would be cancelled and not issued to any other applicant. Current permittees would be given a one year phase-out period to adjust their operations; during this one year period they would be authorized to graze the allotment while the cancellation process proceeded (following 36 CFR 222.4(a)[8] and FSH 2209.13, section 16.1). During that one year phase-out period, livestock grazing would continue to follow the Term Grazing Permit.
terms and conditions and AOIs as described in Alternative 2 (Continue Current Livestock Grazing Management).

2.3 Management Common to Alternative 2 (Continue Current Livestock Grazing Management) and Alternative 3 (Proposed Action – Adaptive Management)

Upon completion of National Environmental Policy Act (NEPA) compliance and an associated NEPA decision, and if grazing is reauthorized, new AMPs would be prepared for the three allotments. The terms and conditions of the grazing permits would be modified or re-issued to conform to the NEPA decision. The following are conditions which would be part of grazing permits and AOIs:

- Allowable forage use by livestock and wild herbivores in riparian areas would be as follows:
  - Residual forage would average 6 inches of height in all riparian areas.
  - During a given year, streambank alternations should not exceed 20% on any stream (using a linear measure along a stream and defined types of disturbances).
- Remove livestock from the grazing unit or allotment when further use on key monitored areas would exceed the above allowable use criteria.
- Manage rangeland vegetation for a mixture of successional stages. Manage vegetation to allow for successional progress towards a desired condition.
- Manage sheep grazing to avoid heavy forage utilization and minimize trampling of vegetation and soil resources. Limit grazing of any given area to once per year (use not more than 30-40% forage by weight).
- As an average over time, plants would be given the opportunity to reach near full growth prior to grazing (deferment) or to attain substantial regrowth following grazing.
- Ensure that the more remote areas of the allotments are being used, not just the most convenient, in order to spread grazing pressure over each allotment rather than concentrate it in higher quality areas.
- In fire and harvest created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.
- In aspen stands, livestock grazing should be managed to contribute to the long-term health and sustainability of aspen.
- Noxious weeds would be treated as deemed necessary.

The following would also apply to both Alternative 2 and Alternative 3:

- All existing rangeland structural improvements would remain in place and would be maintained (normally by the permit holder as specified in the grazing permit), unless conditions were identified indicating a need for additional structural improvements. No new roads, fences, water facilities or structural improvements are currently proposed.
- There is currently one stock reservoir in the planning area, which is primarily within the boundary of the Quaker Knob Allotment, but which also provides a water source for the Fortification Allotment. This reservoir would continue to be used by livestock.
• Within the Fortification and Quaker Knob Allotments, the area surrounding the Freeman Reservoir, including Freeman Campground and the Sherman Youth Camp, would not be grazed. And the Freeman Reservoir would not be used as a stock water source or be maintained by the permittee (Figure 5).
• The three allotments would continue to be managed independently with no fence barriers between them.
• A system of annual deferred rotation would be used for grazing. This type of delayed livestock grazing would provide adequate time to allow plant reproduction, establishment of new plants, and/or to restore the vigor of existing plants. Sheep herders would be used to rotate sheep within allotments, to move sheep to new bedgrounds on a daily basis, to prevent sheep from crossing over into adjacent allotments, and to assure compliance with established terms and conditions of associated grazing permits.
• Purposeful placement of salt in upland areas would protect riparian areas by dispersing grazing.
• For all allotments, livestock would be moved to the next foraging area and/or removed from the allotment when maximum allowable use levels (e.g., using indicators such as available forage) were reached. This would occur even if this is earlier than the date livestock would normally be scheduled to move off a foraging area or allotment.
• Forest Plan standards and guidelines would apply.

Depending on annual weather, forage conditions, and livestock management practices, the permittee might not always be able to fully use their permitted AUMs (Table 1 in Section 2.4, below).

Alternatives 2 and 3 are considered to pose low potential for interaction between domestic and bighorn sheep (possible transmission of disease from domestic livestock). Neither the Forest Service nor Colorado Parks and Wildlife has identified and mapped any bighorn sheep habitat in the area. Further, the Black Mountain Planning Area contains forested cover types which impede movement of bighorn sheep, and the boundary of the planning area is approximately 35 miles from the closest bighorn sheep herd management unit and the associated RBS-37 Mount Zirkel bighorn sheep herd (identified as a low priority herd) (Colorado Parks and Wildlife 2012; Yost 2012).

2.4 Alternative 2 – Continue Current Livestock Grazing Management

Under Alternative 2, the Forest Service would continue to authorize permitted livestock grazing on the Black Mountain, Fortification, and Quaker Knob Allotments. Current permitted livestock class, numbers and season of use would be implemented as shown in Table 1.
Table 1. Current livestock management – numbers and season of use.

<table>
<thead>
<tr>
<th>Allotment Name</th>
<th>Livestock Numbers</th>
<th>Season of Use</th>
<th>Animal Unit Months (AUMs)(^1)</th>
<th>Acres</th>
<th>Suitable Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Mountain</td>
<td>979 ewe/lamb(s)</td>
<td>July 11 – September 10</td>
<td>599</td>
<td>7,518</td>
<td>2,314</td>
</tr>
<tr>
<td>Black Mountain</td>
<td>4 pack/saddle horses</td>
<td>July 11 – September 10</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fortification</td>
<td>950 ewe/lamb(s)</td>
<td>July 11 – September 5</td>
<td>534</td>
<td>2,986</td>
<td>2,166</td>
</tr>
<tr>
<td>Fortification</td>
<td>2 pack/saddle horses</td>
<td>July 11 – September 5</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quaker Knob(^2)</td>
<td>1000 ewe/lamb(s)</td>
<td>August 1 – September 1</td>
<td>148</td>
<td>494</td>
<td>478</td>
</tr>
<tr>
<td>Quaker Knob(^2)</td>
<td>2 pack/saddle horses</td>
<td>August 1 – September 1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>1,294</strong></td>
<td><strong>10,998</strong></td>
<td><strong>4,958</strong></td>
</tr>
</tbody>
</table>

\(^1\)An AUM relates to amount of forage that livestock consume in a month. One AUM equates to forage consumption by three ewes and their lambs for one month, or one horse for one month.

\(^2\)The Quaker Knob Allotment is permitted for 15 days use between August 1 and September 1.

2.5 Alternative 3 – Proposed Action - Adaptive Management

Design of the Proposed Action

The proposed action is designed to address the following considerations which were identified by the interdisciplinary team:

*Improve trends in riparian condition, increase species diversity and improve species composition in upland vegetation, and sustain or improve habitat for aquatic and terrestrial species.*

Livestock grazing has been indicated as a causative factor for degraded riparian ecosystem health on the northern tributary of the North Fork Fortification Creek within the Black Mountain Allotment, locally known as Billy George Creek (Figure 4). Extensive livestock grazing and trampling in both the upland and riparian areas of the Billy George Creek area have increased bare ground, which directly affects stream and riparian health. The vegetation composition of this area has also been negatively impacted, with at least one acre of Canada thistle and undesirable non-native grasses, including smooth brome and timothy. Project design minimizes the adverse impacts of invasive weeds.

*Provide adaptive management flexibility.*

An adaptive management strategy has been developed to provide flexibility, and to respond more effectively to environmental conditions and resource concerns in a timely manner.

*Better address diverse management concerns near Freeman Reservoir, Freeman Campground, and Sherman Youth Camp.*

At Freeman Reservoir, Freeman Campground, and the Sherman Youth Camp, livestock grazing has the potential to adversely affect visitors’ outdoor experience, sanitary conditions, and sensitive resources. Regarding management of allotments which include these areas, it is relevant to note that the Youth Camp is fenced but the campground and reservoir are not (Figure 5). Design criteria have been developed to reduce the potential for conflicts.
**Adaptive Management for the Proposed Action**

Under the proposed action, the Forest Service would continue to authorize livestock grazing on the Black Mountain, Fortification, and Quaker Knob Allotments, using an adaptive management strategy (FSH 2209.13, Chapter 90). Adaptive management is defined as an iterative process where land managers begin by implementing management practices designed to meet desired conditions in a timely manner. However, if monitoring shows that desired conditions are not being met, or if movement toward achieving the desired conditions in an acceptable timeframe is not occurring, then an alternate set of management actions are implemented to achieve the desired results.

Adaptive management as proposed under this alternative is either within the scope of effects analyzed for this EA, or else a supplemental NEPA document and decision would need to be prepared. Under the proposed action, monitoring would be used (as described below) to determine what adjustments are needed to ensure adequate progress toward desired conditions.

Under this adaptive management strategy, rangeland management would start with the same livestock numbers and seasons of use as Alternative 2 (Table 1, above).

Rangeland management (as described under Alternative 2 – Continue Current Livestock Grazing Management) would be modified and augmented as follows. For existing grazing permits and AOIs, the following conditions would replace those listed in Alternative 2 (above) and would be part of future grazing permits and AOIs:

- Allowable forage use by livestock and wild herbivores on upland sites would be as follows:
  - Not more than 30% within the Billy George Creek area (Figure 4).
  - Not more than 30-40% on remaining uplands within the planning area.
- Improve riparian and upland range condition in the Billy George Creek area (Figure 5) by reducing grazing pressure in the following way:
  - Upon entering the Black Mountain Allotment, sheep would be grazed in the Billy George Creek area for a period not to exceed three days.
  - When exiting the Black Mountain Allotment, sheep would be grazed in the Billy George Creek area for a period not to exceed five days or when bank alteration or allowable use on vegetation is reached.

**Monitoring for the Proposed Action**

Monitoring could result in an adjustment of permitted numbers of livestock or seasons of use for each allotment. This action would require a one year written notice to the permittee, consistent with 36 CFR 222.4(a)(8).

**Riparian Monitoring**

Monitoring would track riparian conditions. If monitoring showed that desired conditions were not being met, or if movement toward achieving the desired conditions in an acceptable timeframe were not occurring, then an alternate set of management actions would be implemented to achieve the desired results.

Long-term monitoring (five and 10 years after plan implementation) metrics correspond to effectiveness or trend monitoring. Short-term indicators would provide data on the type and degree of livestock impacts on a bi-annual (every two years) basis that are contributing to long-term trends. As part of the analysis for this EA, key areas (USDA 1996) were selected to reflect current riparian conditions and provide a baseline for adaptive action. These key areas are located on the northern tributary of the
North Fork Fortification Creek (Billy George Creek). Long and short-term monitoring indicators are as follows:

- **Long-term indicators** would be monitored the first year that the new management plan was implemented, and then repeated five and ten years afterwards. This would allow enough time to interpret effects upon riparian ecosystems due to changes in livestock management. The following long-term indicators would be used to monitor ecosystem and stream health:
  - Greenline – A measure of the linear variability and makeup of vegetation species in the first perennial vegetation on or near a waterway, relative to a baseline established the first year of monitoring.
  - Streambank stability – Degree to which a streambank is eroding or not eroding.

- **Short-term indicators** would be monitored every two years in the identified key area at the end of the grazing season. The short-term indicators would help to determine how livestock use may be affecting long-term riparian ecosystem conditions. A transect for short-term indicators was established in the Billy George Creek area as part of this analysis. The following metrics would be used as short-term indicators:
  - Stubble height – Residual forage height after livestock browsing.
  - Streambank alteration – A metric of wild and domestic livestock hoof activity.
  - Photo points – At all monitoring sites, permanent photo points would be established. These would provide a visual context to assist in data interpretation. If the data were showing significant changes, the photos could provide some information such as it being a wet versus dry year, recent livestock impacts, etc. Photos would be re-taken every two years. Photos could be compared between years to understand and/or determine changes that might be occurring, but not necessarily reflected in the collected data.

If monitoring along Billy George Creek indicates that

- riparian ecosystem conditions are not moving toward desired conditions, or
- are not consistent with Forest Plan standards and guidelines, and
- the bi-annual monitoring has indicated that livestock impacts are still occurring,

then adaptive management actions to further reduce livestock impacts would be implemented. If the short-term monitoring indicates livestock impacts are minimal, then no additional actions would be taken with regard to livestock grazing in these areas.

If long-term monitoring indicates a decline in resource conditions in any monitored reach, adaptive management actions, including reduction in season of use and/or number of livestock, would be required to improve resource conditions and meet Forest Plan standards and Watershed Conservation Practices direction (USDA 1997, FSH 2509.25).

**Upland Range Monitoring**

The following upland monitoring indicators are based on 1) applicability to the management and monitoring objectives, 2) statistical repeatability, and 3) minimal equipment requirements and time efficiency.

- Photo points – At all monitoring sites, permanent photo points would be established. These would provide a visual context to assist in data interpretation. If the data were showing significant changes, the photos might provide some information such as it being a wet versus dry year, recent livestock impacts, etc. Photos would be re-taken at intervals of approximately five years. Photos could be compared between years to understand and/or determine changes that may be occurring, but not necessarily reflected in the collected data.
• Line-point intercept – The line-point intercept method is a rapid, accurate way for assessing soil and vegetation conditions. Baseline data for the line-point intercept transect would be established following implementation and repeated at an interval of approximately five years. This method quantifies soil cover, including vegetation, litter, rocks and biotic crusts using measurements related to wind and water erosion, water infiltration, and the ability of the site to resist and recover from degradation (USDA 2009). This method also provides information on foliar cover, plant basal cover, bare ground/soil erosion risk, and changes in species composition.

**Design Criteria for the Proposed Action**

Design criteria have been developed to address potential adverse environmental effects or otherwise optimize project implementation. The following design criteria are required elements of the proposed action. Design criteria would be included in each allotment’s AMP and would be implemented through the issuance of grazing permits and AOIs.

**General**

• If newly discovered adverse impacts to threatened, endangered, Region 2 sensitive species (TES) or Routt National Forest species of local concern and/or their habitats are identified, management will work with the biologists or botanists to reduce those impacts, as appropriate. TES species include mammals, birds, reptiles, fish, amphibians, and plants. If appropriate, protection would occur through adjusting grazing management in the Annual Operating Plan. Timing restrictions might also need to be applied.

• Establish a no grazing buffer of approximately one quarter mile around the Freeman Campground and Freeman Reservoir (Figure 5). This 1) assures protection of the Freeman Reservoir Dam’s integrity of cultural resource and potential National Historic Register eligibility, and 2) better addresses diverse management concerns near Freeman Reservoir, Freeman Campground, and Sherman Youth Camp.

**Heritage**

• If any new actions are planned (e.g., constructing new allotment improvements), consult with cultural resource staff to determine if additional survey is needed prior to implementation.

• Additional cultural resource surveys to assess effects on historic properties are required before project implementation in the following cases: 1) In areas where existing improvements are present but were not included within the area sampled for the presence of cultural resources for this EA, 2) where existing improvements within the allotment boundaries will become of age for inclusion in the National Register of Historic Places, or 3) when existing improvements are to be improved or removed.

• Discovery: Any cultural and/or paleontological resources (historic or prehistoric site or object) discovered by any person working on the permittee’s behalf shall be immediately reported to the Forest archeologist. All operations in the immediate area of a discovery shall be suspended until written authorization to proceed is issued by the Forest archeologist. An evaluation of the discovery will be made to determine the appropriate actions to follow to prevent the loss of significant cultural or scientific values. Any decision as to proper mitigation measures to be taken will be made by the Forest archeologist after consultation with the Colorado State Historical Preservation Office.
• Education: Collection or disturbance of artifacts and other archaeological, historical, and paleontological materials by permittees or those working for them shall not be allowed. Offenders shall be subject to prosecution under the appropriate State and Federal laws. Forest permittees and permittee employees will be notified of the Discovery and Education stipulations in the Term Grazing Permits.

Plants
• Livestock shall not be trailed through or allowed to congregate within 300 ft. of any currently known or newly discovered rare plant populations. Exclosures for livestock could be constructed, if needed, to maintain viable populations

Raptors
• No salting, bedding, or supplement placement within ¼ mile of active Northern Goshawk nesting areas (known locations will be provided to the permittee during the annual meeting).

The Proposed Action is consistent with the goals and objectives in, and fully in compliance with, the Forest Plan, and incorporates appropriate guidelines for the Elkhead Mountain and Slater Creek Geographic Areas (GAs) and Management Areas (MAs) 1.32, 4.3, 5.11, and 5.13. MA 5.11 and MA 5.13, which comprise the majority of the GAs. MA 5.11 emphasizes abundant forage for livestock and wildlife in meadows, created openings, and forested stands with less dense overstories. MA 5.13 emphasizes abundance of forage in areas where timber harvest has occurred, in natural openings, and in meadows. Resource specific compliance with Forest Plan standards are further discussed in Chapter 3 and the project record.
Figure 4. Billy George Creek area, where adaptive management could benefit riparian and upland conditions.
Figure 5. Areas within the Black Mountain Planning Area which are excluded from livestock grazing.
Chapter 3 – Environmental Consequences

This section summarizes the potential impacts of the proposed action and alternatives for each potentially impacted resource. Full specialist reports are in the project record. See Appendix A for a history of the Black Mountain Planning Area and discussion of cumulative actions.

3.1 Amphibian, Fisheries, and Aquatic Habitat

Affected Environment

Black Mountain Allotment
The Black Mountain Allotment includes Willow, Fourmile, and the upper headwaters of Fortification Creeks. During field surveys, there were few visible signs of grazing impacts to streambanks and riparian areas, and aquatic habitats were in good condition. This is partially due to the dense forest cover, downed trees, and steep gradient of streams. Few impacts were observed along stream reaches containing Colorado River cutthroat trout (CRCT).

Riparian conditions, and therefore amphibian habitat conditions, are primarily in good condition. An exception occurs in portions of Billy George Creek, which are in poor condition.

Fortification Allotment
The Fortification Allotment includes the North, Middle, and South Forks of Fortification Creek and Cottonwood Creek. The riparian areas associated with these creeks were moderately impacted by grazing in low gradient reaches. Steeper and confined stream reaches received little grazing impact. Stock and beaver ponds have received moderate to heavy use but still provide habitat for amphibians and fish.

The North Fork Fortification Creek contains CRCT and northern leopard frog, which are Region 2 sensitive species. The stream reach with CRCT generally has a thick willow/alder community along the streambanks or beaver ponds resulting in minimal access to the stream by livestock. Northern leopard frog occur in beaver ponds along North Fork Fortification Creek where minimal impacts to habitat were observed. Northern leopard frog habitat in stock ponds varies from poor to good condition depending on the pond’s accessibility to livestock.

Quaker Knob Allotment
The Quaker Knob Allotment includes a number of stock ponds. Stock ponds have received moderate to heavy use but still provide some habitat for amphibians.

Environmental Effects

Endangered Species Act and Region 2 Sensitive Species Determinations

Federally Listed and Proposed Species
There are no threatened or endangered aquatic or riparian-dependent species or habitats documented within the Black Mountain Planning Area.

Region 2 Sensitive Aquatic Species
Three Region 2 sensitive aquatic species are known or thought to occur within the Black Mountain Planning Area. Rangeland management activities would occur near known and potential habitat for these species. Based on the effects analysis, some individuals may be 1) directly crushed by trampling and 2) indirectly affected by modified habitat conditions. The proposed grazing management would result in slight improvement to impacted areas. Therefore, the action alternatives “may adversely impact individuals, but not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing” for the boreal toad, northern leopard frog, and Colorado River cutthroat trout. Please refer to Table 2 for determinations by alternative.
Table 2. Determinations (by alternative) for R2 aquatic species.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Determination of Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alternatives 2 and 3</td>
</tr>
<tr>
<td>Boreal Toad</td>
<td><em>Anaxyrus boreas</em> boreas</td>
<td>R2 Sensitive</td>
<td>MAII&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Northern Leopard Frog</td>
<td><em>Lithobates pipiens</em></td>
<td>R2 Sensitive</td>
<td>MAII</td>
</tr>
<tr>
<td>Colorado River cutthroat trout</td>
<td><em>Oncorhyncus clarkii plueriticus</em></td>
<td>R2 Sensitive</td>
<td>MAII</td>
</tr>
</tbody>
</table>

<sup>1</sup> MAII = May adversely impact individuals, but not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

<sup>2</sup> NI = No Impact

Environmental Effects (All Amphibian and Fish Species)

**Alternative 1 - No Action – No Permitted Livestock Grazing**

Direct and Indirect Effects: Analysis of the effects of Alternative 1 considers the potential future condition of aquatic habitat if all domestic livestock grazing was removed from the planning area after one year. Direct and indirect effects for the first year would be the same as Alternative 2. Once livestock were removed there would be no potential for impacts to riparian areas or water quality from livestock grazing. Areas impacted by historic grazing would be expected to recover. Conversely, adverse impacts from wild ungulates and recreation activities would still be present and effect aquatic organisms and habitats. Fish and amphibian habitat in good condition would be maintained while the areas with moderate habitat conditions would likely improve. Based on current conditions within the planning area, little change would be expected, except in the area of Billy George Creek where meaningful long-term, benefits would likely occur.

Cumulative Effects: Cumulative effects only apply to the first year and would be the same as Alternative 2, for that time period.

**Alternative 2 – Continue Current Livestock Grazing Management**

Direct and Indirect Effects: The condition of fish and amphibian populations and aquatic habitats within most areas in the allotments would remain stable reflecting the effects of all past and current rangeland management activities. Habitat conditions would be expected to remain in moderate to good condition. Livestock trampling would have minimal direct adverse impacts to Colorado River cutthroat trout egg deposits, while the impacts from trampling by livestock to amphibian eggs and individuals would vary among stock ponds.

Cumulative Effects: No additional cumulative actions were identified. Therefore cumulative effects would the same as direct and indirect effects.

**Alternative 3 – Proposed Action – Adaptive Management**

Direct and Indirect Effects: Effects would be similar to Alternative 2. However, there would be improved riparian conditions along adversely impacted stream reaches, most specifically along Billy George Creek. Amphibian habitat associated with stock ponds would likely remain unchanged. Overall, the condition of fish and amphibian populations and aquatic habitats would stay the same with some localized improvements. Adaptive management would be expected to have as yet unknown beneficial effects.

Cumulative Effects: No additional cumulative actions were identified. Therefore cumulative effects would the same as direct and indirect effects.
3.2 Botany

Affected Environment
Field reconnaissance efforts included a pre-field review and a field survey. The pre-field review considered threatened, endangered, Region 2 (R2) sensitive species, and species of local concern (SoLC). This established a target list of species that may occur in or be affected by the project activities, based on potential habitat in the planning area. Surveys adhered to the National Resource Information Systems Threatened, Endangered and Sensitive Plants Protocol (USDA 2006), were conducted only on Forest Service land, and focused on target species identified in the pre-field review.

No threatened or endangered species are carried forward in this analysis because none are present in the analysis or planning area. R2 sensitive species and SoLC are analyzed. Species evaluated in this report which share similar biology and habitat are discussed as a group, and the effects discussion encompasses all species.

Environmental Effects
Region 2 Sensitive Species
The 2015 R2 sensitive species list consists of 86 species, of which 31 are known or suspected to occur on the Routt National Forest. Based on the pre-field review and field surveys, 12 R2 sensitive species had potential habitat in the planning area. None were found during field surveys. Field surveys identified potential habitat for three species that may have escaped detection. These species are carried forward in this analysis. Species with no known individuals and no potential habitat in the analysis area are considered to have a lack of suitable habitat. No further analysis is needed for species that are not known or suspected to occur in the planning area and for which no suitable habitat is present, and therefore the determination is “No impact.” Table 3 summarizes species carried forward for consideration.

Species of Local Concern (SoLC)
Based on the pre-field review and field survey, 80 SoLC were determined to have potential habitat in the planning area. Six species were found in the planning area, all in the Black Mountain Allotment. Because presence of six Botrychium species cannot reasonably be determined during surveys (e.g., due to small size, identification easiest during flowering stage), these species were assumed to be present and were carried forward in the analysis (R2 FSM 2672.43). Species carried forward in this analysis are summarized in Table 3.

Alternative 1 – No Action – No Permitted Livestock Grazing
Direct & Indirect Effects: After a one year period during which grazing permits were phased out, direct effects, such as grazing and trampling by sheep, would cease. Grazing and trampling by wildlife, however, would continue. Overall, there could be increased survivorship and fecundity of individuals and populations of species analyzed in this document. Direct effects of grazing and trampling are discussed in detail under Alternative 2 – Continue Current Livestock Grazing Management.

Removal of domestic livestock could result in changed species composition of plant communities. Cessation of livestock grazing in moist meadows could allow succession towards increased native species diversity in wetlands and riparian areas. Removal of livestock in and around stock ponds and wet areas could allow new or suppressed wetland species individuals to grow. Although the removal of livestock can be associated with decreased species richness and diversity, such decrease occurs primarily through reduction of grazing-tolerant, non-native species.
Alternative 2 – Continue Current Livestock Grazing Management
Direct & Indirect Effects: Direct effects would include grazing and/or trampling of individuals resulting in breaking, crushing or uprooting. Such impacts can physically damage individuals, populations, and/or the habitat where they grow. This can reduce growth, development and/or seed set, or cause mortality of individuals. Such impacts to individual plants can reduce population size, change meta-population structure, and potentially affect viability of the species. However, species evaluated in this report would continue to experience their current levels of disturbance.

Table 3. Region 2 Sensitive Species and Forest Species of Local Concern (SoLC) carried forward in this analysis.

<table>
<thead>
<tr>
<th>Name</th>
<th>Rank</th>
<th>Habitat Description¹</th>
<th>Potential in AA?</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carex diandra Lesser panicled sedge</td>
<td>R2</td>
<td>Montane and subalpine fens (Gage &amp; Cooper, 2006a). OBL¹ 9,000-10,000 ft. (Ackerfield 2015).</td>
<td>HAB</td>
<td>Trampling, grazing, hydrologic alterations</td>
</tr>
<tr>
<td>Sphagnum angustifolium Sphagnum</td>
<td>R2</td>
<td>Acid fens, float mats 7,000-12,000 ft. OBL¹. (Austin 2007).</td>
<td>HAB</td>
<td>Trampling, grazing, hydrologic alterations</td>
</tr>
<tr>
<td>Viola selkirkii Selkirk's violet</td>
<td>R2</td>
<td>Shady moist forests. 8,500-9,100 ft. (Ackerfield 2015).</td>
<td>HAB</td>
<td>Trampling, grazing</td>
</tr>
<tr>
<td>Athyrium felix-femina Common ladyfern</td>
<td>SoLC</td>
<td>Riparian areas and moist forest meadows in the spruce-fir and lodgepole pine zones at elevations from 8,500 to 11,000 ft. (Ackerfield 2015)</td>
<td>FOUND vicinity of NFSR 99.1B</td>
<td>Trampling, grazing, hydrologic alterations</td>
</tr>
<tr>
<td>Botrychium echo Reflected moonwort</td>
<td>SoLC</td>
<td>Alpine and subalpine meadows. 9,500 to 11,700 ft. (Ackerfield 2015)</td>
<td>FOUND vicinity of NFST 1144</td>
<td>Trampling, grazing, invasive species</td>
</tr>
<tr>
<td>B. hesperium Western moonwort</td>
<td>SoLC</td>
<td>Subalpine meadows and openings, spruce-fir forests. 8,500-11,500 ft. (Ackerfield 2015)</td>
<td>HAB</td>
<td>Trampling, grazing, invasive species</td>
</tr>
<tr>
<td>B. lanceolatum ssp. lanceolatum lance-leaved moonwort</td>
<td>SoLC</td>
<td>Subalpine meadows, openings in forests, and on rocky slopes. 9,000-12,200 ft. (Ackerfield 2015)</td>
<td>FOUND vicinity of NFST 1144</td>
<td>Trampling, grazing, invasive species</td>
</tr>
<tr>
<td>B. lineare (B. campestre) Narrowleaf moonwort</td>
<td>SoLC</td>
<td>Open subalpine slopes along the Continental Divide and grasslands along E. plains. 3,800-11,700 ft. (Ackerfield 2015)</td>
<td>HAB</td>
<td>Trampling, grazing, invasive species</td>
</tr>
<tr>
<td>B. minganense Mingan moonwort</td>
<td>SoLC</td>
<td>Subalpine meadows, openings in forests, and on rocky slopes. 9,000-12,000 ft. (Ackerfield 2015)</td>
<td>HAB</td>
<td>Trampling, grazing, invasive species</td>
</tr>
<tr>
<td>B. multifidum Leathery grapefern</td>
<td>SoLC</td>
<td>In fens, along streams, and in moist upper montane to subalpine meadows 6,700-9,500 ft. (Ackerfield 2015)</td>
<td>HAB</td>
<td>Trampling, grazing, invasive species</td>
</tr>
<tr>
<td>B. neolunaria (B. lunaria, B. crenulatum) Common moonwort</td>
<td>SoLC</td>
<td>Moist subalpine slopes, and alpine slopes. 10,500 to 12,000 ft. (Ackerfield 2015)</td>
<td>FOUND vicinity of NFST 1144</td>
<td>Trampling, grazing, invasive species</td>
</tr>
<tr>
<td>B. pinnatum Northern moonwort</td>
<td>SoLC</td>
<td>Forest openings and moist subalpine slopes. 9,500-11,000 ft. (Ackerfield 2015)</td>
<td>HAB</td>
<td>Trampling, grazing, invasive species</td>
</tr>
<tr>
<td>B. simplex Least moonwort</td>
<td>SoLC</td>
<td>Moist subalpine meadows, and forest openings along streams. 7,500-11,500 ft. (Ackerfield 2015)</td>
<td>HAB</td>
<td>Trampling, grazing, invasive species</td>
</tr>
<tr>
<td>Iliamna sp. Wild hollyhock</td>
<td>SoLC</td>
<td>Meadows, along streams, and creeks and on forest borders. 6,500-9,000 ft. (Ackerfield 2015)</td>
<td>FOUND vicinity of NFSR 99.1A.</td>
<td>Trampling, grazing, invasive species</td>
</tr>
</tbody>
</table>
### Rangeland Management in the Black Mountain Planning Area

#### Environmental Assessment

<table>
<thead>
<tr>
<th>Name</th>
<th>Rank</th>
<th>Habitat Description</th>
<th>Potential in AA?</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Listera convallarioides</em></td>
<td>SoLC</td>
<td>Shady, moist forests and along streams. 6,800-10,000 ft. (Ackerfield 2015)</td>
<td>FOUND vicinity of NFSR 99.1B</td>
<td>Trampling, grazing, hydrologic alterations</td>
</tr>
</tbody>
</table>

1\(^{OBL}\) – Wetland obligate species.

Invasive Species: Invasive species often occur where habitats are disturbed, including areas of livestock grazing. Invasive species can alter composition of native plant communities by displacing native plant species and increasing resource competition (Olson 1999). Noxious weeds can lead to detrimental habitat changes, potentially be lethal to native plants, and change mycorrhizal communities (With 2002).

Soil Compaction: Soil compaction could occur where livestock grazing is concentrated. Activities that compact soils can affect both soil micro-organisms and plants themselves.

Ground Disturbance: Ground disturbance can beneficially effect moonworts, which are mostly found in previously disturbed areas, and actions that clear or burn areas could, over the long-term, create habitat for these species.

Alternative 2 has limited flexibility with respect to altering grazing practices to prevent the spread of invasive species. However, weed control would continue as it has under current management.

**Alternative 3 – Proposed Action - Adaptive Management**

Direct & Indirect Effects: The direct and indirect effects of this alternative would be similar to those described for Alternative 2. However, Alternative 3 has greater flexibility to allow/implement grazing practices that could help control some populations of invasive species. Additionally, adaptive management could be employed to benefit overall vegetative conditions.

**Cumulative Effects for All Alternatives:** Cumulative effects are only evaluated for species with direct or indirect impacts from the alternatives, and limited to species identified in Table 3.

The species analyzed are all herbaceous perennials. Little detail exists regarding any of these species, particularly with respect to lifespan. The discussion considers only the planning area, and extends one decade prior to and forward from this report. Because historical population data are unavailable, it is unknown whether these species have always been rare or if management activities have made them less common across the landscape due to cumulative effects.

Specifically, within the past decade the following have contributed to cumulative effects:

- Bark beetle epidemic (~2010 – 2013) which killed the majority of lodgepole pine and left extensive areas of standing dead trees.
- Roadside hazard tree clearing (2011 – 2014) which removed dead trees within ~100 feet of open roadways to provide for public safety.

The bark beetle epidemic and subsequent roadside hazard tree clearing have both resulted in more open and in some places complete removal of the canopy. This has resulted in drier habitats with more solar radiation. The species discussed in this section typically occur in shadier, moister conditions. Surveys were conducted prior to roadside hazard tree clearances. Any rare plant populations detected were protected during implementation. None of the populations found during surveys for this project
were in or near these areas. It is therefore unlikely that the hazard tree clearances would contribute to the cumulative effects for this project.

The standing dead trees resulting from the bark beetle epidemic also resulted in extreme fuel loads. This creates potential for extreme fire events. Under the No Action alternative, these materials would remain on-site. As dead trees fall and the standing fuels are redistributed to ground, the likelihood of fire causing extreme soil damage increases. None of the plant species evaluated here, in fact few of any plant species known in the planning area, would likely survive or recover from extreme fire within a decade.

The actions and effects described above can be both additive and interactive to each other and to the direct and indirect effects described above. Because there are policies, standards and guidelines that limit effects to plant habitat, cumulative effects are not expected to result in any change in status or viability of plant species. Also, cumulative effects are not expected to contribute to an increase in any current or predicted downward trend in population numbers or density, or habitat capability that would reduce the existing distribution of any of the species carried forward into this analysis.

**Region 2 Sensitive Species and Species of Local Concern Determinations**

*Alternative 1 – No Livestock Grazing Permitted*

A determination of “Beneficial impact” was made for all species, because removal of livestock would decrease direct impacts from grazing and trampling which could directly lead to increased viability of individuals/populations. Additionally indirect effects, such as improved habitat conditions could help increase viability of populations. However, the degree of benefit would vary by species.

*Alternative 2 – Continue Current Livestock Management*

A determination of “May adversely impact individuals, but not likely to result in a loss of viability nor cause a trend to federal listing or a loss of species viability range wide” was made for all species in Alternative 2 because current activities would continue. Individuals and/or populations would continue to experience direct and indirect adverse effects of grazing and trampling. However, the degree to which a given species experiences these adverse effects will vary. In general, upland species are more likely to experience these effects than the wetland species evaluated here.

*Alternative 3 – Proposed Action – Adaptive Management*

A determination of “May adversely impact individuals, but not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing” was made for Alternative 3, because individuals and/or populations would continue to experience direct and indirect adverse effects of grazing. As with previous alternatives, individual species may experience greater and lesser degrees of effects within similar determinations.

**3.3 Heritage**

**Environmental Effects**

*Alternative 1 – No Action Alternative – No Permitted Livestock Grazing*

**Direct Effects:** In the short-term of the first year after the Alternative was implemented, direct effects would be the same as for Alternative 2 (see below). In the long-term, elimination of livestock grazing in the area would protect cultural resources from damage resulting from sheep (see Alternative 2, below). Effects to cultural resources, if present, would still result from natural events (e.g., unstable soils). There are no known reasonably foreseeable projects in the area which could further contribute to effects.
Indirect Effects: In the short-term of the first year after the Alternative was implemented, indirect effects would be the same as for Alternative 2 (see below).

Alternative 2 – Continue Current Livestock Grazing Management

Direct Effects: Livestock grazing can be considered a ground-disturbing activity. Impacts to cultural resources from livestock include the potential alteration or destruction of artifacts or cultural features on the surface of sites, as well as damage to site soil matrices and depositional strata (Horne and McFarland 1993). Potential results of livestock grazing activities include permanent damage, alteration, and destruction of historic period and prehistoric surface artifacts, features, and structures, as well as shallow subsurface cultural deposits. Some of these ground-disturbing activities include trampling, milling, and the creation of trails or well-worn routes by livestock movement through an area. Potential direct impacts might also include the destruction of archaeological contexts. Under the implementing regulations of Section 106 (36 CFR 800) of the National Historic Preservation Act and Forest Service Manual direction (USDA 2008a), sites considered not eligible to the NRHP may be directly affected once adequately recorded, evaluated, and concurrence is received from the State Historic Preservation Officer regarding NRHP eligibility.

Generally, this alternative is associated with limited effects to cultural resources. Implementation of this alternative would 1) result in losses limited to cultural resources not meeting qualifying criteria as sites (i.e., isolated finds), or 2) not affect those characteristics of a site that make it important, or 3) result in very low potential for effect. Lastly, in surveyed areas, recording and archiving basic information about each cultural resource for future reference serves to partially mitigate potential effects to cultural resources.

Indirect Effects: Grazing activities can lead to erosion and the subsequent indirect effect of exposure of cultural sites. Exposure could increase the chances of vandalism or artifact collection. This concern is addressed through heritage discovery and education stipulations included in Term Grazing Permits. Additional potential indirect impacts include artifact collection, vandalism, and erosion on the surveyed portion of the planning area. The discovery clause associated with grazing permit authorizations requires that discoveries not be collected, damaged, or moved. This may help reduce potential indirect effects and protect unidentified buried deposits.

Cumulative Effects: All projects that have been conducted in the past and will be conducted in the future, in which ground disturbing activities are proposed, have the potential to disturb or modify cultural resources. Additional possible short-term impacts could include direct destruction and/or modification of cultural resources by vehicles, equipment, or other human activities associated with rangeland management. Long-term impacts could include any resultant erosion, change in vegetation cover, and/or subsequent artifact collecting. When combined with the direct and indirect effects discussed above, cumulative effects for Alternative 2 would be adverse and long-term but would not be expected to be substantial.

Alternative 3 – Proposed Action – Adaptive Management

Effects would be similar to those for Alternative 2.

Direct Effects: Alternative 3 would benefit protection and management of cultural resources in several ways. Cultural resources are generally located close to water, where livestock tend to gather. Under this alternative direct effects to Freeman Reservoir would not be expected to occur because avoidance and monitoring measures would be in place to ensure that direct effects are either avoided or negligible.

Possible reduction in the overall numbers of AUMs could benefit Freeman Reservoir and previously unidentified cultural resources from negative effects. This is because domestic livestock can have
adverse effects by disturbing soils, and thereby change artifact assemblages. This can occur through fracturing, and through vertical or horizontal displacement.

**Indirect Effects:** Shorter duration grazing in the Billy George Creek area would cause less damage to vegetation than Alternative 2, resulting in less erosion. More stable soils would better protect artifacts, assemblages, and contexts in this specific area.

**Cumulative Effects:** The cumulative effects to cultural resources would be similar to those under Alternative 2, but would result in less disturbance to soils and added protection to Freeman Reservoir.

**National Historic Preservation Act Determination**
Because the only heritage site pertaining to a this planning effort is the Freeman Reservoir Dam, and a no grazing buffer would protect this site under all action alternatives, the Forest Service’s determination for this undertaking is “No adverse effect” to historic properties. The Colorado State Historic Preservation Officer concurred on January 29, 2016.

### 3.4 Hydrology

**Affected Environment**
The Black Mountain Planning Area lies within the Willow Creek-Spring Creek, Upper Fourmile Creek, Headwaters Fortification Creek, and Little Cottonwood Creek-Fortification Creek watersheds (Table 4).

**Table 4. Named streams in the analysis area, by watershed and allotment.**

<table>
<thead>
<tr>
<th>Watershed</th>
<th>Streams within the watershed</th>
<th>River basin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willow Creek-Spring Creek</td>
<td>Willow Creek</td>
<td>Little Snake River</td>
</tr>
<tr>
<td>Upper Fourmile Creek</td>
<td>Headwater tributaries to Fourmile Creek</td>
<td>Little Snake River</td>
</tr>
<tr>
<td>Headwaters Fortification Creek</td>
<td>North Fork Fortification Creek; South Fork Fortification Creek</td>
<td>Yampa River</td>
</tr>
<tr>
<td>Little Cottonwood Creek-Fortification Creek</td>
<td>Little Cottonwood Creek</td>
<td>Yampa River</td>
</tr>
</tbody>
</table>

**Measures for Analysis of Effects**

**Water Quality**
State water quality designations include four uses within the hydrological analysis area. These designations require that streams and water bodies be: 1) capable of sustaining a wide range of coldwater biota including sensitive species, 2) suitable for recreation on or about water bodies, 3) suitable for drinking following standard treatment procedures, and 4) suitable for irrigation and livestock consumption. In accordance with these designated beneficial uses, minimum state water quality standards have been established. None of the streams in the analysis area have been listed as impaired on the Colorado 303(d) list (Colorado 2016). The analysis area does not serve as a municipal watershed.

**Watershed Condition**
In the Forest Watershed Condition Assessment (USDA 2010b), all of the affected watersheds were classified as Condition Class 1 due to minimal past disturbances. Condition Class 1 watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition. Past management impacts to watershed conditions include timber harvest and associated roads, construction and operation of the Freeman Reservoir, and recreation including the use of Freeman Creek Campground, non-motorized trails, and dispersed recreation such as hunting.
Riparian Ecosystem Health

Wetlands and riparian areas occur throughout the hydrologic analysis area, both adjacent to stream channels and off channel; wetland and riparian areas are generally in good condition. The Routt National Forest Riparian Inventory (USDA 1993), National Wetland Inventory (USDI 2011), and field reconnaissance were used to identify wetland and riparian locations. For the purpose of this analysis, wetlands are considered a subset of riparian areas.

The existing condition for riparian ecosystem function was evaluated relative to its capability (this measure of capability is unrelated to the use of the same word related to rangeland management, where it pertains to livestock forage availability). For this hydrologic analysis, capability is defined as the highest ecological status a riparian-wetland area can attain given political, social, or economic constraints (USDI 1998).

The following are tools for measuring riparian ecosystem health:

- **Proper Functioning Condition (PFC) Surveys:** Where appropriate, PFC surveys (USDI 1993) were conducted to assess riparian health. Riparian areas are considered to be in “proper functioning condition” when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows, with consideration of surrounding factors such as geology, land slope, and soil conditions. Riparian areas are considered “functional at risk” when an existing soil, water, or vegetation attribute makes them susceptible to degradation. PFC surveys were conducted on the South Fork Fortification Creek, and northern tributary of the North Fork Fortification Creek, locally known as Billy George Creek. The PFC survey on the South Fork Fortification Creek was rated as very high PFC meaning that there was very little if any room for an improved condition.

The PFC survey on Billy George Creek was rated as “proper functioning condition,” but on the border line of “functional at risk.” Concerns included extensive trampling of the areas adjacent to the stream channel and riparian area, and low vigor in the riparian plants. There is a concern that this reach may be on a downward trend due to extensive livestock use. The trampling in the upland areas has resulted in substantial bare ground which indirectly affects stream and riparian health. The increase in bare soil results in increased surface erosion which both increases peak flows and sediment delivery to the stream system.

- **Multiple Indicator Monitoring (MIM):** A riparian condition survey based on the MIM method was done on Billy George Creek as follow up to the concerns noted in the PFC survey. The MIM protocol is designed to monitor streambanks, stream channels, and streamside riparian vegetation, integrating annual grazing use and long-term trend indicators, which allows for evaluation of livestock grazing management (USDI 2011).

The MIM survey found that 74% of the streambanks were stable (26% unstable) and that average height of grazed sedges was 6.6 inches (within Forest Plan standards). However, the greenline indicated that riparian plant communities may not be adequate to protect streambanks during high flows. The MIM survey also showed only minimal woody shrub cover, especially considering the extent of alders and willows in the Billy George Creek area, which provide desirable cover.
A review of monitoring methods for livestock grazing found that a combination of stubble height and bank alteration monitoring coupled with use compliance (correct livestock numbers in the correct pastures at a specified time) to be effective in meeting the longer term goal of improving greenline ratings and streambank stability (University of Idaho, 2004).

Environmental Effects

**Alternative 1: No Action – No Permitted Livestock Grazing**

Direct and Indirect effects: Under this alternative, after the initial one year phase-out of grazing permits (during which effects would be the same as for Alternative 2), there would be no potential for adverse impacts to riparian or wetland areas, stream health, or water quality from livestock grazing. There would be no potential for livestock grazing to contribute to elevated *E. coli* levels on the Forest (*E. coli* is an important potential element of water contamination, especially related to human health). However, human, wildlife, and livestock sources such as horses would still be present, and could continue to affect bacterial concentrations, stream health and riparian condition.

The following could affect hydrology in the hydrological analysis area: 1) roads, 2) timber harvesting, 3) livestock grazing, 4) recreation, and 5) wildfire. All of these activities have the potential to adversely affect riparian and stream health.

Riparian areas currently at “proper functioning condition” would remain so. Billy George Creek, which was categorized as bordering “functional at risk,” would be expected to improve and then remain in “proper functioning condition.” Greenline ratings in Billy George Creek would improve due to less browsing, although browsing by wildlife could still occur. Over time, the amount of bare ground in the uplands would be expected to decrease. Billy George Creek would likely recover to a greater extent than under Alternative 2 or 3.

**Alternative 2 – Continue Current Livestock Grazing Management**

Direct and Indirect effects: This alternative does not include adaptive management principles to adjust management as needed to ensure improvement in identified resource concern areas, so it is uncertain whether this alternative would improve riparian ecosystem health and improve upland conditions, because management and environmental conditions (e.g., climate) would be similar but perhaps not identical to that in the past. Under this alternative, hydrological conditions would likely remain similar to the existing condition. Creeks currently in “proper functioning condition” would be expected to remain so. Billy George Creek could decline to a “functional at risk” rating. The consistency with the Forest Plan for Water and Aquatic Standard 4 is less certain than Alternatives 1 and 3.

Cumulative effects: Cumulative effects would include those from the cumulative actions discussed in effects of Alternative 1, with the addition of effects from livestock as managed under Alternative 2. The potential for livestock grazing to contribute to *E. coli* levels, along with human and wildlife sources, would remain. Overall water quality would be expected to be maintained or improved, as would other hydrologic measures due to relative consistency of trends due to direct and indirect effects described above.

**Alternative 3 – Proposed Action - Adaptive Management**

Direct and Indirect effects: Under this alternative, conditions would be similar to those under Alternative 2, although conditions in areas of concern would improve due to management which would maintain and improve riparian conditions, stream health, and water quality. There would be an upward trend in hydrologic resources, although at a slower rate than under Alternative 1. Limiting the time sheep spend in the Billy George Creek area at the start and end of the grazing season would minimize the potential
for overgrazing, and likely allow vegetative recovery of both riparian and upland species. Additionally, monitoring would help to ensure improved riparian and upland conditions, and adaptive management measures would be used to achieve desired conditions.

**Cumulative effects:** Cumulative effects would be similar to Alternative 2 although with more certainty of improvement of identified areas of concern due to upward trends as described under direct and indirect effects described above. Greenline ratings along Billy George Creek would improve, although at a slower rate than in Alternative 1.

### 3.5 Rangeland Management

**Affected Environment**

**Black Mountain and Fortification Allotments**
The primary areas used by sheep are dominated by aspen with a forb understory. These forbs provide the most abundant forage in mid to late summer, when they are in flower. Late summer showers may generate re-growth of these plants for additional forage. After the forbs have cured and gone to seed, sheep use grasses and sedges in meadows and on open hillsides.

Heavy grazing and trampling of vegetation on upland and riparian areas in the Billy George Creek area, observed in surveys in 2014, demonstrated a need for a change in management. The current condition in this drainage is likely caused by the amount of time that sheep congregate there while entering and exiting the Black Mountain and Fortification Allotments from the adjacent private land. There are no other access points where sheep can be moved onto or off of the allotments. Salting the sheep within the riparian area has also contributed to the poor vegetative condition. The permittee has been notified of this issue and will instruct the herders not to do this in the future. However, the 2014 surveys showed that overall in the Black Mountain and Fortification Allotments, current management has been consistent with meeting Forest Plan objectives. Rangeland suitable for domestic livestock grazing has shown a trend of meeting or moving toward desired conditions.

**Quaker Knob Allotment**
Plant communities in this allotment are similar to those in the Black Mountain and Fortification Allotments. Because, under current management, the Quaker Knob Allotment has had flexibility in timing of use, maximum allowable use has occurred while still maintaining acceptable vegetative cover. An inspection made in 2014 showed the allotment to be in good vegetative condition. There are no known resource concerns at this time.

**Invasive Species – All Allotments**
The Routt National Forest complies the Colorado Noxious Weed Act (35-5.5 Colorado Revised Statute), which establishes a noxious weed list with prioritized management goals for weeds (e.g., eradication, containment or suppression). In the planning area, there are no known infestations of species which require eradication. Canada thistle occurs in the planning area, however its occurrence in Moffat County is so widespread that suppression is the only practical management objective.

**Environmental Effects**

**Alternative 1 – No Action – No Permitted Livestock Grazing**

**Direct and Indirect Effects:** Following the initial one year phase-out of grazing permits, there would be no direct effects to forage species from sheep grazing and trailing that currently occurs on an annual basis. There would no longer be direct impacts from livestock on streambanks. There would be no grazing of aspen saplings or riparian shrubs by sheep. Vegetation would continue to be managed toward
desired conditions including the treatment and eradication of noxious weeds where possible. Range improvements such as stock dams could be removed and the natural drainage restored. Fences along the forest boundary would need to be maintained to prevent domestic livestock from entering the national forest. This maintenance is typically the responsibility of the adjacent private land owners.

The overall effect of no livestock grazing on rangeland condition would be beneficial for the first few years. The vegetation that had been heavily grazed on a consistent basis in the past would improve in vigor and re-establish a more extensive root system, and aspen would be expected to regenerate more rapidly. Those upland areas capable of producing more vegetative cover would experience a beneficial indirect effect of increased litter accumulation and decreased bare ground. This matting and accumulation of dead plant material would insulate the ground, providing improved water-holding capacity and a decrease in surface soil movement and erosion.

In the absence of domestic livestock, and depending on the intensity of elk grazing, plants that have evolved with grazing (e.g., particularly bunchgrasses like Idaho fescue) could experience an adverse effect due to less grazing, becoming stifled and ingrown. Eventually the centers of the base of the bunchgrass could become decadent, lose vigor, and die off.

The cover of the tall forbs component beneath the aspen canopy would revert to the composition that existed before the combined effects of grazing by both elk and domestic sheep. This intensity of grazing has decreased some desirable species.

The removal of livestock grazing and its associated activities (e.g., the presence of riders, herders, dogs, noise from sheep, etc.) would likely expand the geographic extent of seasonal elk grazing patterns.

Alternative 2 – Continue Current Livestock Grazing Management

Direct and Indirect Effects: Continuation of current grazing levels on the uplands of all three allotments would likely sustain desired plant species and their communities (aside from in the Billy George Creek area). The riparian plant communities (aside from in the Billy George Creek area), comprised of well-established willow cover or streambanks protected by deep rooted vegetation and/or large rocks, would continue to show minimal impacts from sheep grazing.

Current management would not improve rangeland conditions in the Billy George Creek area. Areas of bare soil would persist, supporting Canada thistle which typically occurs in areas of ground disturbance. Canada thistle has little or no forage value, so it cannot be influenced through more intensive grazing. Only treatment by herbicides has proven effective for reducing infestations, and although treatment would continue under current management, given the remoteness of these allotments, control would reduce but not contain spread. Although Canada thistle would be monitored and treated with herbicides, treatment would be less effective under current grazing management than under Alternative 1, because the level of ground disturbance would remain unchanged or increase. Sheep would tend to avoid areas dominated by thistle and potentially graze adjacent forage more heavily, resulting in increased thistle cover.

Current management would be limited to established dates during which livestock could occupy the allotments. There would not be flexibility to respond to changes in environmental conditions and events on a year-to-year basis. (Because changes in weather patterns effect the timing of vegetative growth, livestock grazing is optimally as flexible as changes in rangeland conditions). Due to lack of flexibility 1) livestock would be adversely affected due to grazing forage which is not at the optimal stage of growth, and 2) forage would be adversely affected due to being grazed when it is more susceptible to damage.
**Cumulative Effects:** Past timber projects, various historic livestock grazing management, development of recreation and transportation infrastructure, current recreational use, and treatment of Canada thistle are the main cumulative actions for rangeland management. There are no known reasonably foreseeable actions in the planning area.

The cumulative effect of past actions has led to the current existing condition, which is generally satisfactory with some site specific degradation (e.g., Billy George Creek area). Cumulative effects are the incremental contribution of management, as outlined in the direct and indirect effects above, when combined with the effects of the cumulative actions outlined in the previous paragraph. The cumulative effect of continuing current management would mostly result in a static or very slow upward trend for upland, riparian and forested (aspen) vegetative conditions. However, there could be an adverse trend of expansion of bare ground and Canada thistle in some areas, but this would likely be very slow and almost negligible over time. In the Billy George Creek area, even with the treatment of Canada thistle, the re-establishment of grasses and forbs would be difficult at best.

**Alternative 3 – Proposed Action – Adaptive Management**

**Direct and Indirect Effects:** Aside from effects resulting from a change in management for the Billy George Creek area, direct and indirect effects would be the same as under Alternative 2.

Within the Billy George Creek area there would be a direct beneficial effect due to limiting grazing duration and treating the most heavily infested areas of Canada thistle. Because Canada thistle is a deep rooted species and resilient to disturbance, it could take several years before a substantial reduction occurred. Limiting the intensity of grazing in the uplands and riparian areas coupled with aggressive treatment of Canada thistle would provide opportunity for increased cover of grasses and forbs over existing areas of bare soil, due to the opportunity to produce seed and develop more substantial root systems. Conversely, displacement of sheep within the Black Mountain Allotment could result in adverse impacts in adjacent areas, from more intense grazing.

**Cumulative Effects:** The current existing condition under Alternative 2 is taken as the baseline. There are no additional cumulative actions. The effects of Alternative 3 would be similar to Alternative 2 but with the opportunity for re-establishing grasses and forbs on areas of bare soil and reducing the cover of Canada thistle. Due to displacement of sheep out of the Billy George Creek area, there could be a small incremental adverse effect to vegetation throughout the rest of the Black Mountain Allotment. However, there would likely be an overall beneficial trend for vegetation in the planning area over the long-term.

### 3.6 Social and Economic Analysis

**Social and Economic Effects Common to All Alternatives**

Residents in Moffat County will be most likely to experience the direct social and economic impacts of actions which may be authorized by the decision associated with this environmental assessment. Participation by permittees and others in the ranching business in a variety of community, charitable, social, church, and school groups would be expected to remain high. Social associations among ranchers would be expected to remain in place under both action alternatives. Some organizations and informal gatherings might experience minor changes in participation under these alternatives, but this might be more attributable to ongoing changes in the cultural and population makeup in Moffat County, rather than a consequence of any alternative. Finally, the alternatives would have no meaningful effect on public health and safety.
Social Effects

**Alternative 1 – No Action – No Permitted Livestock Grazing**

Following a one year phasing out of permitted grazing, the elimination of grazing on these allotments would considerably affect permittee operations and possibly ranch viability. Some ranching operations could be shut down if a substitute for the loss of summer forage could not be obtained. Under this alternative, any operation forced to sell, and therefore go out of business, would be perceived by local residents as directly caused by the elimination of livestock grazing on federal land, potentially causing discord between the Forest Service and the community. The sale of ranch properties in Colorado often invites development and changes in land use; such changes could increasingly be expected in this part of Moffat County. Families and groups in the smaller communities could experience a variety of lifestyle changes.

People and entities preferring livestock free areas on national forest land would be positively affected by the implementation of this alternative.

**Alternatives 2 and 3 – Continue Current Livestock Grazing Management and Proposed Action - Adaptive Management**

Because these alternatives retain forage opportunities for permittee operations, there would be no broad-scale changes expected in the social demographics of the area. Those who would like to see an end to grazing in the area would continue to have concerns associated with the use of forage by livestock on national forest lands.

Economic Effects

**Alternative 1 – No Action – No Permitted Livestock Grazing**

The economic impacts of this alternative would be the greatest for permittees, their employees, and to a limited extent, the local economy. Some jobs would be directly affected following a one year phasing out of the grazing permits.

Because this analysis does not consider the permittees’ personal business and financial information (e.g., profit margin, real estate, equipment, other personal property investments, total debt, etc.), it is difficult to assess whether a ranching business would become unviable under this alternative.

It could compel the permittees to rent or buy additional pasture or purchase additional feed to maintain their current livestock numbers. Although this would be an additional expense for the permittees, it could create economic opportunity for the suppliers of these products and/or needs. When working ranches have ceased operations during the past decade, vacant ranchland has sometimes been sold to developers, thereby potentially increasing sub-divisions and the loss of open space.

Indirect effects due to reduced spending by potentially displaced ranch workers in the local community is possible but considered negligible because displaced local workers would still purchase basic needs. Foreign ranch workers are provided food by their employers (those who hold grazing permits), and employers might cease such purchases, which are negligible in a county-wide context.

**Alternatives 2 and 3 – Continue Current Livestock Grazing Management and Proposed Action - Adaptive Management**

Changes to permittee operations, and therefore the local economy, would be minimal under Alternative 2 or 3. Beneficial indirect effects would continue due to spending related to basic needs of the ranching operation employees.
Environmental Justice
This analysis is intended to evaluate some effects on demographics of minority populations and low-income populations of communities, for the purpose of assessing environmental justice concerns. Environmental justice considers the effects of decisions related to the environment upon vulnerable sectors of the human population.

Relative to the decision resulting from this EA, the populations potentially affected by environmental justice are primarily the employees of the affected ranching operations. These employees include both local residents and foreign labor.

Alternative 1 – No Action – No Permitted Livestock Grazing
Although it is not possible to forecast the exact response of ranching operations to termination of grazing permits, it could result in loss of employment to local residents and cancellation of labor contracts for foreign workers. While wages for these two categories of workers vary, most of these workers could be considered economically disadvantaged by US standards. This alternative could have adverse effects for environmental justice.

Alternatives 2 and 3 – Continue Current Livestock Grazing Management and Proposed Action - Adaptive Management
Alternatives 2 and 3 would continue to provide employment opportunities for potentially economically disadvantaged local and foreign contract labor.

3.7 Soils
Affected Environment
Livestock grazing causes soil compaction, particularly when grazing occurs on moist soils. When soils are saturated or near field capacity, puddling may also occur. To limit compaction, the season of use and on/off dates established in the AMP can help limit livestock use when soils are too moist in the spring and remove livestock at the appropriate times in the fall (Lull 1959). Additionally, low elevation pastures have historically been grazed later in the grazing season when soils are drier, especially on the western side of the allotments where Cottonwood and Fortification Creek assume a lower elevation and the soils are a finer texture. In years when an extremely heavy snow pack or a very wet spring has occurred, the dates livestock have been allowed onto the allotment were delayed to allow soils to dry out sufficiently so that compaction/puddling damage has been minimized. Some compaction/puddling damage has occurred during summer thunderstorms common to the higher elevations, but these storms are generally not widespread, are often of short duration and high intensity, and the detrimental damage associated with them has often been limited to where livestock concentrate. The dates in the spring when livestock have historically begun grazing have been adjusted from year to year, depending on range readiness. The range is generally ready for livestock grazing when soils are sufficiently dry and sufficient forage has been produced to support the livestock.

Elk use occurs throughout the allotments. Heavy use by elk likely occurs during calving season. Because it is not possible to quantitatively separate elk and livestock use, effects are considered relative to the existing condition.

Soil resources within the analysis area vary from one location to another. The area contains dozens of points where soil samples were excavated and evaluated. All sampled areas were determined to be under the 15 percent Forest Plan threshold for detrimental soil disturbance. Ground cover in all areas surveyed was found to be sufficient to control accelerated erosion. Impacts to soils, due to grazing of livestock or other ungulates, have occurred in small areas, usually less than one acre. For example, a
transect was conducted within the Cottonwood Creek and Fortification Creek drainages, in the Quaker Knob and Fortification Allotments. Ground cover was found to be sufficient to control accelerated surface erosion. Detrimental soil disturbance was estimated at less than 10 percent.

**Environmental Effects**

Livestock grazing causes some loss of residual plant litter, primarily through trampling. The allowable use of forage specified in the AMPs restricts the amount of forage removal, which ensures that sufficient litter remains on site for erosion protection (Hart 1993). Range program monitoring has shown that when specified allowable use of forage is adhered to, there is adequate ground cover (vegetation and litter) to protect the soil from excessive erosion. Only in the areas of heavy livestock concentrations (around water developments, salt grounds, and bedding grounds) are ground cover/ litter amounts lower than desired for adequate soil protection.

*Alternative 1 - No Action – No Permitted Livestock Grazing*

Current areas of compacted soils would most likely recover very slowly as vegetative communities returned and matured. The rate of recovery of compaction is still not well defined, but it appears that compacted conditions persist for decades. Most improvements occur between 20 to 40 years (Lull 1959). Current levels of erosion would continue in the short-term, but then decrease to lower levels as vegetation returned to areas that were previously dominated by bare soil. Natural soil movement, such as soil sloughing and landslides, would continue.

*Alternative 2 – Continue Current Livestock Grazing Management*

Deferred grazing rotations support plant and soil recovery through 1) opportunity to adjust the time and timing of grazing, 2) allowing some plants to go completely to seed prior to grazing, and 3) opportunity for plant regrowth.

Upland areas presently receiving moderate grazing use, having adequate plant litter and cover, and receiving sufficient recovery time following grazing, would be expected to have gradually improving soil conditions, moving toward increasingly desirable conditions.

In conclusion, areas that currently demonstrate beneficial ecological trends would probably continue to show improvement under this alternative, and areas of acceptable concern and degradation would likely remain.

Because exact effects on soils from past actions cannot be quantitatively determined, the resultant current existing conditions are taken as a baseline, which is recognized as an adversely altered condition. These existing conditions and trends would combine with effects from Alternative 2 to produce cumulative effects. Adverse effects from past actions would be lessening over time, and in combination with rangeland management effects on soils, conditions would not exceed any Forest Plan standards for the soil resource.

*Alternative 3 – Proposed Action – Adaptive Management*

Effects would be similar to Alternative 2. However, under Alternative 3, due to addressing adverse resource impacts near Billy George Creek (using adaptive grazing management), soil conditions in that area would be notably improved.

Because exact effects on soils from past actions cannot be quantitatively determined, the resultant current existing conditions are taken as a baseline, which is recognized as an adversely altered condition. These existing conditions and trends would combine with effects from the proposed action to
produce cumulative effects, as explained under Alternative 2, except that conditions in the Billy George Creek area would meaningfully improve over the long-term.

Compliance with Regulatory Framework
Based on the environmental consequences of the alternatives, all three would comply with the Forest Service Region 2 soil quality standards and the Forest Plan standards and guidelines (USDA 1997).

3.8 Wildlife

Affected Environment
No concerns for trends toward federal listing or loss of population viability were raised for R2 sensitive species. If a concern were to arise, then appropriate protections would be incorporated in the Term Grazing Permits under Alternative 2, or per the design criteria for Alternative 3.

There is one federally listed species within the analysis area for wildlife – Canada lynx.

A Lynx Analysis Unit (LAU) is an area within which direct, indirect, and cumulative effects analyses are conducted for Canada lynx. The Black Mountain Planning Area is contained entirely within the Elkhead Mountains LAU. This LAU is in the northwest portion of the Hahns Peak/Bears Ears District, and has seen little impact from management actions during the last 30 years. Other than grazing, the area is largely used for recreation such as hunting, OHV use, hiking, camping, and outfitting/guiding.

Environmental Effects
Alternative 1- No Action – No Permitted Livestock Grazing

Direct Effects: Lynx will travel through meadows, shrublands, and aspen stands during movement or population dispersal periods. After a one year period of phasing out grazing permit and removal of livestock, direct disturbances to lynx from livestock grazing in upland and riparian areas during periods of dispersal or foraging would be eliminated. During the initial year when livestock grazing continued, effects would be the same as under Alternative 2.

Indirect Effects: Willow and riparian habitats are used by lynx for foraging of their primary prey species (snowshoe hare) and also alternate prey species (e.g., blue grouse, gophers, and other small mammals). Though it is important to note that this area has minimal willow riparian habitat, sheep grazing has affected such areas. Other prey species rely on other riparian communities (e.g., carex, sedge, etc.). The effects of ungulates may have reduced potential foraging habitat for prey species, which could have resulted in an indirect, adverse effect on lynx. Removing livestock from the allotments could allow these habitats to recover at a faster rate than under Alternative 2 or 3 (with grazing pressure from both wild and domestic ungulates). With the removal of livestock, it is anticipated that riparian communities would begin improving within a few years. Therefore, positive, indirect effects to lynx, over the mid and long-term, would be anticipated due to improved foraging habitat.

Endangered Species Act Determination for the Canada lynx under Alternative 1: The negative direct and indirect impacts to lynx and lynx foraging habitat from livestock grazing would be eliminated with the removal of livestock. Riparian areas impacted from years of wild and domestic ungulate grazing pressure would be expected to begin to recover and improve over the long-term, following a one year phase-out of grazing permits. This would increase prey and improve foraging for lynx. The determination for Canada lynx under Alternative 1 is “No effect.”
**Alternative 2 - Continue Current Livestock Grazing Management**

*Direct Effects:* The direct effects to Canada lynx due to grazing livestock, such as disturbance of individuals during periods of population dispersal and foraging, would continue to occur over the short, mid, and long-term.

*Indirect Effects:* Within the planning area, wild or domestic ungulate grazing may have impacted Canada lynx foraging habitat and its ability to support prey species in both upland and riparian areas. Current patterns of livestock and ungulate forage use would be expected to continue, with possibly compromised forage availability. This could have negative, indirect effects to Canada lynx.

*Cumulative Effects:* The Elkhead Mountains LAU lies within the northwest portion of the Routt National Forest, and this remote portion of the forest has seen little impact in comparison to many other areas of the forest. There has been some historic timber harvest in the LAU, and most of the harvest areas were east of the Black Mountain Allotment. One harvest area within the allotment includes the area around National Forest System Road 109; these harvests took place about 30 years ago and have regenerated into immature mixed conifer stands. There are large private parcels on the northwestern boundary of the LAU that include sparsely populated subdivisions that are outside of the LAU. It is not known what management actions are occurring on these private lands or how they may affect the lynx habitat in the LAU. The Forest Service is not aware of any reasonably foreseeable activities on private lands in the Elkhead Mountains LAU that would affect lynx. The adjacent lands are used for ranching and livestock production. The southwestern part of the LAU, where the Black Mountain Allotment is found, is primarily ranchland outside of Craig, Colorado. Current cumulative actions within the planning area include recreational use of Freeman Reservoir and the Sherman Youth Camp. All approved federal actions have been incorporated into the environmental baseline. There are no other relevant foreseeable future actions or effects or connected actions on state, tribal, or private lands. Because none of the above potential cumulative actions is believed to meaningfully affect Canada lynx, cumulative effects would be the same as combined direct and indirect effects.

**Endangered Species Act Determination for the Canada lynx under Alternative 2:** Under current management, the existing condition of the planning area meets the Grazing Management objectives, standards and guidelines identified in the Southern Rockies Lynx Amendment (SRLA) (USDA Forest Service 2008b). However, continued livestock grazing could affect lynx prey base habitat by altering the composition and structure of vegetation species. These impacts are consistent with those that have been occurring in the planning area for decades and do not represent new effects to lynx. Over the long-term, impacts to vegetation that may influence lynx prey would be anticipated to increase. The determination for Canada lynx under Alternative 2 is “May affect, but not likely to adversely affect.”

**Alternative 3 – Proposed Action - Adaptive Management**

*Direct Effects:* Effects would be similar to those under Alternative 2. However, under adaptive management conditions would improve over the long-term. If livestock numbers were reduced, the level of direct disturbance to lynx during movement periods or foraging would be reduced in the Black Mountain Allotment.

*Indirect Effects:* At this time, riparian areas appear to be functioning properly, except in the vicinity of Billy George Creek. Under Alternative 3, the Billy George Creek area would have less grazing pressure because of a shorter duration of livestock grazing. Through the adaptive management approach, it is anticipated that willow and riparian communities would begin improving within a few years. Therefore,
positive, indirect effects (improved riparian conditions) over the mid and long-term would be anticipated, which would provide improved foraging habitat for lynx.

**Cumulative Effects:** As described under Alternative 2, there would be no relevant cumulative actions. Therefore, cumulative effects would be the same as combined direct and indirect effects for Alternative 3.

**Endangered Species Act Determination for the Canada lynx under Alternative 3:** Domestic livestock grazing has been recognized as a factor influencing the decline or loss of aspen as a seral species in subalpine forests. In riparian areas within lynx habitat, large ungulate forage use levels may result in competition for forage resources used by lynx prey (Ruediger et al. 2000). The majority of the grazing activity occurs in non-lynx or secondary lynx habitat because livestock typically graze areas that have a low to moderate percent slope with minimal obstructions on the ground such as fallen trees or dense conifer cover. “Livestock grazing could have local effects on lynx foraging habitat in areas that grow quaking aspen and willow in riparian areas. Local impacts could affect individual lynx. However, no information exists to indicate that grazing poses a threat to overall lynx populations,” and in addition, “appropriate grazing management can rejuvenate and increase forage and browse in key habitats” (USDA Forest Service 2008b).

Under the Alternative 3, the existing condition of the Black Mountain Planning Area would meet the Grazing Management objectives, standards and guidelines identified in the SRLA (USDA 2008b). This project may affect lynx prey habitat by altering the composition and structure of vegetation species. These impacts, however, are consistent with those that have been occurring in the analysis area for decades, and do not represent new effects to lynx. Over the long-term, adverse impacts to vegetation that may influence lynx prey would be anticipated to decrease, and overall vegetation conditions would be expected to improve. The determination for Canada lynx under Alternative 3 is “May affect, but not likely to adversely affect.”

**Region 2 Sensitive Species Determination for the Northern goshawk under Alternatives 1, 2, and 3**

There is one suspected Northern goshawk (*Accipiter gentilis*) territory that falls within the planning area. Monitoring since 2013 has shown this territory to be inactive upon each visit; there is no evidence that Northern goshawks have ever occupied this territory. Under the three alternatives, it is anticipated that there would not be a meaningful influence on population trend across the planning unit of the Routt National Forest. The determinations are Alternative 1: “Beneficial impact,” Alternatives 2 and 3: “May adversely impact individuals, but not likely to result in a loss of viability on the planning unit, nor cause a trend to federal listing or a loss of species viability range-wide.”

### Chapter 4 – Information Sources for this Planning Effort

#### 4.1 Comments and Consultation

The proposal has been listed since December 17, 2015 in the Schedule of Proposed Actions (SOPA) for the Medicine Bow - Routt National Forests. On July 29, 2016, the District rangeland management specialist and hydrologist met with the Black Mountain permittee to discuss rangeland allotment conditions, the Forest’s field review of the Billy George Creek area, and management options. The information exchanged was used to develop the proposed action.
On August 21, 2016 a Legal Notice of Opportunity to Comment (NOPA) was published in the newspaper of record, Steamboat Pilot & Today, initiating a 30-day public comment. Simultaneously, a letter soliciting comments was mailed or e-mailed directly to those thought to be interested in or affected by the proposal, including range allotment permittees, governmental agencies, tribes, public entities, and private individuals. The NOPA was also made available through the Medicine Bow - Routt National Forests & Thunder Basin National Grassland public web site at http://www.fs.usda.gov/projects/mbr/landmanagement/projects. One comment letter was received, from Colorado Parks and Wildlife.

Consultation with the Colorado State Historic Preservation Officer, Steve Turner, was completed on January 29, 2016, when he concurred with the Forest Service's initial correspondence for consultation and determination of “No adverse effect” to historic properties under section 106 of the National Historic Preservation Act (letters dated November 2, 2015 and January 21, 2016).

In accordance with the Southern Rockies Lynx Amendment, a screening process was used to determine effects to Canada lynx. Because the determination was “Not likely to adversely affect,” no consultation with US Fish and Wildlife Service was required.

4.2 Forest Service Interdisciplinary Team
Artemisia Turiya – NEPA Coordinator, Editor, Social and Economic analysis
Bridget Roth/ Brittany Milway – Archeologist
Erica Dickerman – Recreation Specialist
Erik Taylor – Rangeland Management Specialist, Project Lead, Social and Economic analysis
Liz Schnackenberg – Hydrologist
Mark Cahur – Timber Management Specialist
Marti Aitken – Botanist
Melissa Dressen – Wildlife Biologist
Nick Bencke – GIS
Rick Henderson – Fisheries Biologist
Ryan Adams – Soil Scientist

4.3 References Cited in this Environmental Assessment
The project record contains a complete list of references used for effects analysis.


Code of Federal Regulations, Title 36, Part 222.

Code of Federal Regulations, Title 36, Part 800.


Appendices

Appendix A – A Brief History of the Black Mountain Planning Area, and Cumulative Actions

Cumulative actions are past, present and reasonably foreseeable future activities in the vicinity of the Black Mountain Planning Area which may contribute to cumulative effects. Cumulative effects result from the incremental effects of Alternatives when added to effects of cumulative actions. Actions discussed below, but not analyzed in a given resource’s effects analysis, are considered to have no potential effect on that resource.

Past, Present, and Reasonably Foreseeable Rangeland Management Actions

Black Mountain and Fortification Allotments: The Black Mountain and Fortification Allotment areas have supported ranching operations since at least the early 1900s. Management has been under the Black Mountain Sheep and Goat (S&G) AMP since 1977 and the Fortification Creek S&G AMP since 1982. These management plans were re-evaluated and continued in 1992 and 1990, respectively, and remain in effect today. Permitted numbers and season of use have remained stable through recent years (1995-2016) (Table 1, p.9). Terms of use are discussed in Chapter 2 under Alternative 2.

Since 1997, in conformance with the Forest Plan, Term Grazing Permits have allowed forage use (up to 40% by weight) by livestock and wild herbivores on upland sites. In riparian areas, residual forage was to be maintained at an average of not less than six inches in height. However, these conditions cannot be verified by long-term records.

Following the Forest Plan revision (1997), Annual Operating Instructions (AOIs) have required that bands of sheep are herded such that all areas suitable for grazing within the allotments are utilized only once during each grazing season, and upland forage consumption has been set at light to moderate (30-40%)
by weight. In 2014, monitoring measures were put into place to assess whether streambank alteration was exceeding 20% on any segment.

Future rangeland management will be determined by the responsible official at the completion of this NEPA compliance process.

Quaker Knob Allotment: The Quaker Knob Allotment has supported ranching operations since at least the early 1900s. Management has been under the Quaker Knob S&G AMP since 1968. This management plan was re-evaluated and continued in 1985 and remains in effect today. Permitted numbers and season of use have remained stable over recent years (2003-2016) (Table 1, p.9).

Since 1997, in conformance with the Forest Plan, Term Grazing Permits have allowed forage use by livestock and wild herbivores on upland sites up to 40-50% by weight. In riparian areas, residual forage was to be maintained at an average of not less than six inches in height. However, these conditions cannot be verified by long-term records.

Following the Forest Plan revision (1997), AOIs have required that bands of sheep are herded such that all areas suitable for grazing within the allotments are utilized only once during each grazing season, and upland forage consumption has been set at light to moderate (30-40%) by weight.

Future rangeland management will be determined by the responsible official at the completion of this NEPA compliance process.

Past, Present, and Reasonably Foreseeable Non-Rangeland Actions

Table 5. Non-rangeland cumulative actions within the Black Mountain Planning Area.

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Snowmobile Trails</strong></td>
<td>Within the planning area there are 16.5 miles of designated snowmobile trails. Snowmobile trails are groomed prior to and during the snowmobile season.</td>
</tr>
<tr>
<td><strong>Roads on the Forest’s Motor Vehicle Use Map</strong></td>
<td>There are approximately 23 miles of road open to the public in the planning area (Figure 2, p.4).</td>
</tr>
<tr>
<td><strong>Non-motorized Trails</strong></td>
<td>There are 18.5 miles of non-motorized trails which include those for foot traffic, bicycles and horses (Figure 2, p.4).</td>
</tr>
<tr>
<td><strong>Freeman Reservoir</strong></td>
<td>The 17.4 acre reservoir is managed by the state for recreational fishing, and is not used as a permitted livestock watering area.</td>
</tr>
<tr>
<td><strong>Freeman Campground and Freeman Reservoir Area</strong></td>
<td>This is a designated campground and day use area used primarily for fishing, hunting, camping, and access to hiking.</td>
</tr>
<tr>
<td><strong>Sherman Youth Camp</strong></td>
<td>This fenced area includes a variety of recreational facilities.</td>
</tr>
<tr>
<td><strong>Recreation Outfitter and Guide Special Use Permits</strong></td>
<td>There are two active 10-year O/G Permits (Wilderness Tracks and Dusty Trails Outfitter). Additional recreation permits may be issued in the planning area during the life of the AMP.</td>
</tr>
<tr>
<td><strong>Timber Management</strong></td>
<td>Timber management actions have occurred in the planning area in the past and could occur again in the future. However, no timber sales are planned on the Forest 5-Year Timber Management Plan.</td>
</tr>
</tbody>
</table>
Appendix B – Response to Public Comments

A Legal Notice was published in the *Steamboat Pilot & Today* on August 21, 2016 initiating a formal 30 day comment period. One letter was received, from Colorado Parks and Wildlife, Area Wildlife Manager, Bill deVergie, September 13, 2016.

The letter correctly reflected the proposed action, with one discrepancy needing resolution. The letter stated that monitoring information collected annually would be assessed to determine if desired conditions are being met. However, the NOPA stated that riparian monitoring would occur bi-annually (every two years). In addition, although upland monitoring intervals were not specifically commented on by CPW, it came to the Forest Service’s attention that these were not identified in the NOPA. Upland monitoring intervals are now defined as occurring every 5 years. Please refer to Section 2.5 of this EA, Alternative 3 – Proposed Action – Adaptive Management for a full description of the monitoring strategies (Chapter 2, Section 2.5, pp.10-14).

Appendix C – Finding of No Significant Impact

The Medicine Bow - Routt National Forests, Hahns Peak/Bears Ears Ranger District proposes to continue to authorize domestic livestock grazing in the Black Mountain Planning Area.

As the responsible official, I am responsible for making a finding regarding potential for the alternatives discussed in this EA to result in significant effects to the human environment. Specialists have taken a hard look at the environmental effects using relevant scientific information and knowledge of site specific conditions gained from field visits and remote methods. I have reviewed and considered the EA and documentation included in the project record, and I have determined that Alternative 3 – Proposed Action – Adaptive Management will not have a significant effect on the quality of the human environment. As a result, no environmental impact statement will be prepared. My rationale for this finding is based on the context and intensity of effects outlined below and organized by sub-section of the Council on Environmental Quality's definition of ‘significantly’ (40 CFR 1508.27).

**Context**

Rangeland Management in the Black Mountain Planning Area includes approximately 11,000 acres of National Forest System lands, of which approximately 5,000 are suitable for livestock grazing. Livestock grazing has occurred in the planning area with approximately the same number of animals since the 1950s. The scope of this planning effort and analysis is limited to evaluating the appropriate level of permitted livestock grazing, given considerations of rangeland and other resource conditions; Forest Plan standards, goals, and objectives; and social and economic factors.

The effects disclosed in this EA and associated resource reports located in the project record use geographic bounds associated with the planning area but specific to each resource. Effects to the locality (e.g., effects beyond the boundaries of the planning area) and geographic region (e.g., the Medicine Bow - Routt National Forests, extent of specific animal and plant populations) were also considered, as appropriate. Both short-term and long-term effects of the proposed action were found to be of limited extent. Effects are not expected to meaningfully affect the human environment or national resources within a broad context.

**Intensity**

Intensity is a measure of the severity, extent, or quantity of effects.

1. *Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.*
The EA considers and discloses both beneficial and adverse effects. Under Alternative 3 (Chapter 2 pp.10-14), there will be monitoring related to achievement of desired conditions, and appropriate adjustment of management in order to maintain or improve resource conditions. Some short-term and sometimes long-term (mostly localized) negative impacts will occur to botanical, hydrological, rangeland vegetation, and soil resources due to ground disturbance from livestock (Chapter 3). However, these impacts will be lessened relative to current management (Alternative 2) through project design (primarily the flexibility of adaptive management). Additionally, there will be immediate and long-term benefits (and trends) associated with adaptive management and changes to management of the Billy George Creek area (Chapter 3). My finding of no significant environmental effects is not biased by the beneficial effects of this action.

2. The degree to which the proposed action affects public health or safety.

Public health and safety will be minimally affected by the action. The proposed action will improve public health and safety by establishing a buffer around Freeman Reservoir, Freeman Campground, and the Sherman Youth Camp where livestock grazing will no longer occur. The beneficial effect of this is due to reduction of exposure to pathogens carried by livestock.

Water quality is best protected through implementation of Alternative 3 (Chapter 3 pp.24-27).

3. Unique characteristics of the geographic area such as the proximity to historical or cultural resources, parklands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

There are no known unique characteristics of the planning area that will be adversely affected. No parklands, prime farmlands, wild or scenic rivers, or ecologically critical areas occur in the planning area.

Heritage resources were surveyed and one structure was identified as needing protection (Freeman Reservoir dam). Potential effects to this structure were identified and adequately addressed through design criteria.

The action is consistent with Executive Order 11988 because floodplains in the planning area are limited, and additional adverse impacts due to this action are not anticipated. The action is also consistent with Executive Order 11990 because no additional adverse impacts to wetlands are anticipated under any alternative, and management will adhere to National Core Best Management Practices (USDA 2012).

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.

The Forest Service has extensive experience in analyzing and implementing this type of rangeland management planning. Based upon the analysis by Forest Service resource specialists, no scientific controversy was identified regarding effects to the human environment.

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

Livestock grazing has occurred on the Routt National Forest in general, and the planning area specifically, for over 60 years. The Forest Service has extensive experience in analyzing and implementing this type of rangeland management planning. Because of this, potential issues associated with this proposed action are understood and there is a low degree of uncertainty regarding the effects to the human environment. Issues brought forth by resource (Chapter 3) are not unique and have been identified before on the Routt National Forest. Project design will limit meaningful adverse effects.
6. The degree to which the action may establish precedent for future actions with significant effects or represents a decision in principle about a future consideration.

The proposed action will not establish precedent for future actions with significant effects because this type of rangeland management planning has been routinely implemented by the Forest Service and is consistent with Forest Plan direction.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

The analysis associated with this EA shows that there will be no significant cumulative effects due to the proposed action. Cumulative effects analysis within the EA and specialist reports in the project record did not identify any significant risks, or individually or cumulatively significant impacts (Chapter 3).

8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

Within the Black Mountain Planning Area there are no known resources that are listed or are eligible for listing in the National Register of Historic Places. Because the Freeman Reservoir remains unevaluated for potential inclusion to the National Register of Historic Places, design criteria have been put in place until a formal determination of eligibility is completed for that resource (Chapter 3 pp.22-24). In addition, design criteria for inadvertent discoveries is part of the proposed action and will ensure resource protection (Chapter 2 p.13). There are no other known scientific, cultural, or historical resources present in the planning area.

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

There would be no significant or meaningful adverse effects to endangered or threatened species or their habitat, nor to any Region 2 sensitive species (Chapter 3).

10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

The proposed action does not threaten a violation of federal, state, or local law requirements for protection of the environment. This EA was prepared in compliance with all applicable laws, regulations, and policy, and complies with the Forest Plan.