

## *References*

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## ***Glossary of Terms***

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# Glossary of Terms

**Abiotic:** Characterized by the absence of life or living organisms.

**Adaptive management:** A principle that incorporates monitoring and research into conservation actions. Specifically, it is the integration of planning, management, and monitoring to test assumptions in order to adapt and learn.

**Biodiversity:** The diversity of plant and animal species in an environment.

**Biotic:** Pertaining to life or living organisms.

**Browsing:** When used in reference to deer, describes the eating of shoots or twigs of shrubs and trees.

**Carrying capacity (K):** Sometimes called “biological carrying capacity,” this is the maximum number of animals of a species that can live in a given environment. Carrying capacity is not a static number but an ever-changing target that will vary, short-term, with weather and range conditions, and long-term with gradual alterations in habitat and vegetation communities.

**Cervid:** A member of the deer family Cervidae, comprising deer, caribou, elk, and moose.

**Clone:** Aspen trees connected by their roots; they are a single organism.

**Compaction:** The compression of soil layers reducing the ability of plants to survive, reducing water infiltration capacity, and increasing water runoff.

**Core winter range:** Areas within the park in which some elk congregate from October through April, including the vicinity of Moraine Park / Beaver Meadows and Horseshoe Park.

**Critical habitat:** As defined in the Endangered Species Act (1973), pertains to: “(i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of this Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of this Act, upon a determination by the Secretary (of the U.S. Department of the Interior) that such areas are essential for the conservation of the species.”

**Density dependent:** Having influence on individuals in a population that varies with the degree of crowding within the population.

**Density independent:** Having influence on individuals in a population that does not vary with the degree of crowding.

**Depredation:** A term used by state wildlife agencies to describe animals that cause economic damage to private landowners by destroying structures, consuming feed or preying on domestic animals.

**Desired conditions:** In this case, describes what the vegetation on the elk range should be like after implementation of the management actions contained in this plan/EIS. It summarizes the anticipated changes in vegetation that would result from carrying out planned management actions. It is an expression of resource goals that have been set for vegetation on the elk range and describes the vegetation as it would appear when the goals set for it have been achieved.

**Ecosystem:** A system formed by the interaction of a community of organisms with their environment.

**Endangered:** Defined by U.S. Fish and Wildlife Service and listed in the Federal Register as being in danger of extinction.

**Exclosure:** A fenced area designed to exclude one or more species.

**Exotic:** As described by NPS Management Policies (2001), describes a species that did not evolve in concert with the species native to an ecosystem, and occupies or could occupy park lands directly or indirectly as the result of deliberate or accidental human activities. Sometimes called “non-native,” “alien,” or “invasive.”

**Extinction:** Disappearance from the earth.

**Extirpation:** Disappearance from a specified geographic area.

**Extra-label:** Use of a non-approved product or use of an approved product in a way that differs from the package insert (dose, frequency, route) or for a condition not specified on the label.

**Forbs:** Non-woody, broad-leaf, flowering plants that are neither grasses nor grasslike.

**Gregarious:** Tending to form a group with others of the same species

**Herbaceous:** A plant with no persistent woody stem above ground; characteristics of that of an herb.

**Hydrologic:** Pertaining to the occurrence, circulation, distribution, and properties of the water.

**Intraspecific:** Between members of the same species.

**Microclimate:** The climate of a small area, such as a plant community or wooded area, which may be different from that in the general region.

**Native:** As described by NPS Management Policies (2001), pertains to a species that has occurred or now occurs as a result of natural processes on lands designated as units of the national park system.

**Recruitment:** Birth and survival of young to the age at which their survival rates approximate those of adults in the population.

**Primary summer range:** The areas used by most of the Rocky Mountain National Park / Estes Valley elk population during June, July, and August. It includes the Kawuneeche Valley and subalpine and alpine areas within the park as well as areas outside the park.

**Primary winter range:** From October through April, most elk use the primary winter range, which is on the eastern portion of the park and extends outside the park to the Estes Valley and eastward.

**Range:** The geographical extent of a species or subspecies. See also primary range and core winter range.

**Riparian:** Pertaining to, situated or dwelling on the bank of a river or other body of water.

**Rut:** The mating season for certain species, usually ungulates.

**Scrub:** A large area covered with low trees and shrubs.

**Sedimentation:** The deposition or accumulation of mineral or organic matter by water, air, or ice.

**Steroid:** Any of a large group of fat-soluble compounds, such as bile acids and sex hormones, most of which have specific physiological actions.

**Subspecies:** Sometimes called a “race”, a genetically distinct geographical subunit of a species.

**Threatened:** Defined by U.S. Fish and Wildlife Service and listed in the Federal Register as likely to become endangered within the foreseeable future (see “endangered”).

**Ungulate:** Belonging to the group of hoofed animals (the former order Ungulata), including the odd-toed perissodactyls (including horses and rhinoceros) and even-toed artiodactyls (including cows, deer, and pigs).

**Watershed:** The region or area drained by a river, stream, etc.

**Withdrawal period:** The number of days that must elapse between drug administration and slaughter so that meat from a treated animal is fit for human consumption.

**Zona Pellucida:** The proteinaceous layer surrounding the ovum of mammals.

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# **APPENDIXES**

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## **APPENDIX A: INTERAGENCY PROJECT AGREEMENT**

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**PROJECT AGREEMENT**  
**Elk and Vegetation Management Plan/Environmental Impact Statement**  
**Rocky Mountain National Park and Vicinity**  
**March 4, 2003**

Approved by:

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Vaughn L. Baker Date  
Superintendent, Rocky Mountain National Park

---

Russell George Date  
Director, Colorado Division of Wildlife

---

Honorable John Baudek Date  
Mayor, Town of Estes Park

---

Tony Paglia, President of the Board of Directors Date  
Estes Valley Recreation and Parks District

---

James S. Bedwell, Supervisor Date  
Arapaho and Roosevelt National Forests

---

Brian Person, Area Manager Date  
U.S. Bureau of Reclamation, Eastern Colorado Area Office

---

Honorable Gene Stover Date  
Mayor, Town of Grand Lake

APPENDIX A

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Honorable Duane Dailey  
Commissioner, Grand County

Date

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Tom Bender, Chair of the Board of County Commissioners  
Larimer County

Date

## PROJECT AGREEMENT

### Elk and Vegetation Management Plan/Environmental Impact Statement Rocky Mountain National Park and Vicinity

#### PURPOSE

The purpose of this project agreement is to establish how an Elk and Vegetation Management Plan and Environmental Impact Statement (Plan/EIS) will be prepared for the Rocky Mountain National Park area using the planning process required by the National Environmental Policy Act of 1969 (as amended) (NEPA), laws applicable to the Park, and National Park Service (NPS) policy. This agreement will terminate on the issuance of the final Plan/EIS. This agreement identifies the products to be produced, a project schedule, and the roles and responsibilities of the following participating agencies:

- Rocky Mountain National Park
- Arapaho-Roosevelt National Forest
- U.S. Bureau of Reclamation
- Colorado Division of Wildlife
- Town of Estes Park, Colorado
- Estes Valley Recreation and Park District, Colorado
- Town of Grand Lake, Colorado
- Grand County, Colorado
- Larimer County, Colorado

#### PROJECT BACKGROUND

The appropriate population size and associated effects of elk in Rocky Mountain National Park (RMNP) and Estes Park have been intensely debated since the 1930s. Recent research results indicate that the elk population size, distribution, and migratory patterns are outside the range of variability that would be expected under natural conditions. This has resulted largely because the influence of any significant predation (including hunting) is missing from the system. All major, natural predators of elk (e.g., wolves) were gone from the area by the early 1900s; and hunting on adjacent U.S. Forest Service and private lands has become largely ineffective due to extensive land development in and around the Town of Estes Park and elk habituation to these residential areas.

The size and concentration of the elk population is resulting in a number of adverse effects in the area. Willow and aspen have declined on the core winter range in RMNP, and these species are not sustainable in some areas under the current level of herbivory. Property damage and human safety concerns in Estes Park have escalated as elk increasingly winter and summer within town limits.

Due to the migratory nature of the elk population, local land and wildlife management agencies consider a regional approach essential to develop a meaningful, long-term plan.

During winter, there are approximately 1000 elk in the lower elevations of RMNP and 2000 elk in the Town of Estes Park and adjacent U.S. Forest Service and private lands. The majority of all these animals migrate to higher elevations in RMNP during the summer. Throughout the course of a year, elk and the habitat they occupy are under the jurisdiction of different state and federal agencies, local governments, and private landowners.

As such, an interagency planning team has been assembled to prepare an Elk and Vegetation Management Plan/EIS. The Plan/EIS will evaluate a range of management alternatives and the potential impacts to natural and human environments resulting from each alternative.

### **PROJECT PURPOSE**

The Plan/EIS will discuss the following:

1. Address size and distribution of the elk population.
  - Maintain a wild and free-ranging population
  - Restore the natural range of variability to the extent possible
  - Make specific commitments related to size, density, and distribution
2. Coordinate strategies and objectives of this Plan/EIS with those of the RMNP Chronic Wasting Disease EIS.
3. Recognize the need to coordinate the management of natural, social, and economic values of the affected agencies.
4. Reduce the risk from elk to public safety to the extent practicable.
5. Address the risk of damage to private property by elk.
6. Provide for recreational opportunities associated with elk, such as viewing or hunting.
7. Restore the natural range of variation in plant communities that would be expected under natural conditions in the park and at selected sites outside the park, to the extent possible.
  - Make specific commitments regarding levels of herbivory
  - Prevent loss of aspen clones on the core winter range until more information on historic significance is available
  - Maintain or increase existing willow cover
8. Recognize the economic significance of the elk herd.

## **PLANNING PROCESS**

The purpose of the interagency planning team is to undertake a quality planning process to produce the Plan/EIS. The National Park Service will function as the lead agency. The U.S. Forest Service, U.S. Bureau of Reclamation, Colorado Division of Wildlife, Grand County, Larimer County, Town of Estes Park, Town of Grand Lake, and Estes Valley Recreation and Parks District will serve as cooperating agencies.

Each agency is represented on either the core planning team or an extended planning team. Throughout the planning process, all core planning team members will maintain consistent communication and coordination with each other and the extended team. Routine coordination will be accomplished through a variety of methods, including electronic mail, conference calls, meetings, memoranda, and progress reports. Core planning team members will be present at internal team meetings to determine issues and objectives, potential management techniques, develop specific alternatives, evaluate the potential impacts of each alternative, and identify the environmentally preferred alternative; attend public scoping meetings; and write or review appropriate portions of the Plan/EIS. The core planning team will periodically update the extended planning team. The extended planning team will stay informed on the progress of the planning process, participate in meetings as needed, provide information to the core planning team within their area of expertise or jurisdiction, and review appropriate portions of the Plan/EIS. The cooperating agencies agree not to share preliminary draft documents with the media prior to the lead agency's announcement of availability of those documents.

Total Quality NEPA, Inc., has been contracted to provide NEPA guidance and to facilitate internal team meetings. A private firm(s) will also be contracted to assist with public involvement and EIS preparation.

Appropriate coordination with the U.S. Fish and Wildlife Service, Army Corps of Engineers, and the State Historic Preservation Office will be conducted to ensure compliance with applicable laws, regulations and executive orders.

The planning process will follow the steps outlined on the attached project schedule. These include the following steps required by the NEPA process: public scoping, development of a draft Plan/EIS, public review and comment period on the draft Plan/EIS, preparation of a final Plan/EIS, preparation of a Record of Decision, and approval by the NPS Intermountain Regional Director.

## **PRODUCTS**

The primary products that will be developed are:

- *Draft Elk and Vegetation Management Plan/Environmental Impact Statement*
- *Final Elk and Vegetation Management Plan/Environmental Impact Statement*
- *Record of Decision* (NPS only)

The draft Plan/EIS will include the following key components, as well as all pertinent supporting data: purpose and need, description of alternatives and proposed action, affected environment, environmental consequences, and consultation/coordination.

The final Plan/EIS will incorporate any necessary revisions, and will document comments to the draft Plan/EIS and associated responses.

A Record of Decision (ROD) will concisely explain, in accordance with Council on Environmental Quality guidelines, the decision made, when the decision will be implemented, the rationale for the decision, other alternatives considered, and applicable mitigation measures.

## **PUBLIC INVOLVEMENT**

Extensive public involvement will be undertaken to provide information to and solicit input from all interested stakeholders. Stakeholders will be identified during the scoping process. Public involvement will be conducted as an iterative process, allowing stakeholders to participate at multiple stages of the Plan/EIS process.

### **Methods of Communication**

- **NOTICE OF INTENT** - A Notice of Intent to prepare an Elk and Vegetation Management Plan/EIS will be published in the *Federal Register*.
- **MAILING LIST** - A comprehensive mailing list for the Plan/EIS will be developed. The team will compile an initial list of interested citizens and organizations. Individuals and organizations will be continually added to the mailing list at their request.
- **NEWSLETTER** – A series of newsletters will be prepared at the key stages to convey the planning process, inform stakeholders of progress, and invite response.
- **WEB SITE** – A web site will be developed and maintained on the NPS Park-Net planning site throughout the process (this site will be linked to the park's home page). The site will provide background information including research reports, notice of public involvement opportunities, newsletters, and draft and final plans.
- **PUBLIC MEETINGS** – public meetings will be held for scoping and review of the draft Plan/EIS, and at other times as needed throughout the process. A variety of methods (open houses, workshops, etc.) will be employed based on the desired objectives of each meeting. A contractor will be responsible for designing, facilitating and handling logistics of public meetings. Core planning team members will be present at each public meeting to answer questions. A variety of media materials (e.g., handouts, presentations, research reports, etc.) will be used to best enable the public to understand the issues and alternatives.
- **NEWS RELEASES** – At significant steps of the process, news releases will be used to inform the public of the nature and content of the plan, public meetings, and where to get more detailed information. All public meetings and comment periods will be preceded by press releases to newspapers, TV and radio stations.

- **TRIBAL CONSULTATION** – Consultation with the American Indian tribes will recognize the government-to-government relationship between the tribes and the federal government. The timing and methods of consultation with tribes who have religious or cultural associations with the lands of Rocky Mountain National Park will be determined with each interested tribe.

## **SCIENTIFIC INFORMATION**

The planning team will prepare the Plan/EIS using the best available scientific and project area information. This will include data on local economics, tourism, hunter harvest, and social values. It will also include the final report of a National Park Service/United States Geological Survey research initiative that was recently completed, along with numerous other studies conducted in the area (e.g., aspen research), data from on-going monitoring (e.g., annual elk population surveys), and relevant research from other areas. Any applicable new data or research results that become available will be incorporated in the planning process.

## **PROJECT TEAM, ROLES AND RESPONSIBILITIES**

Most tasks will require a combined effort by various planning team members and contractors. The following roles and responsibilities of each signatory of this agreement are listed below. Appendix 1 identifies agency representatives.

### **Core Team**

#### **Lead Agency:**

##### Rocky Mountain National Park

- Contract private firm(s) (NEPA oversight, public involvement, EIS preparation) and provide the point of contact for the interagency team
- Identify stakeholders and maintain comprehensive mailing list
- Distribute federal register notices, meeting notices, scoping brochure, newsletters, and draft and final documents as appropriate
- Issue press releases
- Prepare and submit federal register notices
- Maintain an administrative record of the planning process
- Attend all team meetings
- Work with contractors to develop public involvement media
- Attend all public meetings
- Provide expertise and data on park resources, visitors, and operations
- Contribute to data analysis and write sections of the Plan/EIS
- Review entire Plan/EIS
- Keep extended team members informed
- Coordinate with NPS Intermountain Region and Washington Offices
- Select the preferred alternative

- Prepare a Record of Decision

**Cooperating Agencies:**

**Town of Estes Park**

- Identify stakeholders and provide mailing list
- Attend all team meetings
- Review press releases and public involvement media
- Attend public meetings
- Provide expertise and data on local economics, public safety, zoning and planning
- Review and comment on appropriate portions of the draft and final Plan/EIS

**Estes Valley Parks and Recreation District**

- Identify stakeholders and provide mailing list
- Attend all team meetings
- Review press releases and public involvement media
- Attend public meetings
- Provide expertise and data on conditions and management of recreational fields and golf courses
- Review and comment on appropriate portions of the draft and final Plan/EIS

**Extended Team**

**Cooperating Agencies:**

**Colorado Division of Wildlife**

- Attend team meetings as necessary
- Attend public meetings as necessary
- Provide expertise and data on wildlife related topics
- Review and comment on appropriate portions of the draft and final Plan/EIS

**Arapaho-Roosevelt National Forest**

- Attend team meetings as necessary
- Attend public meetings as necessary
- Provide expertise and data on habitat conditions and management on USFS lands
- Review and comment on appropriate portions of the draft and final Plan/EIS

**Town of Grand Lake**

- Attend team meetings as necessary

- Attend public meetings as necessary
- Provide expertise and data on local economics, public safety, zoning and planning as needed
- Review and comment on appropriate portions of the draft and final Plan/EIS

Grand County

- Attend team meetings as necessary
- Attend public meetings as necessary
- Provide expertise and data on county zoning and planning as needed
- Review and comment on appropriate portions of the draft and final Plan/EIS

U.S. Bureau of Reclamation

- Attend team meetings as necessary
- Attend public meetings as necessary
- Provide expertise and data on USBR property in the project area
- Review and comment on appropriate portions of the draft and final Plan/EIS

Larimer County

- Attend team meetings as necessary
- Attend public meetings as necessary
- Provide expertise and data on county zoning and planning as needed
- Review and comment on appropriate portions of the draft and final Plan/EIS

**APPENDIX 1. Agency Representatives**

**Rocky Mountain National Park**

Vaughn Baker  
Ken Czarnowski  
Therese Johnson  
Ryan Monello

**Colorado Division of Wildlife**

Rick Kahn  
Rick Spowart

**Town of Estes Park**

Richard Widmer  
Bob Joseph  
Dave Shirk

**Estes Valley Parks and Recreation District**

Stan Gengler

**Arapaho-Roosevelt National Forest**

Hal Gibbs  
Vernon LaFontaine  
Dennis Lowry

**Town of Grand Lake**

James Cervenka

**Grand County**

Duane Dailey

**Bureau of Reclamation**

Will Tully

**Larimer County**

Frank Lancaster

**APPENDIX B: ESTIMATED COSTS OF THE ACTION  
ALTERNATIVES**

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## ESTIMATED COSTS OF THE ACTION ALTERNATIVES

The cost of each alternative was derived from multiple sources. Direct professional estimates were provided by staff from the National Park Service and the U.S. Department of Agriculture's Animal and Plant Health Inspection Service, Wildlife Services Division for costs associated with lethal reduction, wolf reestablishment, chronic wasting disease testing, monitoring, education/interpretation, and aversion methods. Comparable costs were derived from literature sources and subject matter experts for fences, fertility control, and carcass disposal.

The costs for Alternative 1 are not presented in the following tables. Alternative 1 assumes continuation of the current staff levels described in Chapter 3, Affected Environment, Park Operations. It is assumed that funding would continue throughout the 20-year planning timeframe to support current levels of staffing.

Cost estimates are presented for the components of the alternatives and include both infrastructure and other costs that occur one time during the project and annual or recurring costs that are incurred throughout the life of the project. In all action alternatives, the cost of overall project oversight, visitor management including carrying out any temporary closures, and visitor education and interpretation about the program would be provided with existing personnel as a part of their other regular duties.

The base assumptions for each alternative are presented in the alternatives descriptions in Chapter 2 and the methodology sections in Chapter 4, and were used for determining amounts and frequencies of use for the various elements of the alternatives. Additionally, the following assumptions were used to develop cost estimate:

The expected amount of fencing for each alternative is as represented in Chapter 2 description of the alternatives. Although the timing for the installation of fences would be based on monitoring and the effect of elk herbivory on aspen and willow recovery, it is uncertain in what years fences would be installed. Fence costs were estimated at \$30,000 per linear mile.

Linear miles of fence for willow were based on information from the fence design of the park's Fan Lake enclosure. A 20 acre enclosure with a typical number of turns and corners requires approximately 5,600 linear feet of fence. Total mileage was calculated by dividing the total willow acreage fenced by 20 acre blocks and multiplying the number of blocks by 5,600 feet and converted to miles.

Linear miles for aspen were based on best professional judgement with an assumed average enclosure size of 2.5 acres. A 2.5 acre square would equal 0.25 miles of fence. A thirty-five percent increase was added to account for turns and bends in the fence to arrive at a total of 0.3375 mile per 2.5 acre block.

The use of helicopters to transport fence materials to remote locations varies based on the amount of fencing estimated for each alternative. The cost to use helicopters was based on \$1,400 per hour. The number of hours needed per alternative was estimated as follows and was based on best professional judgement:

Alternative 2 = 50 hours

Alternative 3 = 500 hours

Alternative 4 = 350 hours

Alternative 5 = 25 hours

The cost of high intensity lethal reduction (culling more than 200 elk per year) in the first four years for Alternatives 2 and 5 are based on using contractors. The costs for this type of operation

## APPENDIX B

were estimated by the U.S. Department of Agriculture, Animal and Plant Health Inspection Service. Assumptions used included:

Lethal reduction activities would require a staff of 1.5 full-time equivalents (FTE) to administer the program;

Field operations would require a seasonal staff of 10 at a GS-9 federal salary level working for 7 months each year.

The cost for lower intensity lethal reduction (culling less than 200 elk per year) during years 5-20 in Alternatives 2 and 5 and in years 1-20 in Alternatives 3 and 4 is based on using park staff labor. Work would be accomplished by two teams composed of one full time GS-9 staff position; and one GS-6 and two GS-5 staff positions for 13 weeks each year. The cost also includes pack stock to support the culling activities.

The cost of all lethal reduction activities, CWD testing, and disposal of carcasses that test positive for CWD was estimated using the median number within the range of elk to be culled for each alternative..

Labor to collect CWD samples is included in lethal reduction labor since it is assumed that these activities would take place concurrently by the same staff. The materials cost of the CWD test is \$25 per test.

Carcass disposal is based on a five percent CWD rate in the median number of elk culled. Disposal of CWD positive carcasses would be accomplished with chemical digestion at a cost of \$70 per carcass.

Ninetyfive percent of culled elk will not test positive for CWD and meat and/or carcasses would be donated to eligible recipients, with funding for a donation program covered by other entities such as non-governmental organizations.

The cost for elk redistribution in years 1-4 in Alternatives 2 is based on labor provided by one GS-6 and two GS-5 staff positions for 13 weeks each year.

The cost of elk redistribution in years 5-20 in Alternative 2 and years 1-20 in Alternatives 3 and 4 is based on labor provided by one GS-6 and two GS-5 staff positions for 13 weeks each year; and one GS-5 staff position for 26 weeks each year.

Fertility control operations in Alternative 4 would have similar operating characteristics as those of high intensity lethal reduction performed by contractors, but would require approximately 50% less labor.

The wolf release program in Alternative 5 would require an additional full-time biologist at a GS-11 federal salary level; aerial surveillance and tracking would take place with fixed-wing aircraft or helicopters, and an average of 12 surveillance and tracking outings would take place each year.

An adaptive management assessment would be conducted every five years to evaluate the effectiveness of the elk and vegetation management program and determine the need to adjust or change any component of the program. The cost of the adaptive management assessment is indicated annually as one-fifth of the estimated cost of additional monitoring and evaluation that would be needed every five years.

		Alternative 2
<b>INFRASTRUCTURE AND ONE-TIME COSTS</b>		<b>Estimated Cost</b>
A.	Fencing (aspen only)	\$630,000.00
B.	Aviation (fence installation)	\$70,000.00
C.	Initial equipment (reduction operations)	\$172,000.00
D.	Refrigerated Truck	\$75,000.00
E.	Capture Facility	\$25,000.00
<b>Total Infrastructure and One-Time Cost</b>		<b>\$972,000</b>
<b>ANNUAL COSTS</b>		
A.	<b>Reduction - Lethal</b>	
	Year 1-4 450 elk per year Labor, Travel, Pack Animals	\$991,646.24
	Year 5-20 88 elk per year Labor, Pack Animals	\$95,950.00
B.	<b>Carcass Disposal</b>	
	Year 1-4	\$1,610.00
	Year 5-20	\$350.00
C.	<b>CWD Testing</b>	
	Year 1-4	\$11,250.00
	Year 5-20	\$2,200.00
D.	<b>Monitoring (elk and vegetation)</b>	\$42,075.00
E.	<b>Redistribution (Yr.1-4)</b>	\$31,350.00
F.	<b>Redistribution (Yr. 5-20)</b>	\$50,050.00
G.	<b>Adaptive Management Assessment</b>	\$21,130.00
<b>Total Annual Cost (Years 1-4)</b>		<b>1,099,061</b>
<b>Total Annual Cost (Years 5-20)</b>		<b>211,755</b>

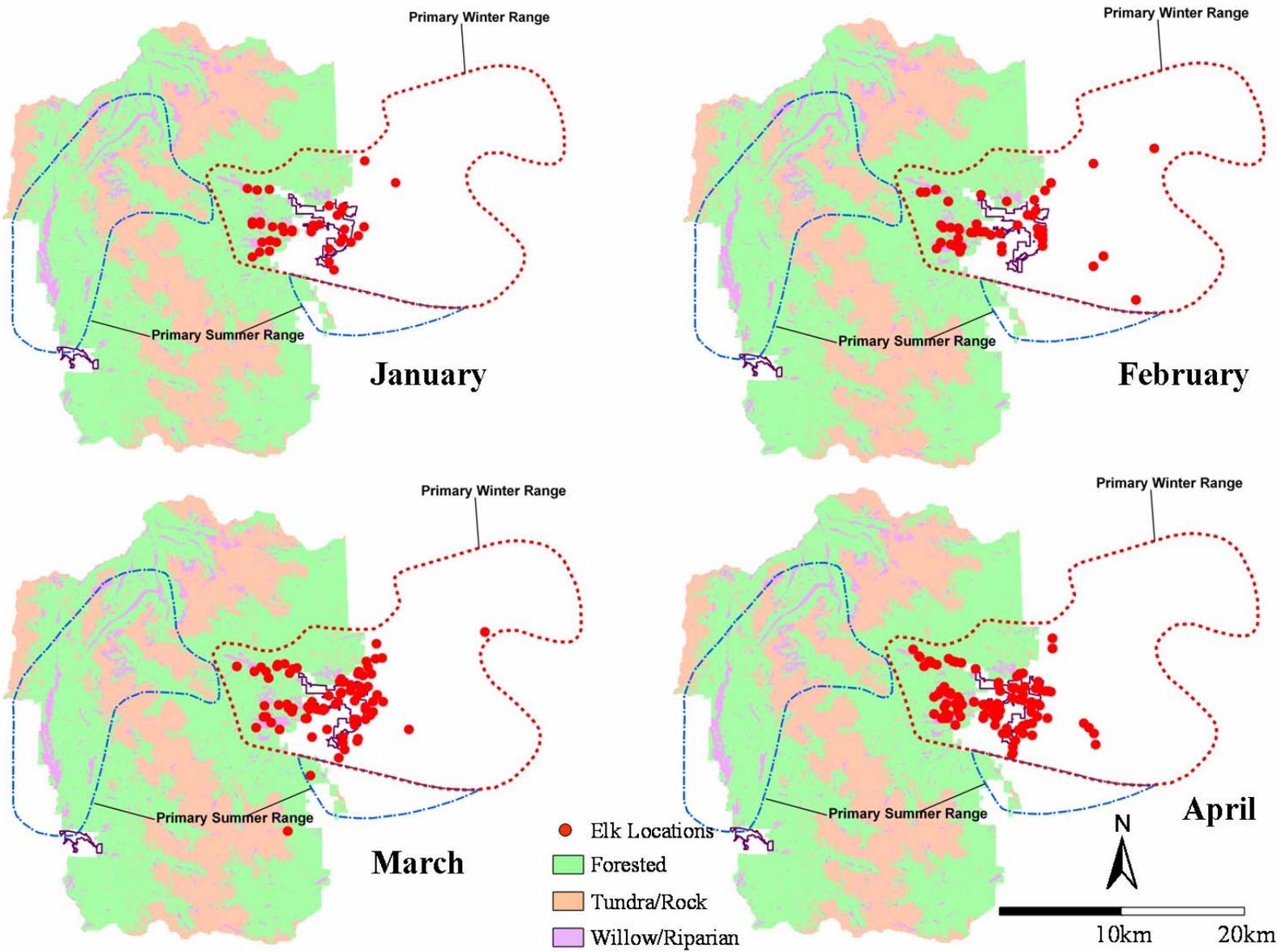
		Alternative 3
<b>INFRASTRUCTURE AND ONE-TIME COSTS</b>		<b>Estimated Cost</b>
A.	Fencing	\$1,440,000.00
B.	Aviation (fence installation)	\$700,000.00
C.	Initial equipment (reduction operations)	\$34,100.00
<b>Total Infrastructure and One-Time Cost</b>		<b>2,174,100</b>
<b>ANNUAL COSTS</b>		
A.	Reduction - Lethal	
	Year 1-20 100 elk per year Labor and pack animals	\$95,950.00
B.	Carcass Disposal	
	Year 1-20	\$350.00
C.	CWD Testing	
	Year 1-20	\$2,500.00
D.	Monitoring (elk and vegetation)	\$42,075.00
E.	Redistribution	\$50,050.00
F.	Adaptive Management Assessment	\$21,130.00
<b>Total Annual Cost (Years 1-20)</b>		<b>212,055</b>

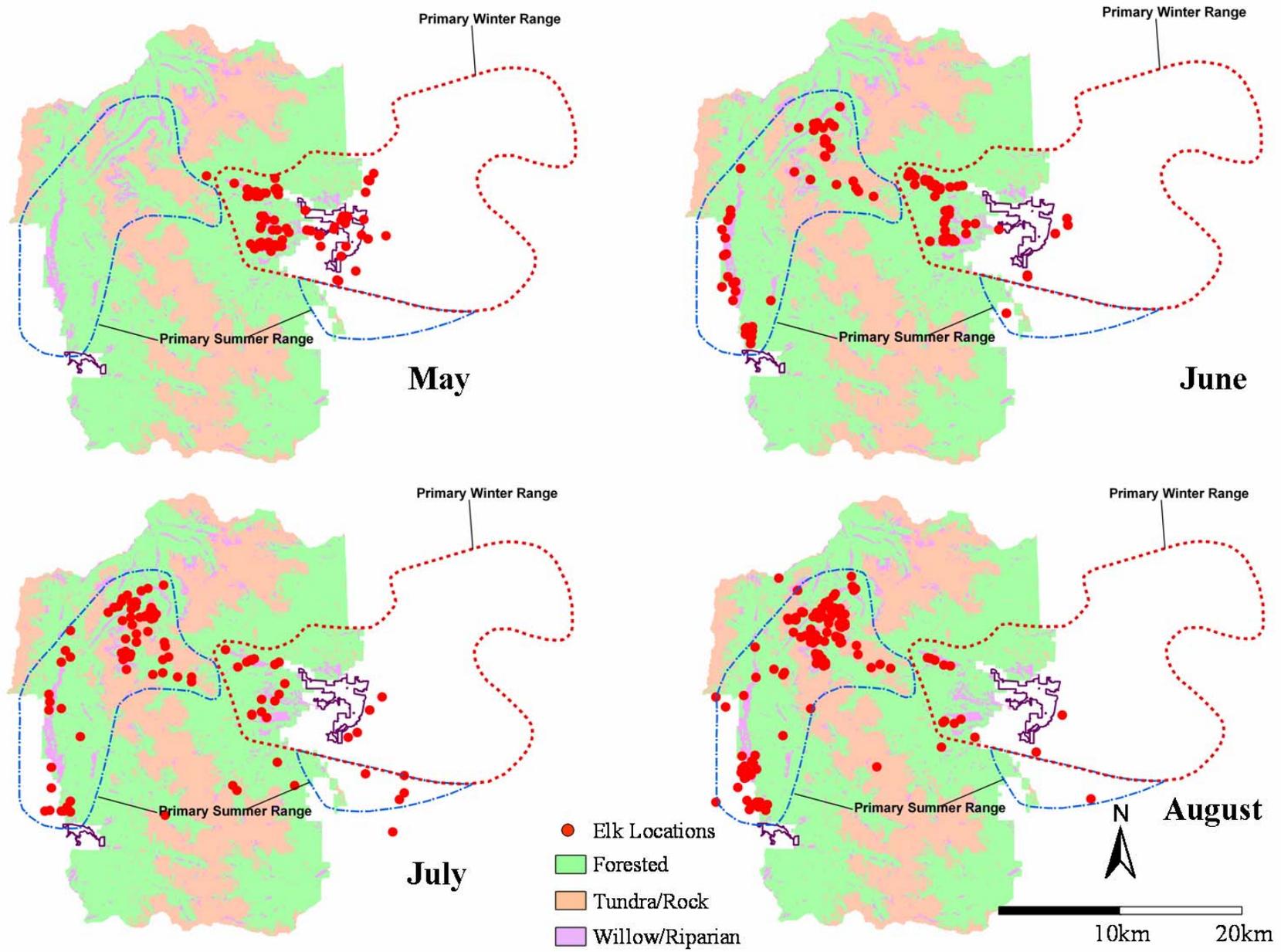
		Alternative 4
<b>INFRASTRUCTURE AND ONE-TIME COSTS</b>		<b>Estimated Cost</b>
A.	Fencing	\$1,020,000.00
B.	Aviation (fence installation)	\$490,000.00
C.	Initial equipment (reduction operations)	\$34,100.00
D.	Capture Facility	\$25,000.00
<b>Total Infrastructure and One-Time Cost</b>		<b>1,569,100</b>
<b>ANNUAL COSTS</b>		
A.	<b>Reduction - Fertility</b>	
	Year 1-4 400 elk per year Labor and fertility agent	\$464,000.00
	Year 5-20 200 elk per year Labor and fertility agent	\$232,000.00
B.	<b>Reduction - Lethal</b>	
	Year 1-20 115 elk per year Labor and pack animals	\$95,950.00
C.	<b>Carcass Disposal</b>	
	Year 1-20	\$420.00
D.	<b>CWD Testing</b>	
	Year 1-20	\$2,875.00
E.	<b>Monitoring (elk and vegetation)</b>	\$42,075.00
F.	<b>Redistribution</b>	\$50,050.00
<b>Total Annual Cost (Years 1-4)</b>		<b>655,370</b>
<b>Total Annual Cost (Years 5-20)</b>		<b>423,370</b>

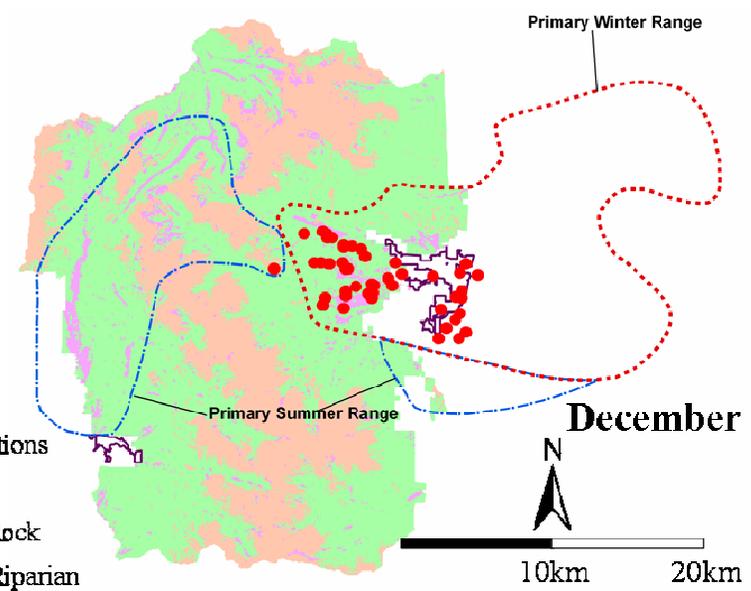
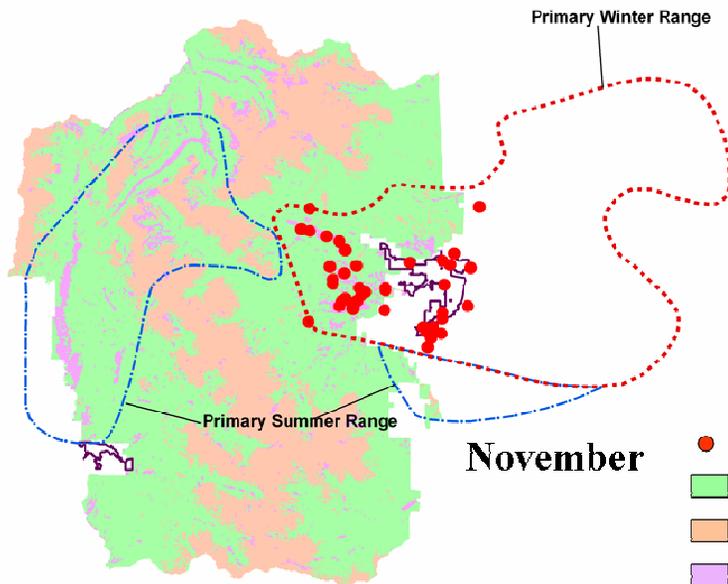
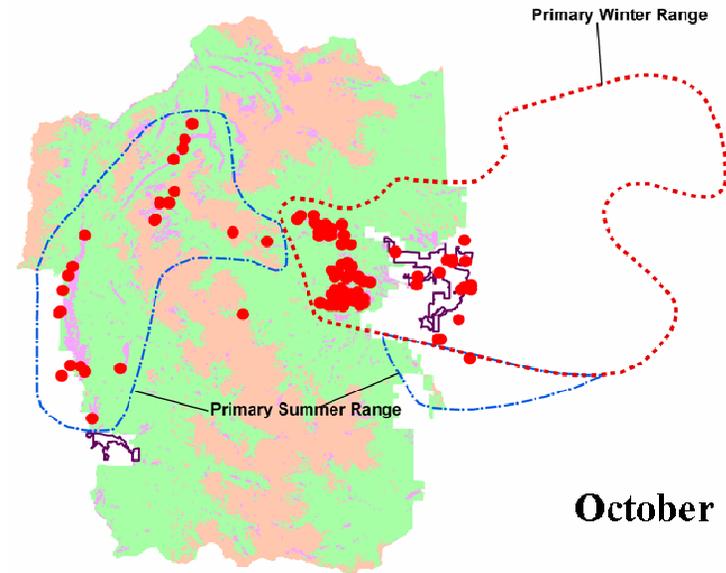
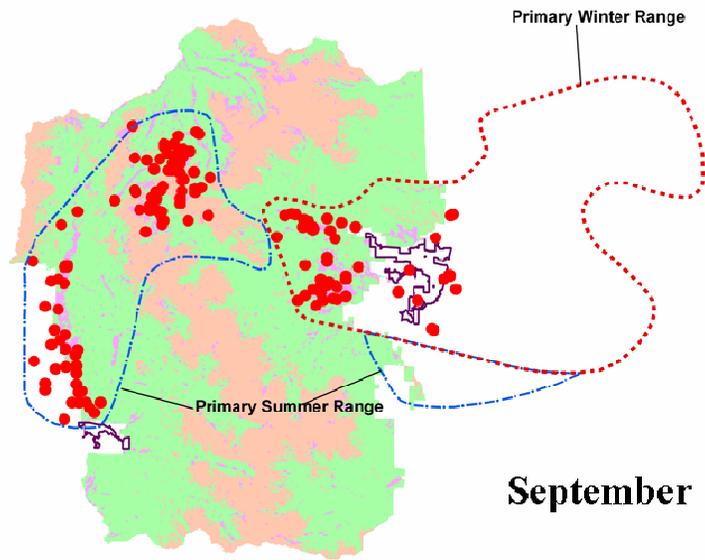
		Alternative 5
<b>INFRASTRUCTURE AND ONE-TIME COSTS</b>		<b>Estimated Cost</b>
A.	Fencing (aspen only)	\$330,000.00
B.	Aviation (fence installation)	\$35,000.00
C.	Initial equipment (reduction operations)	\$172,000.00
D.	Refrigerated Truck	\$75,000.00
E.	Initial equipment (wolf program)	\$55,220.00
F.	Capture/transport - Wolves	\$28,412.00
G.	Wolf Pen - for soft release	\$42,618.00
H.	Capture Facility	\$25,000.00
<b>Total Infrastructure and One-Time Cost</b>		<b>763,250</b>
<b>ANNUAL COSTS</b>		
A.	<b>Reduction - Wolves</b>	
	Labor	\$114,608.00
	Fixed Wing Aircraft	\$18,652.80
	Tranquilizer and net gun supplies	\$1,160.00
	Capture operations	\$290,000.00
	Education/enforcement (NPS)	\$35,515.00
B.	<b>Reduction - Lethal</b>	
	Year 1-4	
	225 elk per year	
	Labor, travel, pack animals	\$724,278.00
	Year 5-20	
	50 elk per year	
	Labor, pack animals	\$95,950.00
C.	<b>Carcass Disposal</b>	
	Year 1-4	\$840.00
	Year 5-20	\$210.00
D.	<b>CWD Testing</b>	
	Year 1-4	\$5,625.00
	Year 5-20	\$1,250.00
E.	<b>Monitoring (elk and vegetation)</b>	\$42,075.00
<b>Total Annual Cost (Years 1-4)</b>		<b>1,232,754</b>
<b>Total Annual Cost (Years 5-20)</b>		<b>599,421</b>

## **APPENDIX C: ELK USE OF RANGES BY SEASON**

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## **APPENDIX D: SPECIAL STATUS SPECIES**

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**THREATENED AND ENDANGERED UNIT SPECIES LIST  
ENDANGERED SPECIES ACT (ESA)  
ROCKY MOUNTAIN NATIONAL PARK**

**December 2004**

The following table contains a list of species that are specific to Rocky Mountain National Park and are federally listed as endangered, threatened or candidates for listing, by the U.S. Fish and Wildlife Service under the provisions of the Endangered Species Act. The U.S. Fish and Wildlife Service has reviewed the list and provided a letter of concurrence dated April 12, 2005 (see attached).

The species that are included in the table must meet one of the following criteria:

1. The species is known to occur within the park.
2. The species does not occur within the park, but suitable habitat is available, the habitat is within the known elevation range for the species, and the species is known to exist in counties that the park occupies.
3. The species does not occur within the park, but actions within the park have the potential to affect the species.

In compliance with the Endangered Species Act, all management actions within the park are evaluated to determine if they will have any effect on endangered, threatened or candidate species on this list.

Federally Listed and Candidate Species & Their Status in Colorado	Known to Occur in RMNP	Known to Occur in Boulder County	Known to Occur in Larimer County	Known to Occur in Grand County
<b>Amphibians</b>				
Boreal toad, <i>Bufo boreas boreas</i> , Candidate for Listing	Yes	Yes	Yes	Yes
<b>Birds</b>				
Bald Eagle, <i>Haliaeetus leucocephalus</i> , Threatened	Yes	Yes	Yes	Yes
Least tern, <i>Sterna antillarum</i> , Endangered	No	▲	▲	No
Mexican spotted owl, <i>Strix occidentalis lucida</i> , Listed Threatened	No	Yes Historically	Yes Historically	No
Piping plover, <i>Charadrius melodus</i> , Threatened	No	▲	▲	No

APPENDIX D

<b>Federally Listed and Candidate Species &amp; Their Status in Colorado</b>	<b>Known to Occur in RMNP</b>	<b>Known to Occur in Boulder County</b>	<b>Known to Occur in Larimer County</b>	<b>Known to Occur in Grand County</b>
Whooping crane, <i>Grus americana</i> , Endangered	No	▲	▲	No
Yellow-billed cuckoo, <i>Coccyzus americanus</i> , Candidate for Listing	Yes Historically	No	Yes	Yes
<b>Fish</b>				
Bonytail, <i>Gila elegans</i> , (presumed-historical) Endangered	No	No	No	*
Colorado pikeminnow, <i>Ptychocheilus lucius</i> , Endangered	No	No	No	*
Greenback cutthroat trout, <i>Oncorhynchus clarki stomias</i> , Threatened	Yes	Yes	Yes	No
Humpback chub, <i>Gila cypha</i> , Endangered	No	No	No	*
Pallid sturgeon, <i>Scaphirhynchus albus</i> , Threatened	No	▲	▲	No
Razorback sucker, <i>Xyrauchen texanus</i> , Endangered	No	No	No	*
<b>Mammals</b>				
Canada lynx, <i>Lynx canadensis</i> , Threatened	Yes	Yes	Yes	Yes
Preble's meadow jumping mouse, <i>Zapus hudsonius preblei</i> , Threatened	No	Yes	Yes	No
<b>Plants</b>				
Colorado butterfly plant, <i>Gaura neomexicana</i> spp. <i>Coloradensis</i> , Threatened	No	Yes	Yes	No
Utes ladies'-tresses, <i>Spiranthes diluvialis</i> , Threatened	No	Yes	Yes	No

Table Terminology

\* Water depletions in the Upper Colorado River basin may affect these species

▲ Water depletions in the South Platte River basin may affect these species

Candidate - Means there is sufficient information indicating that formal listing under the ESA maybe appropriate

Endangered - Means the species could become extinct

Threatened - Means the species could become endangered



## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
 Ecological Services  
 Colorado Field Office  
 755 Parfet Street, Suite 361  
 Lakewood, Colorado 80215

IN REPLY REFER TO:  
 ES/CO: NLAA/RMNP  
 Mail Stop 65412

OCT 18 2005

Mr. Larry Gamble  
 Chief, Branch of Planning & Compliance  
 Rocky Mountain National Park  
 Estes Park, Colorado 80517

Dear Mr. Gamble:

The U.S. Fish and Wildlife Service has received your October 3, 2005, emailed correspondence requesting concurrence for your revised Threatened and Endangered Unit Species List (revised December 2004). The purpose of the "unit species list" is to streamline the section 7 consultation required of Federal agencies under the Endangered Species Act. This list would eliminate the Rocky Mountain National Park (RMNP) agencies from having to request a threatened and endangered species list each time they require consultation with the Service.

The Service concurs with your updating the status listed for the Boreal toad, *Bufo boreas boreas*. This species is no longer a candidate species and it is appropriate to remove it from your Threatened and Endangered Unit Species List. The Service also concurs that the following listed species may be affected by activities of the Rocky Mountain National Park and consultations will be needed. Although candidate species presently receive no protection under the Act, it is within the spirit of the Act to consider project impacts to potentially sensitive species. Please be aware that threatened and endangered species lists should be updated every 90 days by telephone or in writing. If the update requires a change in the list below, the change will be documented in writing. The following species are of potential concern for your projects.

### **Unit Species List for the Rocky Mountain National Park**

Bald eagle	<i>Haliaeetus leucocephalus</i>
Bonytail	<i>Gila elegans</i>
Canada lynx	<i>Lynx canadensis</i>
Colorado butterfly plant	<i>Gaura neomexicana</i> spp. <i>Coloradensis</i>
Colorado pikeminnow	<i>Ptychocheilus lucius</i>
Greenback cutthroat trout	<i>Oncorhynchus clarki stomias</i>
Humpback chub	<i>Gila cypha</i>
Least Tern	<i>Sterna antillarum</i>
Mexican spotted owl	<i>Strix occidentalis lucida</i>

Pallid sturgeon	<i>Scaphirhynchus albus</i>
Piping plover	<i>Charadrius melodus</i>
Preble's meadow jumping mouse	<i>Zapus hudsonius preblei</i>
Razorback sucker	<i>Xyrauchen texanus</i>
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>
Whooping crane	<i>Grus americana</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>

If the Service can be of further assistance, contact Andrea Jackson of my staff at (303)275-2349.

Sincerely,



Susan Linner  
Colorado Field Supervisor

Reference: SpeciesList/ RMNP 10-2005

State Endangered, Threatened, and Rare Species

for

## Rocky Mountain National Park

*Last Revised February 2006*

Rocky Mountain National Park (RMNP) uses the following table to identify state endangered and threatened species, species of concern and rare species that must be protected if found within a proposed project site. The RMNP list is updated annually. Federally threatened, endangered and candidate species are maintained in another list, separate from state listed species.

Agencies have a variety of ways of tracking and measuring the biological imperilment of species. The Colorado Wildlife Commission determines if a given specie needs protection under state laws. Three primary categories are applicable to Rocky Mountain National Park:

### State Status Codes

- E State Endangered** – Listed as endangered by the Colorado Division of Wildlife. Those species or subspecies of native wildlife whose prospects for survival or recruitment within Colorado are in jeopardy, as determined by the Commission. State endangered species have legal protection under Colorado Revised Statutes 33-2-105 Article 2.
- T State Threatened** – Listed as threatened by the Colorado Division of Wildlife. Those species or subspecies of native wildlife which, as determined by the Commission, are not in immediate jeopardy of extinction but are vulnerable because they exist in such small numbers, are so extremely restricted in their range, or are experiencing such low recruitment or survival that they may become extinct. State threatened species have legal protection under Colorado Revised Statutes 33-2-105 Article 2.
- SC State Special Concern** – Those species or subspecies of native wildlife that have been removed from the state threatened or endangered list within the last five years; are proposed for federal listing (or a federal listing "candidate species") and are not already state listed; have experienced, based on the best available data, a downward trend in numbers or distribution lasting at least five years that may lead to an endangered or threatened status; or are otherwise determined to be vulnerable in Colorado.

The Colorado Division of Wildlife maintains species list for T&E and SC species at <http://wildlife.state.co.us/wildlifespecies/speciesofconcern/>

### Species of Continental Importance Code

Partners in Flight (PIF) developed a North American Landbird Conservation Plan in 2004 and an updated species assessment database and handbook in 2005. These documents provide a continental synthesis of priorities, objectives and rankings that will guide landbird conservation actions at national and international scales. Species of continental concern are identified in the column with CNHP global rank codes as CC. A list of all PIF landbird species of continental importance, watch listed species, and stewardship species can be found at <http://www.rmbo.org/pif/pifdb.html>. North American Avian Species of Continental Importance (RMNP is within the Intermountain West Avifaunal Biome Bird Conservation Region (BCR) 16)

**CC** Continental Concern Species. Species must meet all of the following criteria in order to rank as a species of concern within RMNP

- Population size (PS-g) score greater than 3,
- Breeding distribution (BD-g) score greater than 3,
- Threats to breeding (TB-g) score greater than 3,
- Population trend (PT-t) score greater than 2,
- Percent of Population (Pct POP) in BCR-16 greater than 20%

### **Global and State Ranking Codes**

The Colorado Natural Heritage Program (CNHP), based in Fort Collins manages a large database and ranking system for Colorado species. The database can be accessed through the Internet at [www.cnhp.colostate.edu](http://www.cnhp.colostate.edu). The CNHP ranking system has two primary components – a ranking for the global status of the specie (G), and a ranking for that part of the range found within the state (S). Numeric extensions are added to these on a scale of 1 (critically imperiled) to 5 (demonstrably secure). A reference that CNHP uses to identify global status of a species is an online encyclopedia of life maintained by NatureServe at <http://www.natureserve.org/>

Natural Heritage ranks should not be interpreted as legal designations. Although most species protected under state or federal endangered species laws are extremely rare, not all rare species receive legal protection. National Park Service policies and guidelines require the preservation and protection of all native species.

### **Global Rank Codes**

- G1** Critically imperiled globally because of rarity (5 or fewer occurrences in the world; or 1,000 or fewer individuals), or because of some factor of its biology makes it especially vulnerable to extinction.
- G2** Imperiled globally because of rarity (6 to 20 occurrences, or 1,000 to 3,000 individuals), or because other factors demonstrably make it very vulnerable to extinction throughout its range.
- G3** Vulnerable through its range or found locally in a restricted range (21 to 100 occurrences, or 3,000 to 10,000 individuals).

- G4** Apparently secure globally, though it might be quite rare in parts of its range, especially at the periphery, usually more than 100 occurrences and 10,000 individuals.
- G5** Demonstrably secure globally, although it may be quite rare in parts of its range, especially at the periphery.
- G#T#** Trinomial rank (T) is used for subspecies or varieties. These taxa are ranked on the same criteria as G1-G5.
- GQ** Indicates uncertainty about taxonomic status.
- G#?** Indicates uncertainty about an assigned global rank.

### State Rank Codes

- S1** Critically imperiled state because of rarity (5 or fewer occurrences in the world; or 1,000 or fewer individuals), or because of some factor of its biology makes it especially vulnerable to extinction.
- S2** Imperiled state because of rarity (6 to 20 occurrences, or 1,000 to 3,000 individuals), or because other factors demonstrably make it very vulnerable to extinction throughout its range.
- S3** Vulnerable through its range within a state or found locally in a restricted range (21 to 100 occurrences, or 3,000 to 10,000 individuals).
- S4** Apparently secure within the state, though it might be quite rare in parts of its range, especially at the periphery, usually more than 100 occurrences and 10,000 individuals.
- S5** Demonstrably secure within the state, although it may be quite rare in parts of its range, especially at the periphery.
- S#B** Refers to the breeding season imperilment of species that are not permanent residents.
- S#N** Refers to the non-breeding season imperilment of species that are not permanent residents. Where no consistent location can be discerned for migrants or non-breeding populations, a rank of SZN is used.
- SH** Historically known, but usually not verified for an extended period of time and could be extirpated from the park or the state.
- SNR** Not yet ranked in the state due to lack of information.
- SX** Presumed extirpated from within the state.
- S#?** Indicates uncertainty about an assigned state rank.

The RMNP list of state Endangered, Threatened, and Rare Species does not include State Rank Codes S4 and S5, unless it has been identified as a species of continental concern (CC), because these rankings indicate that the species is apparently or demonstrably secure within the state. If a species is listed as unconfirmed, it means it occurred historically and is presently not confirmed in the park; or has never been confirmed but the park has appropriate habitat, or it has been confirmed (historically or presently) in the counties the park occupies.

## APPENDIX D

Scientific Name	Common Name	Time of Occurrence in RMNP	State Status	CNHP, CC Rank	
				Global	State
<b>Amphibians</b>					
<i>Bufo boreas pop1</i>	Boreal toad (Southern Rocky Mountain Population)	All year	E	G4T1Q	S1
<i>Rana sylvatica</i>	Wood Frog	All year	SC	G5	S3
<b>Birds</b>					
<i>Accipiter gentiles</i>	Northern goshawk	All year		G5	S3B
<i>Aegolius funereus</i>	Boreal owl	All year		G5	S2
<i>Otus flammeolus</i>	Flammulated owl	Summer or migrant		CC, G4	S4
<i>Amphispiza belli?</i>	Sage sparrow	Summer or migrant		G5	S3B
<i>Bucephala islandica</i>	Barrow's goldeneye	Winter or migrant	SC	G5	S2B
<i>Buteo regalis</i>	Ferruginous hawk	Migrant	SC	G4	S3B, S4N
<i>Calcarius mccownii</i>	McCown's longspur	Migrant		G5	S2B
<i>Catharus fuscescens</i>	Veery	Summer or migrant		G5	S3B
<i>Sialia mexicana</i>	Western bluebird	Summer		CC, G5	S5B, S4N
<i>Pipilo chlorurus</i>	Green-tailed towhee	Summer		CC, G5	S5
<i>Catoptrophorus semipalmatus</i>	Willet	Migrant		G5	S1B
<i>Melanerpes lewis</i>	Lewis's woodpecker	Summer, migrant		CC, G4	S4

Scientific Name	Common Name	Time of Occurrence in RMNP	State Status	CNHP, CC Rank	
				Global	State
<i>Sphyrapicus thyroideus</i>	Williamson's sapsucker	Summer		CC, G4	S4B
<i>Coccyzus americanus occidentalis</i> (unconfirmed)	Western Yellow-billed cuckoo	Accidental, two recorded occurrences, 1947 & 1980	SC	G5T2Q	SNA
<i>Empidonax occidentalis</i>	Cordilleran flycatcher	Summer		CC, G5	S5B
<i>Cypseloides niger</i>	Black swift	Summer		G4	S3B
<i>Vermivora virginiae</i>	Virginia's warbler	Summer		CC, G5	S5
<i>Dendroica graciae</i>	Grace's warbler	Accidental, one recorded occurrence, 1990		G5	S3B
<i>Dolichonyx oryzivorus</i>	Bobolink	Accidental, summer or migrant		G5	S3B
<i>Egretta thula</i>	Snowy Egret	Migrant or rare summer		G5	S2B
<i>Falco peregrinus anatum</i>	American peregrine falcon	Summer or migrant	SC	G4T3	S2B
<i>Glaucidium gnoma</i>	Northern pygmy owl	All year		G5	S3B
<i>Grus canadensis tabida</i>	Greater sandhill crane	Summer or migrant	SC	G5T4	S2B, S4N
<i>Haliaeetus leucocephalus</i>	Bald eagle	All year	T	G5	S1B, S3N
<i>Leucosticte australis</i>	Brown-capped rosy-finch	All year		CC, G4	S3B, S4N
<i>Loxia leucoptera</i>	White-winged crossbill	All year, Irregular visitor		G5	S1B

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Scientific Name	Common Name	Time of Occurrence in RMNP	State Status	CNHP, CC Rank	
				Global	State
<i>Numenius americanus</i>	Long-billed curlew	Migrant	SC	G5	S2B
<i>Pelecanus erythrorhynchos</i>	American white pelican	Migrant	SC	G3	S1B
<i>Plegadis chihi</i>	White-faced ibis	Migrant		G5	S2B
<i>Seiurus aurocapillus</i>	Ovenbird	Rare summer or rare migrant		G5	S2B
<i>Sterna forsteri</i>	Forster's tern	Migrant		G5	S2B, S4N
<i>Strix occidentalis lucida</i> (Unconfirmed)	Mexican spotted owl	* All Year	T	CC, G3T3,	S1B, SUN
<b>Fish</b>					
<i>Oncorhynchus clarki pleuriticus</i>	Colorado River cutthroat Trout	All year	SC	G4T3	S3
<i>Oncorhynchus clarki stomias</i>	Greenback cutthroat trout	All year	T	G4T2T3	S2
<b>Mammals</b>					
<i>Canis lupis</i> (historic/ presently unconfirmed)	Gray wolf		E	G4	SX
<i>Lynx canadensis</i>	Lynx	All year	E	G5	S1
<i>Gulo gulo</i> (unconfirmed)	Wolverine	All year	E	G4	S1
<i>Lontra canadensis</i>	River otter	All year	T	G5	
<i>Sorex hoyi montanus</i>	Pygmy shrew	All year		G5T2 T3	S2
<i>Sorex nanus</i>	Dwarf shrew	All year		G4	S2
<i>Ursus arctos</i> (historic/extirpated)	Grizzly or Brown bear		E	G4	SX

Scientific Name	Common Name	Time of Occurrence in RMNP	State Status	CNHP, CC Rank	
				Global	State
<b>Invertebrates (Insects)</b>					
<i>Alloperia pilosa</i>	A stonefly	All year		G3	S2
<i>Colorado luskii</i>	Lusk's pinemoth	Summer		G4	S1?
<i>Hyles galli</i>	Galium sphinx moth	Summer		G5	S3?
<i>Paratrytone snowi</i>	Snow's skipper	Summer		G5	S3
<i>Perlomyia utahensis</i>	A stonefly	All year		G3	S2
<i>Pictetiella expansa</i>	A stonefly	All year		G3	S2
<i>Pyrgus ruralis</i>	Two-banded skipper	Summer		G5	S3
<i>Stinga morrisoni</i>	Morrison's skipper	Summer		G4G5	S3S4
<b>Mollusk</b>					
<i>Acroloxus coloradensis</i>	Rocky mountain capshell	All year	SC	G3	S1
<b>Lichens</b>					
<i>Brachythecium ferruginascens</i>				G3G4	S1S3
<i>Bryum alpinum</i>				G4G5	S1S3
<b>Mosses</b>					
<i>Andreaea heinemannii</i>				G3G5	S1S3
<i>Andreaea rupestris</i>				G5	S1S3
<i>Aulacomnium palustre</i> <i>var. imbricatum</i>				G5TNR	S1S3
<i>Campylopus schimperi</i>				G3G4	S1S3
<i>Grimmia mollis</i>				G3G5	S1S3

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Scientific Name	Common Name	Time of Occurrence in RMNP	State Status	CNHP, CC Rank	
				Global	State
<i>Grimmia teretinervis</i>				G3G5	S1S3
<i>Hylocomiastrum pyrenaicum</i>				G4G5	S1S3
<i>Hylocomium alaskanum</i>				G5	S1S3
<i>Leptopterigynandrum austro-alpinum</i>				G3G5	S1S3
<i>Mnium blyttii</i>				G5	S1S3
<i>Oreas martiana</i>				G5?	S1S3
<i>Plagiothecium cavifolium</i>				G5	S1S3
<i>Pleurozium schreberi</i>	Feathermoss			G5	S1S3
<i>Pohila tundrae</i>				G2G3	S1S3
<i>Rhytidium rugosum</i>	Golden Glade-moss			G5	S1S3
<i>Roellia roellii</i>				G4	S1S3
<i>Sphagnum contortum</i>	Sphagnum			G5	S1S3
<b>Liverworts</b>					
<i>Gymnomitrium corallioides</i>				G4G5	S1S3
<i>Nardia geoscyphus</i>				G5	S1S3
<b>Plants</b>					
<i>Aletes humilis</i> (unconfirmed)	Larimer aletes			G2G3	S2S3
<i>Aquilegia saximontana</i>	Rocky Mountain columbine			G3	S3
<i>Artemisia pattersonii</i>	Patterson's wormwood			G3G4	S3

Scientific Name	Common Name	Time of Occurrence in RMNP	State Status	CNHP, CC Rank	
				Global	State
<i>Asplenium septentrionale</i>	Grass-fern			G4G5	S3S4
<i>Botrychium echo</i>	Reflected moonwort			G3	S3
<i>Botrychium hesperium</i>	Western moonwort			G4	S2
<i>Botrychium lanceolatum</i> <i>var lanceolatum</i>	Lance-leaved moonwort			G5T4	S3
<i>Botrychium lunaria</i>	Common Moonwort			G5	S3
<i>Botrychium minganense</i>	Mingan's moonwort			G4	S1
<i>Carex diandra</i>	Lesser panicled sedge			G5	S1
<i>Carex leptalea</i>	Bristle-stalk sedge			G5	S1
<i>Carex limosa</i>	Mud sedge			G5	S2
<i>Carex oreocharis</i>	A sedge			G3	S1
<i>Carex stenoptila</i>	River bank sedge			G2	S2?
<i>Castilleja puberula</i>	Downy Indian-paintbrush			G2G3	SNR
<i>Chionophila jamesii</i>	Rocky mountain snowlover			G4?	S3S4
<i>Cyripedium fasciculatum</i>	Clustered lady's-slipper			G4	S3
<i>Cystopteris montana</i>	Mountain bladder fern			G5	S1
<i>Draba crassa</i>	Thick-leaf whitlow-grass			G3	S3

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Scientific Name	Common Name	Time of Occurrence in RMNP	State Status	CNHP, CC Rank	
				Global	State
<i>Draba fladnizensis</i>	Arctic Draba			G4	S2S3
<i>Draba grayana</i>	Gray's peak whitlow-grass			G2	S2
<i>Draba porsildii</i>	Porsild's Whitlow-grass			G3G4	S1
<i>Draba streptobrachia</i>	Colorado Divide whitlow-grass			G3	S3
<i>Drymaria effuse</i> var. <i>depressa</i>	Spreading drymaria			G4T4	SNR
<i>Dryopteris expansa</i>	Spreading wood fern			G5	S1
<i>Erocallis triphylla</i>	Dwarf Spring Beauty			G4?	S2
<i>Hippochaete variegata</i>	Variegated scouringrush			G5	S1
<i>Isoetes tenella</i>	Spiny-spored quillwort			G5?T5?	S2
<i>Juncus tweedyi</i>	Tweedy rush			G3Q	S1
<i>Juncus vaseyi</i>	Vasey bulrush			G5?	S1
<i>Lewisia rediviva</i>	Bitterroot			G5	S2
<i>Liatris ligulistylis</i>	Gay-feather			G5?	S1S2
<i>Lilium philadelphicum</i>	Wood lily			G5	S3S4
<i>Listera borealis</i>	Northern twayblade			G4	S2
<i>Listera convallarioides</i>	Broad-Leaved twayblade			G5	S2
<i>Luzula subcapitata</i>	Colorado wood-			G3?	S3?

Scientific Name	Common Name	Time of Occurrence in RMNP	State Status	CNHP, CC Rank	
				Global	State
	rush				
<i>Mimulus gemmiparus</i>	Weber monkey flower			G1	S1
<i>Minuartica stricta</i>	Rock sandwort			G5	S1
<i>Mentzelia sinuata</i>	Wavy-leaf stickleaf			G3	S2
<i>Nuttallia speciosa</i>	Jeweled blazingstar			G3?	S3?
<i>Papaver radicum</i> spp. <i>Kluanense</i>	Alpine poppy			G5T3 T4	S3S4
<i>Parnassia kotzebuei</i>	Kotzebue grass-of-parnassus			G4	S2
<i>Penstemon harbourii</i>	Harbour beardtongue			G3	S3S4
<i>Polypodium hesperium</i>	Western polypody			G5	S1S2
<i>Potentilla rupicola</i>	Rocky mountain cinquefoil			G2	S2
<i>Pyrola picta</i> (unconfirmed)	Pictureleaf wintergreen			G4G5	S3S4
<i>Salix serissima</i>	Autumn willow			G4	S1
<i>Silene kingii</i>	King's campion			G2G4Q	NT
<i>Sisyrinchium pallidum</i>	Pale blue-eyed grass			G2G3	S2
<i>Telesonix jamesii</i>	James' telesonix			G2G3	S2
<i>Tonestus lyallii</i>	Lyall haplopappus			G5	S1?
<i>Viola Selkirkii</i>	Selkirk violet			G5?	S1

## APPENDIX D

There is no record of the Mexican spotted owl occurring in the park, but RMNP with concurrence from the US Fish and Wildlife Service has identified potential habitat; and there are historic records of the owl occurring in Boulder and Larimer Counties in lower elevations.

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**APPENDIX E: ROCKY MOUNTAIN NATIONAL PARK  
WILDLIFE SPECIES LISTS**

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**Mammal Species Reported from Rocky Mountain National Park**

Common Name	Scientific Name
Masked shrew	<i>Sorex cinereus</i>
Water shrew	<i>Sorex palustris</i>
Townsend's big-eared bat	<i>Corynorhinus townsendii</i> ( <i>Plecotus townsendii</i> )
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Hoary bat	<i>Lasiurus cinereus</i>
Long-eared myotis	<i>Myotis evotis</i>
Little brown bat	<i>Myotis lucifugus</i>
Long-legged myotis	<i>Myotis volans</i>
American pika	<i>Ochotona princeps</i>
Snowshoe hare	<i>Lepus americanus</i>
White-tailed jackrabbit	<i>Lepus townsendii</i>
Mountain cottontail	<i>Sylvilagus nuttallii</i>
Yellow-bellied marmot	<i>Marmota flaviventris</i>
Abert's squirrel	<i>Sciurus aberti</i>
Eastern fox squirrel	<i>Sciurus niger</i>
Wyoming ground squirrel	<i>Spermophilus elegans</i>
Golden-mantled ground squirrel	<i>Spermophilus lateralis</i>
Rock squirrel	<i>Spermophilus variegatus</i>
Least chipmunk	<i>Tamias minimus</i>
Colorado chipmunk	<i>Tamias quadrivittatus</i>
Uinta chipmunk	<i>Tamias umbrinus</i>
Red squirrel	<i>Tamiasciurus hudsonicus</i>
Northern pocket gopher	<i>Thomomys talpoides</i>
American beaver	<i>Castor canadensis</i>
Southern red-backed vole	<i>Clethrionomys gapperi</i>
Long-tailed vole	<i>Microtus longicaudus</i>
Bushy-tailed woodrat	<i>Neotoma cinerea</i>
Mexican woodrat	<i>Neotoma mexicana</i>
Common muskrat	<i>Ondatra zibethicus</i>
Deer mouse	<i>Peromyscus maniculatus</i>
Western jumping mouse	<i>Zapus princeps</i>
Common porcupine	<i>Erethizon dorsatum</i>
Coyote	<i>Canis latrans</i>
Common gray fox	<i>Urocyon cinereoargenteus</i>
Red fox	<i>Vulpes vulpes</i> ( <i>Vulpes fulva</i> )
Black bear	<i>Ursus americanus</i>
Common raccoon	<i>Procyon lotor</i>
Northern river otter	<i>Lutra canadensis</i> ( <i>Lontra canadensis</i> )
American marten	<i>Martes americana</i>
Short-tailed weasel	<i>Mustela erminea</i>
Long-tailed weasel	<i>Mustela frenata</i>
Mink	<i>Mustela vison</i>
American badger	<i>Taxidea taxus</i>
Striped skunk	<i>Mephitis mephitis</i>
Western spotted skunk	<i>Spilogale gracilis</i>
Bobcat	<i>Lynx rufus</i> ( <i>Felis rufus</i> )
Mountain lion	<i>Puma concolor</i> ( <i>Felis concolor</i> )

### Mammal Species Reported from Rocky Mountain National Park

Common Name	Scientific Name
Moose	<i>Alces alces</i>
Elk	<i>Cervus elaphus</i>
Mule deer	<i>Odocoileus hemionus</i>
Pronghorn	<i>Antilocapra americana</i>
Bighorn sheep	<i>Ovis canadensis</i>

Source:

[http://www.enature.com/parks/localguide\\_park\\_display.asp?rgn=PK\\_32&showType=4&curGroupID=5&urFamilyID=0&showClass=](http://www.enature.com/parks/localguide_park_display.asp?rgn=PK_32&showType=4&curGroupID=5&urFamilyID=0&showClass=)

### Bird Species Reported from Rocky Mountain National Park

Common Name	Scientific Name
Common loon	<i>Gavia immer</i>
Western grebe	<i>Aechmophorus occidentalis</i>
Horned grebe	<i>Podiceps auritus</i>
Red-necked grebe	<i>Podiceps grisegena</i>
Eared grebe	<i>Podiceps nigricollis</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
American white pelican	<i>Pelecanus erythrorhynchos</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Great blue heron	<i>Ardea herodias</i>
American bittern	<i>Botaurus lentiginosus</i>
Cattle egret	<i>Bubulcus ibis</i>
Green heron	<i>Butorides virescens</i>
Snowy egret	<i>Egretta thula</i>
Least bittern	<i>Ixobrychus exilis</i>
Black-crowned night-heron	<i>Nycticorax nycticorax</i>
White-faced ibis	<i>Plegadis chihi</i>
Turkey vulture	<i>Cathartes aura</i>
Wood duck	<i>Aix sponsa</i>
Northern pintail	<i>Anas acuta</i>
American wigeon	<i>Anas americana</i>
Northern shoveler	<i>Anas clypeata</i>
Green-winged teal	<i>Anas crecca</i>
Cinnamon teal	<i>Anas cyanoptera</i>
Blue-winged teal	<i>Anas discors</i>
Mallard	<i>Anas platyrhynchos</i>
Gadwall	<i>Anas strepera</i>
Greater white-fronted goose	<i>Anser albifrons</i>
Lesser scaup	<i>Aythya affinis</i>
Redhead	<i>Aythya americana</i>
Ring-necked duck	<i>Aythya collaris</i>
Canvasback	<i>Aythya valisineria</i>
Canada goose	<i>Branta canadensis</i>
Bufflehead	<i>Bucephala albeola</i>
Common goldeneye	<i>Bucephala clangula</i>
Barrow's goldeneye	<i>Bucephala islandica</i>

**Bird Species Reported from Rocky Mountain National Park**

Common Name	Scientific Name
Snow goose	<i>Chen caerulescens</i>
Long-tailed duck	<i>Clangula hyemalis</i>
Tundra swan	<i>Cygnus columbianus</i>
Hooded merganser	<i>Lophodytes cucullatus (Mergus cucullatus)</i>
White-winged scoter	<i>Melanitta fusca</i>
Surf scoter	<i>Melanitta perspicillata</i>
Common merganser	<i>Mergus merganser</i>
Red-breasted merganser	<i>Mergus serrator</i>
Ruddy duck	<i>Oxyura jamaicensis</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Northern goshawk	<i>Accipiter gentilis</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Golden eagle	<i>Aquila chrysaetos</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Rough-legged hawk	<i>Buteo lagopus</i>
Broad-winged hawk	<i>Buteo platypterus</i>
Ferruginous hawk	<i>Buteo regalis</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Northern harrier	<i>Circus cyaneus</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Osprey	<i>Pandion haliaetus</i>
Merlin	<i>Falco columbarius</i>
Prairie falcon	<i>Falco mexicanus</i>
Peregrine falcon	<i>Falco peregrinus</i>
American kestrel	<i>Falco sparverius</i>
Blue grouse	<i>Dendragapus obscurus</i>
White-tailed ptarmigan	<i>Lagopus leucurus</i>
Wild turkey	<i>Meleagris gallopavo</i>
American coot	<i>Fulica americana</i>
Common moorhen	<i>Gallinula chloropus</i>
Sora	<i>Porzana carolina</i>
Virginia rail	<i>Rallus limicola</i>
Sandhill crane	<i>Grus canadensis</i>
Killdeer	<i>Charadrius vociferus</i>
American avocet	<i>Recurvirostra americana</i>
Spotted sandpiper	<i>Actitis macularia</i>
Baird's sandpiper	<i>Calidris bairdii</i>
Western sandpiper	<i>Calidris mauri</i>
Least sandpiper	<i>Calidris minutilla</i>
Willet	<i>Catoptrophorus semipalmatus</i>
Wilson's snipe	<i>Gallinago delicata (Gallinago gallinago)</i>
Marbled godwit	<i>Limosa fedoa</i>
Long-billed curlew	<i>Numenius americanus</i>
Red-necked phalarope	<i>Phalaropus lobatus</i>
Wilson's phalarope	<i>Phalaropus tricolor</i>
Lesser yellowlegs	<i>Tringa flavipes</i>
Greater yellowlegs	<i>Tringa melanoleuca</i>

**Bird Species Reported from Rocky Mountain National Park**

Common Name	Scientific Name
Solitary sandpiper	<i>Tringa solitaria</i>
Black tern	<i>Chlidonias niger</i>
Herring gull	<i>Larus argentatus</i>
California gull	<i>Larus californicus</i>
Ring-billed gull	<i>Larus delawarensis</i>
Bonaparte's gull	<i>Larus philadelphia</i>
Franklin's gull	<i>Larus pipixcan</i>
Caspian tern	<i>Sterna caspia</i>
Forster's tern	<i>Sterna forsteri</i>
Sabine's gull	<i>Xema sabini</i>
Band-tailed pigeon	<i>Columba fasciata</i>
Rock pigeon	<i>Columba livia</i>
Mourning dove	<i>Zenaida macroura</i>
Northern saw-whet owl	<i>Aegolius acadicus</i>
Boreal owl	<i>Aegolius funereus</i>
Long-eared owl	<i>Asio otus</i>
Great horned owl	<i>Bubo virginianus</i>
Northern pygmy-owl	<i>Glaucidium gnoma</i>
Eastern screech-owl	<i>Otus asio</i>
Flammulated owl	<i>Otus flammeolus</i>
Western screech-owl	<i>Otus kennicottii</i>
Common nighthawk	<i>Chordeiles minor</i>
Common poorwill	<i>Phalaenoptilus nuttallii</i>
White-throated swift	<i>Aeronautes saxatalis</i>
Black swift	<i>Cypseloides niger</i>
Black-chinned hummingbird	<i>Archilochus alexandri</i>
Magnificent hummingbird	<i>Eugenes fulgens</i>
Broad-tailed hummingbird	<i>Selasphorus platycercus</i>
Rufous hummingbird	<i>Selasphorus rufus</i>
Calliope hummingbird	<i>Stellula calliope</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Northern flicker	<i>Colaptes auratus</i>
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Lewis's woodpecker	<i>Melanerpes lewis</i>
Downy woodpecker	<i>Picoides pubescens</i>
Three-toed woodpecker	<i>Picoides tridactylus</i>
Hairy woodpecker	<i>Picoides villosus</i>
Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>
Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Olive-sided flycatcher	<i>Contopus cooperi</i> ( <i>Contopus borealis</i> )
Western wood-pewee	<i>Contopus sordidulus</i>
Hammond's flycatcher	<i>Empidonax hammondii</i>
Least flycatcher	<i>Empidonax minimus</i>
Dusky flycatcher	<i>Empidonax oberholseri</i>
Cordilleran flycatcher	<i>Empidonax occidentalis</i>
Willow flycatcher	<i>Empidonax traillii</i>

### Bird Species Reported from Rocky Mountain National Park

Common Name	Scientific Name
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>
Say's phoebe	<i>Sayornis saya</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Western kingbird	<i>Tyrannus verticalis</i>
Cassin's kingbird	<i>Tyrannus vociferans</i>
Northern shrike	<i>Lanius excubitor</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Cassin's vireo	<i>Vireo cassinii</i>
Warbling vireo	<i>Vireo gilvus</i>
White-eyed vireo	<i>Vireo griseus</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Plumbeous vireo	<i>Vireo plumbeus</i>
Florida scrub-jay	<i>Aphelocoma coerulescens</i>
American crow	<i>Corvus brachyrhynchos</i>
Common raven	<i>Corvus corax</i>
Blue jay	<i>Cyanocitta cristata</i>
Steller's jay	<i>Cyanocitta stelleri</i>
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>
Clark's nutcracker	<i>Nucifraga columbiana</i>
Gray jay	<i>Perisoreus canadensis</i>
Black-billed magpie	<i>Pica hudsonia</i>
Horned lark	<i>Eremophila alpestris</i>
Barn swallow	<i>Hirundo rustica</i>
Cliff swallow	<i>Petrochelidon pyrrhonota (Hirundo pyrrhonota)</i>
Purple martin	<i>Progne subis</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Tree swallow	<i>Tachycineta bicolor</i>
Violet-green swallow	<i>Tachycineta thalassina</i>
Juniper titmouse	<i>Baeolophus ridgwayi (Parus ridgway)</i>
Black-capped chickadee	<i>Poecile atricapilla</i>
Mountain chickadee	<i>Poecile gambeli</i>
Red-breasted nuthatch	<i>Sitta canadensis</i>
White-breasted nuthatch	<i>Sitta carolinensis</i>
Pygmy nuthatch	<i>Sitta pygmaea</i>
Brown creeper	<i>Certhia americana</i>
Canyon wren	<i>Catherpes mexicanus</i>
Marsh wren	<i>Cistothorus palustris</i>
Rock wren	<i>Salpinctes obsoletus</i>
Bewick's wren	<i>Thryomanes bewickii</i>
House wren	<i>Troglodytes aedon</i>
Winter wren	<i>Troglodytes troglodytes</i>
American dipper	<i>Cinclus mexicanus</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Golden-crowned kinglet	<i>Regulus satrapa</i>
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>
Veery	<i>Catharus fuscescens</i>
Hermit thrush	<i>Catharus guttatus</i>

**Bird Species Reported from Rocky Mountain National Park**

Common Name	Scientific Name
Swainson's thrush	<i>Catharus ustulatus</i>
Wood thrush	<i>Hylocichla mustelina</i>
Varied thrush	<i>Ixoreus naevius</i>
Townsend's solitaire	<i>Myadestes townsendi</i>
Mountain bluebird	<i>Sialia currucoides</i>
Western bluebird	<i>Sialia mexicana</i>
Eastern bluebird	<i>Sialia sialis</i>
American robin	<i>Turdus migratorius</i>
Gray catbird	<i>Dumetella carolinensis</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Sage thrasher	<i>Oreoscoptes montanus</i>
Brown thrasher	<i>Toxostoma rufum</i>
European starling	<i>Sturnus vulgaris</i>
American pipit	<i>Anthus rubescens</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Bohemian waxwing	<i>Bombycilla garrulus</i>
Black-throated blue warbler	<i>Dendroica caerulescens</i>
Bay-breasted warbler	<i>Dendroica castanea</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>
Blackburnian warbler	<i>Dendroica fusca</i>
Grace's warbler	<i>Dendroica graciae</i>
Magnolia warbler	<i>Dendroica magnolia</i>
Black-throated gray warbler	<i>Dendroica nigrescens</i>
Palm warbler	<i>Dendroica palmarum</i>
Chestnut-sided warbler	<i>Dendroica pensylvanica</i>
Yellow warbler	<i>Dendroica petechia</i>
Cape may warbler	<i>Dendroica tigrina</i>
Townsend's warbler	<i>Dendroica townsendi</i>
Black-throated green warbler	<i>Dendroica virens</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Worm-eating warbler	<i>Helmitheros vermivora</i>
Yellow-breasted chat	<i>Icteria virens</i>
Black-and-white warbler	<i>Mniotilta varia</i>
Connecticut warbler	<i>Oporornis agilis</i>
Macgillivray's warbler	<i>Oporornis tolmiei</i>
Northern parula	<i>Parula americana</i>
Ovenbird	<i>Seiurus aurocapillus</i>
Northern waterthrush	<i>Seiurus noveboracensis</i>
American redstart	<i>Setophaga ruticilla</i>
Orange-crowned warbler	<i>Vermivora celata</i>
Golden-winged warbler	<i>Vermivora chrysoptera</i>
Tennessee warbler	<i>Vermivora peregrina</i>
Blue-winged warbler	<i>Vermivora pinus</i>
Nashville warbler	<i>Vermivora ruficapilla</i>
Virginia's warbler	<i>Vermivora virginiae</i>
Hooded warbler	<i>Wilsonia citrina</i>
Wilson's warbler	<i>Wilsonia pusilla</i>

### Bird Species Reported from Rocky Mountain National Park

Common Name	Scientific Name
Hepatic tanager	<i>Piranga flava</i>
Western tanager	<i>Piranga ludoviciana</i>
Scarlet tanager	<i>Piranga olivacea</i>
Sage sparrow	<i>Amphispiza belli</i>
Black-throated sparrow	<i>Amphispiza bilineata</i>
Lark bunting	<i>Calamospiza melanocorys</i>
Mccown's longspur	<i>Calcarius mccownii</i>
Lark sparrow	<i>Chondestes grammacus</i>
Dark-eyed junco	<i>Junco hyemalis</i>
Lincoln's sparrow	<i>Melospiza lincolnii</i>
Song sparrow	<i>Melospiza melodia</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Fox sparrow	<i>Passerella iliaca</i>
Green-tailed towhee	<i>Pipilo chlorurus</i>
Eastern towhee	<i>Pipilo erythrophthalmus</i>
Canyon towhee	<i>Pipilo fuscus</i>
Spotted towhee	<i>Pipilo maculatus</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
American tree sparrow	<i>Spizella arborea</i>
Brewer's sparrow	<i>Spizella breweri</i>
Clay-colored sparrow	<i>Spizella pallida</i>
Chipping sparrow	<i>Spizella passerina</i>
White-throated sparrow	<i>Zonotrichia albicollis</i>
Golden-crowned sparrow	<i>Zonotrichia atricapilla</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Harris's sparrow	<i>Zonotrichia querula</i>
Lazuli bunting	<i>Passerina amoena</i>
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Rusty blackbird	<i>Euphagus carolinus</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>
Bullock's oriole	<i>Icterus bullockii</i>
Baltimore oriole	<i>Icterus galbula</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Common grackle	<i>Quiscalus quiscula</i>
Western meadowlark	<i>Sturnella neglecta</i>
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
Common redpoll	<i>Carduelis flammea</i>
Pine siskin	<i>Carduelis pinus</i>
Lesser goldfinch	<i>Carduelis psaltria</i>
American goldfinch	<i>Carduelis tristis</i>
Cassin's finch	<i>Carpodacus cassinii</i>
House finch	<i>Carpodacus mexicanus</i>
Evening grosbeak	<i>Coccothraustes vespertinus</i>
Black rosy-finch	<i>Leucosticte atrata</i>

**Bird Species Reported from Rocky Mountain National Park**

Common Name	Scientific Name
Brown-capped rosy-finch	<i>Leucosticte australis</i>
Gray-crowned rosy-finch	<i>Leucosticte tephrocotis</i>
Red crossbill	<i>Loxia curvirostra</i>
White-winged crossbill	<i>Loxia leucoptera</i>
Pine grosbeak	<i>Pinicola enucleator</i>
House sparrow	<i>Passer domesticus</i>

Source: [http://www.enature.com/parks/localguide\\_park\\_display.asp?rgn=PK\\_32&showType=4](http://www.enature.com/parks/localguide_park_display.asp?rgn=PK_32&showType=4)

**Fish Species Reported for Rocky Mountain National Park**

Common Name	Scientific Name
Greenback cutthroat trout	<i>Oncorhynchus clarki stomias</i>
Colorado River cutthroat trout	<i>Oncorhynchus clarki pleuriticus</i>
Colorado speckled dace	<i>Rhinichthys osculus</i>
Mottled sculpin	<i>Cottus bairdi punctulatus</i>
Mountain sucker	<i>Catostomus platyrhynchus</i>
Western longnose sucker	<i>Catostomus catostomus griseus</i>
Western white sucker	<i>Catostomus commersoni suckii</i>
Brown trout	<i>Salmo trutta</i>
Eastern brook trout	<i>Salvelinus fontinalis</i>
Rainbow trout	<i>Oncorhynchus gairdneri</i>
Yellowstone cutthroat trout	<i>Oncorhynchus clarki bouvieri</i>

**Amphibian Species Reported for Rocky Mountain National Park**

Common Name	Scientific Name
Boreal toad	<i>Bufo boreas</i>
Tiger salamander	<i>Ambystoma tigrinum</i>
Western chorus frog	<i>Pseudacris triseriata</i>
Wood frog	<i>Rana sylvatica</i>
Northern leopard frog	<i>Rana pipiens</i>

**Reptile Species Reported for Rocky Mountain National Park**

Common Name	Scientific Name
Western terrestrial garter snake	<i>Thamnophis elegans</i>

## **APPENDIX F: AMERICAN INDIAN CONSULTATION**

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## AMERICAN INDIAN CONSULTATION

In October 2002 the Northern Arapaho Tribe and the Northern Ute Tribe were contacted by letter for government-to-government consultation regarding the elk and vegetation. These correspondences are provided in this section. Throughout the planning process, the tribes were invited to participate in the interagency planning meetings and review of internal draft and final documents as well as the Draft Elk and Vegetation Management Plan/Environmental Impact Statement (plan/EIS). Although not cooperating agencies in development of this plan, the tribes have been sent all information that has been provided to the interagency team members.



# United States Department of the Interior

## NATIONAL PARK SERVICE

Rocky Mountain National Park  
Estes Park, Colorado 80517

IN REPLY REFER TO:

L76

Mr. Pat Moss, Tribal Planner  
Northern Arapaho Business Council  
P.O. Box 396  
Fort Washakie, WY 82514

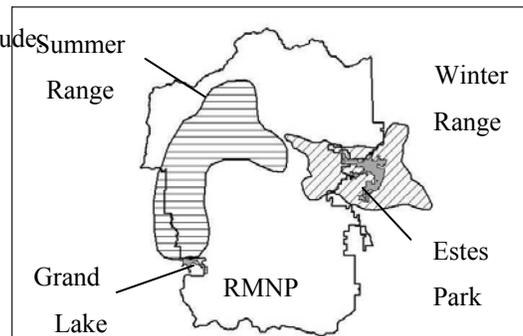
Dear Mr. Addison:

The National Park Service recognizes the historic and current significance of the lands and wildlife in the Rocky Mountain National Park (RMNP) area to the Northern Arapaho tribal members. Currently, the park is in the initial stages of forming an interagency planning team that will formulate a regional Elk and Vegetation Management Plan/Environmental Impact Statement (EIS). At the suggestion of your Tribal Planner, Mr. Pat Moss, I would like to bring you up-to-date on our current research and management planning activities; and begin consultations with yourself, Alonzo Moss, Sr., and William C'Hair to determine the preferred level of involvement of the Northern Arapaho Tribe.

An intensive research initiative on the elk population and their ecological effects in the RMNP area was recently completed and is enclosed. The results provide detailed information on elk population size, trends, distribution, and ecological effects; and strongly reinforce the regional nature of elk management issues in the Estes Valley and

Rocky Mountain National Park. Some of the significant findings includes

- About 3,000 elk reside in the Estes Valley during winter (November to May). Approximately 1/3 of these winter in the park (park sub-population) and 2/3 winter in and around the Town of Estes Park



(town sub-population). Over 90% of the elk from both areas migrate to higher elevations or the west side of RMNP during the summer.

- The park sub-population has been stable at approximately 1,000 elk for over 10 years. This portion of the population is at the carrying capacity of its winter range, meaning elk numbers are limited by food resources. The size of the town sub-population is about 2,000 elk. Separate carrying capacity estimates for the town winter range were inconsistent, making it unclear whether the population may currently be at or nearing carrying capacity, or whether the population may continue to grow to nearly 3,000 elk before stabilizing.
- Willow shrub cover has declined approximately 20% on the primary winter range since the late 1930s, and elk are suppressing the growth and reproduction of willow in these areas. Modeling results indicate that under natural conditions wolves limited the elk population size to at least 15-40% below the number of elk that could be supported by available food resources. Undisturbed conditions were also predicted to support up to twice the current amount of willow cover on primary winter range areas.
- Modeling results indicate that continuing current management would be expected to result in continued conversion of riparian willow and aspen communities to grasslands on the primary winter range. Restoring more natural conditions with vigorous willow communities would require a combination of long-term, intensive management interventions.

The results of this research initiative will be used to develop the Elk and Vegetation Management Plan/EIS. The park planning staff for this project is currently in the process of formulating an interagency planning team and project agreement among local, state, and federal agencies. The interagency team has also identified objectives for the Plan/EIS. As such, I would like to suggest that our planning staff and I visit the Wind River Reservation, so that we can meet with yourself, Alonzo Moss, Sr., William C'Hair, and fully brief you on our progress to date. In addition, this will allow us to begin formal consultations and determine what role the Northern Arapaho Tribe would like to play in the upcoming Elk and Vegetation Management Plan/EIS process. Please feel free to identify any other appropriate tribal or business council members that should be included in consultations. We will be in Ft. Duchense, Utah meeting with the Northern Ute Tribe on October 29th and would be available to come to Ethete to meet with you on October 30<sup>th</sup>. If that were not possible, we would be available on November 14 or 15 or any day during the week of November 18<sup>th</sup>. As such, I would appreciate your calling Ken Czarnowski of my staff at (970) 586-1263 to confirm if October 30<sup>th</sup> would be acceptable for a meeting or perhaps another time as indicated above.

Thank you for your time and interest in this very important topic.

Sincerely,

Vaughn L. Baker  
Superintendent

cc: Mr. Pat Moss, Tribal Planner  
RESMGT: KCzarnowski: SB 100902



## United States Department of the Interior

NATIONAL PARK SERVICE  
 Rocky Mountain National Park  
 Estes Park, Colorado 80517

IN REPLY REFER TO:

L76

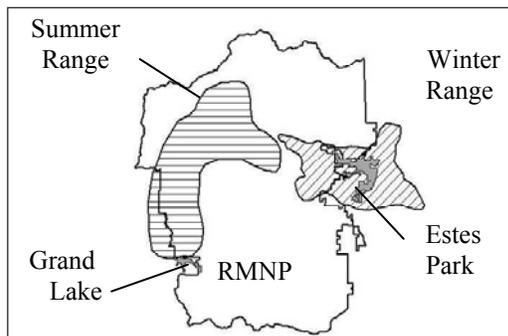
Mr. Floyd Wopsock, Chairman  
 Northern Ute Tribe  
 P.O. Box 190  
 Fort Duchesne, UT 84602

Dear Mr. Wopsock:

The National Park Service recognizes the historic and current significance of the lands and wildlife in the Rocky Mountain National Park (RMNP) area to the Northern Ute tribal members. Currently, the park is in the initial stages of forming an interagency planning team that will formulate a regional Elk and Vegetation Management Plan/Environmental Impact Statement (EIS). At the suggestion of Mr. Roland McCook, I would like to bring you up-to-date on our current research and management planning activities and begin consultations with yourself, and the Tribal Council to determine the preferred level of involvement of the Northern Ute Tribe.

An intensive research initiative on the elk population and their ecological effects in the RMNP area was recently completed and is enclosed. The results provide detailed information on elk population size, trends, distribution, and ecological effects; and strongly reinforce the regional nature of elk management issues in the Estes Valley and Rocky Mountain National Park. Some of the significant findings include:

- About 3,000 elk reside in the Estes Valley during winter (November to May). Approximately 1/3 of these winter in the park (park sub-population) and 2/3 winter in and around the Town of Estes Park (town sub-population). Over 90% of the elk from both areas migrate to higher elevations or the west side of RMNP during the summer.
- The park sub-population has been stable at approximately 1,000 elk for over 10 years. This portion of the population is at the carrying capacity of its winter range, meaning elk numbers are limited by food resources. The size of the town sub-population is about 2,000 elk. Separate carrying capacity estimates for the town winter range were inconsistent, making it unclear whether the population may currently be at or nearing carrying capacity, or whether the population may continue to grow to nearly 3,000 elk before stabilizing.
- Willow shrub cover has declined approximately 20% on the primary winter range since the late 1930s, and elk are suppressing the growth and reproduction of willow in these areas.



Modeling results indicate that under natural conditions wolves limited the elk population size to at least 15-40% below the number of elk that could be supported by available food resources. Undisturbed conditions were also predicted to support up to twice the current amount of willow cover on primary winter range areas.

- Modeling results indicate that continuing current management would be expected to result in continued conversion of riparian willow and aspen communities to grasslands on the primary winter range. Restoring more natural conditions with vigorous willow communities would require a combination of long-term, intensive management interventions.

The results of this research initiative will be used to develop the Elk and Vegetation Management Plan/EIS. The park planning staff for this project is currently in the process of formulating an interagency planning team and project agreement among local, state, and federal agencies. The interagency team has also identified objectives for the Plan/EIS. As such, I would like to suggest that our planning staff and I visit with you at Ft. Duchesne and fully brief you on our progress to date. In addition, this will allow us to begin formal consultations and determine what role the Northern Ute Tribe would like to play in the upcoming Elk and Vegetation Management Plan/EIS process. As arranged with Ms. Dana West, we will be in Ft. Duchesne on October 29th to meet with you and the Tribal Council at 10:30 A.M.

Thank you for your time and interest in this very important topic. If you have any questions, please call Ken Czarnowski of my staff at (970) 586-1263.

Sincerely,

Vaughn L. Baker

Superintendent

cc: Roland McCook

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**APPENDIX G: WILDERNESS MINIMUM REQUIREMENTS  
DECISION GUIDE**

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## **Wilderness Minimum Requirement / Minimum Tool Analysis**

This appendix contains a programmatic level minimum requirements analysis evaluating the elements associated with the Elk and Vegetation Management Plan/EIS action alternatives. Final determination of what methods would be used in wilderness areas on the primary elk range for site-specific actions to manage elk and vegetation will be further evaluated and determined when the National Park Service completes the minimum tool analysis prior to implementation of actions of this plan/EIS. The minimum tool analysis will be tiered from this programmatic analysis to evaluate a hierarchy of actions and least intrusive tools which could be used within wilderness on the primary elk range.

# MINIMUM REQUIREMENTS DECISION GUIDE

## Rocky Mountain National Park Elk and Vegetation Management Plan/EIS

*“ . . . except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act...”*

– the Wilderness Act, 1964

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Please refer to the accompanying MRDG [Instructions](#) for filling out this guide. The spaces in the worksheets will expand as necessary as you enter your response.

### **Step 1:** Determine if any administrative action is necessary.

*Description: **Briefly describe the situation that may prompt action.***

(A.)

Implementation of the elk and vegetation management plan/environmental impact statement (plan/EIS) would prompt action in wilderness in Rocky Mountain National Park. The plan/EIS considers a range of alternatives to manage the elk population and restore native vegetation within areas of the primary elk range, a large portion of which occurs in wilderness. The attached Figure 1 depicts wilderness within the park and the primary elk range. The following section describes briefly the purpose and need for the

plan/EIS that may prompt actions in wilderness. Full description of the existing conditions that have prompted action is provided in the “Purpose and Need” and “Background” sections of the plan/EIS.

The National Park Service is obligated by law and policy to maintain and restore, to the extent possible, the natural conditions and processes in park units. The Rocky Mountain National Park / Estes Valley elk population is larger, less migratory, and more concentrated than it would be under natural conditions. Elk heavily use the habitats in aspen and montane riparian willow communities, which support high levels of biodiversity; as a result, these communities may be declining in areas on the elk range where elk concentrate. The high concentrations of elk and levels of herbivory have degraded the vegetation in communities that support large numbers of bird, butterfly, and plant species in comparison to other habitat types in the park and in the Rocky Mountains (Connor 1993, Mueggler 1985, Simonson et al. 2001, Turchi et al. 1994).

NPS management policies (NPS 2006b) direct managers to strive to maintain the components and processes of naturally evolving park ecosystems. These policies also recognize that if biological or physical processes were altered in the past by human activities, they may need to be actively managed to restore them to a natural condition or to maintain the closest possible approximation of the natural condition. Natural conditions are defined as the condition of resources that would occur in the absence of human dominance over the landscape. Natural conditions occur when the components and processes of the natural system are intact. Natural change is recognized as an integral part of the functioning of natural systems; that is, resource conditions are not static, but fluctuate in response to natural processes, such as weather conditions. Recognizing such fluctuations, the plan/EIS bases its descriptions and analysis on the natural range of variation in resource conditions. A key element in determining the need for action was the comparison between existing conditions and the estimates for the natural range of variation that would be expected under natural conditions.

Elk are a natural component of the Rocky Mountain National Park ecosystem and are expected to affect native vegetation communities that occur in the park. The natural range of variation for elk populations and associated vegetation conditions in the park were estimated based on research and ecosystem modeling specific to Rocky Mountain National Park, as well as related research and experiences in other locations.

Under natural conditions, the elk population size and distribution would be controlled by a number of factors, including predators such as wolves and grizzly bears, hunting by American Indians, and the presence of competitors such as bison. Ecosystem modeling predicted that the elk population under natural conditions, given the current amount of available habitat, would fluctuate between 1,200 and 2,100 elk (Coughenour 2002) with 200 to 800 in the sub-population that winters inside the park, and 1,000 to 1,300 in the sub-population that winters outside the park. These sub-populations are referred to as the park and town sub-populations respectively throughout the text. With an intact predator base, elk would be less sedentary and more wary, resulting in lower concentrations of elk on the elk range. With elk less concentrated and less sedentary, montane riparian willow and aspen would be more abundant with increased stand size and complexity; that is, stands would have a variety of age classes and stems of differing sizes. Under natural conditions with suitable levels of montane riparian willow habitat available, beaver would be more abundant on the elk range and as a result, water levels on the primary elk winter and summer ranges would be higher, further encouraging the establishment and growth of willows. These natural conditions represent the overall desired future condition for elk and vegetation on the elk range, as presented in detail in the “Alternatives” chapter, and are what the National Park Service strives to achieve.

The purpose of the plan/EIS is to guide management actions in Rocky Mountain National Park to achieve these desired natural conditions by reducing the impacts of elk on vegetation and by restoring, to the extent possible, the natural range of variability in the elk population and affected plant communities. A successful plan would realize these purposes while providing continued elk viewing opportunities for visitors.

To determine if administrative action is necessary, answer the questions listed in A - F.

**A. Describe Valid Existing Rights or Special Provisions of Wilderness Legislation**

Are there valid existing rights or is there a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that allows consideration of action involving Section 4(c) uses? Cite law and section.

Yes:  No:  Not Applicable:

**Explain:** There are no special provisions in the Wilderness Act of 1964 or subsequent wilderness legislation that specifically allow consideration of the uses prohibited in Section 4(c) for management of wildlife and vegetation. There is a reference to fire related activities in Section 4(d)(1) which states “In addition, such measure may be taken as may be necessary in the control of fire, insects, and diseases, subject to such conditions as the Secretary deems desirable.” This language allows for fire related actions to be considered but taken only if they are the minimum necessary.

**B. Describe Requirements of Other Legislation**

Do other laws require action?

Yes:  No:  Not Applicable:

**Explain:** As an administrative unit of the National Park System, Rocky Mountain National Park is governed by the National Park Service Organic Act (39 Stat. 535, codified at 16 U.S.C. sections 1 through 4), which prohibits the National Park Service from allowing impairment of park resources and values. Thus the National Park Service would have the authority to remove or redistribute elk and to employ measures to protect vegetation if elk have the potential to impair park resources or values.

**C. Describe Other Guidance**

Does taking action conform to and implement relevant standards and guidelines and direction contained in agency policy, unit and wilderness management plans, species recovery plans, tribal government agreements, state and local government and interagency agreements?

**Yes:**       **No:**       **Not Applicable:**

**Explain:** The reduction and redistribution of the elk population and restoration of native vegetative communities would conform to NPS Management Policies and NPS wilderness preservation and management policies.

Management Policies provide guidelines and direction for management of elk and vegetation within the park.

Section 4.4.1.1 requires that the National Park Service “adopt park resource preservation, development, and use management strategies that are intended to maintain the natural population fluctuation and processes that influence the dynamics of individual plant and animal populations, groups of plant and animal populations, and migratory animal populations in parks”.

Section 4.1.5 also directs the National Park Service to reestablish natural functions and processes in human-disturbed components of natural systems in parks (unless otherwise directed by Congress). Impacts on natural systems resulting from human disturbances include the disruption of natural processes. The National Park Service will seek to return human-disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated. The National Park Service is to use the best available technology, within available resources, to restore the biological and physical components of these systems, accelerating both their recovery and the recovery of landscape and biological- community structure and function. This includes the restoration of native plants and animals, which Section 4.4.1.3 defines as “all species that have occurred or now occur as a result of natural processes on lands designated as units of the national park system”.

NPS Management Policies recognize that due to human disruption of natural processes, more manipulative management of wildlife in units of the National Park system may be necessary. As such section 4.4.2 of the Management Policies allows for the manipulative management of wildlife when “a population occurs in an unnaturally high or low concentration as a result of human influences (such as loss of seasonal habitat, the extirpation of predators, the creation of highly productive habitat through agriculture or urban landscapes) and it is not possible to mitigate the effects of the human influences.”

Section 6.3.7 of the NPS Reference Manual #41 – Wilderness Preservation and Management (RM-41) recognizes that wilderness is a composite resource with interrelated parts. “Without spectacular natural resources, especially indigenous and endemic species, a wilderness experience might not be possible. Natural resources are critical, defining elements of the wilderness resource, but need to be managed within the context of the whole. Natural resources management in wilderness will include and be guided by a coordinated program of scientific inventory, monitoring, and research.”

The NPS RM-41 further states that “The principle of non-degradation will be applied to wilderness management, and each wilderness area’s condition will be measured and assessed against its own unimpaired standard. Natural processes will be allowed, in so far as possible, to shape and control wilderness ecosystems. Management should seek to sustain natural distribution, numbers, population composition, and interaction of indigenous species. Management intervention should only be undertaken to the extent necessary to correct past mistakes, the impacts of human use, and the influences originating outside of wilderness boundaries. Management actions, including restoration of extirpated native species, altered natural fire regimes, controlling invasive alien species, endangered species management, and the protection of air and water quality, should be attempted only when the knowledge and tools exist to accomplish clearly articulated goals.”

**D. Describe Options Outside of Wilderness**

Can this situation be resolved by an administrative activity outside of wilderness?

Yes:  No:

**Explain:** In Rocky Mountain National Park, 94% of the park is recommended wilderness and 1% is designated wilderness. The degradation of vegetation on the primary elk range occurs predominantly in wilderness. To prevent degradation of native plant communities and potential impairment, action would need to be taken in wilderness areas.

- **“Untrammeled” – Wilderness is ideally unhindered and free from modern human control or manipulation.**
- **“Undeveloped” – Wilderness has minimal evidence of modern human occupation or modification.**
- **“Natural” – Wilderness ecological and evolutionary systems are substantially free from the effects of modern civilization.**
- **“Outstanding opportunities for solitude or a primitive and unconfined type of recreation” – Wilderness provides opportunities for people to experience natural sights and sounds, solitude, freedom, risk, and the physical and emotional challenges of self-discovery and self reliance**

**E. Wilderness Character**

Does taking administrative action preserve or impair wilderness character, as described by the qualities listed below?

Untrammeled:            Preserve:     Impair:

**Explain:** Reductions and redistribution of elk and actions to protect vegetation from elk herbivory would not leave the wilderness unhindered and free from human manipulation. However actions to reduce the elk population and to redistribute elk would be transient in nature. Over the long-term, reduction of the elk population and densities to within the natural range of variation would reestablish natural conditions and the untrammled nature of the wilderness character by reducing evidence of human manipulation (e.g., elk population outside natural conditions and habituated to humans) on the primary elk range. The use of temporary fences to protect aspen and/or willow habitat on the primary elk range would result in a patchy recovery of vegetation across the landscape that would reflect human manipulation of the environment. As the elk population is reduced and vegetation recovers, fences would be removed and vegetation would return to more natural conditions reestablishing the untrammled nature of the wilderness character on the primary elk range.

**Undeveloped:**            **Preserve:**     **Impair:**

**Explain:** Fences would be installed to protect native vegetation from herbivory and potential loss of aspen and riparian willow on the elk range. Fences, although not permanent, would be evidence of human modification over the 20-year planning period. The long-term benefits however are the protection and preservation from elk herbivory that is leading toward loss of vegetation and impairment of the resource.

**Natural:**                **Preserve:**     **Impair:**

**Explain:** Installation of non-permanent fences would adversely affect the natural quality of wilderness character while they were in place. Fences would be removed at the end of the planning period. Actions to reduce the elk population size and densities and protection and restoration of vegetative conditions would result in the substantial restoration of natural conditions within wilderness on the primary elk range.

**Outstanding opportunities for solitude or a primitive and unconfined type of recreation:**

**Preserve:**     **Impair:**

**Explain:** Actions to reduce and redistribute elk and install fences such as unsuppressed weapons, motorized equipment use, helicopters, aversive conditioning tools, and presence of management crews would result in short-term transient disturbance of solitude in wilderness areas of the primary elk range. Management activities within wilderness on the elk range would be temporally and spatially dispersed, and opportunity to recreate in wilderness would not be substantially inhibited on the primary elk range. In addition, a large expanse of wilderness in the park outside of the primary elk range would continue to be available for primitive and unconfined recreation.

**Other unique components that reflect the character of this wilderness:**

Preserve:  Impair:  Not Applicable:

**Explain:**

**F. Describe Effects to the Public Purposes of Wilderness**

Is taking administrative action consistent with the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act) of recreation, scenic, scientific, education, conservation, and historical use?

Yes:  No:  Not Applicable:

**Explain:** Restoration of the elk population size and densities and vegetation on the primary elk range to natural conditions would best protect the conservation, scenic, recreation, and educational uses of the wilderness within this portion of the park. The overall purpose of the action under all alternatives would be to restore natural conditions on the elk range in both the elk population and vegetative communities thereby fulfilling the NPS mandate to protect and conserve natural resources.

Reducing elk herbivory would prevent the potential loss of aspen and the conversion of montane riparian habitat to grasslands on the elk range. Aspen and riparian habitats provide habitat for a large number of birds, animals, and insects. Restoration of these habitats would result in an increase in diversity of the park's wildlife and plant species. Improving these habitats protects scenic and recreational opportunities which visitors come to the park to enjoy. All alternatives involve actions to further educate the public on the effects that an overabundant and highly concentrated elk population have on native ecological systems in the park and the effects that management actions would have on restoring native ecological components to wilderness areas.

Management actions would be taken to restore natural behaviors so that elk would be less sedentary and more wary. One of the management objectives of the plan is to decrease the level of habituation to humans that elk currently exhibit and to restore elk behaviors reflective of natural conditions. The ability to observe and study the natural behaviors of elk and the response of vegetation would be valuable to scientific uses as it progresses the understanding of the park's natural resources and ecosystem processes. In addition, there would be a benefit to the visitor experience of the park from the ability to view elk that exhibit more natural behaviors.

<b>Step 1 Decision: Is any administrative action <u>necessary</u>?</b>
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Yes:  No:  More information needed:

**Explain:** Impacts of overabundant and highly concentrated elk on vegetative communities on the primary elk range within the park are well documented and the National Park Service believes it is necessary to reduce elk population numbers and densities and protect vegetation. The plan/EIS concludes that if no action is taken and elk continue to over graze vegetation on the primary elk range. Over time there would be major adverse impacts to native vegetation leading to impairment due to the potential loss of aspen and montane riparian habitats that are limited to a large degree in the park to areas of the primary elk range. In addition, loss of these habitats would result in major adverse impacts on other wildlife species that depend upon the habitat and a likely reduction in biological diversity on the elk range.

If action is necessary, proceed to Step 2 to determine the minimum activity.

## **Step 2: Determine the minimum activity.**

### Description of Alternatives

***For each alternative, describe what methods and techniques will be used, when the activity will take place, where the activity will take place, what mitigation measures are necessary, and the general effects to the wilderness resource and character.***

The alternatives described below correspond to the action alternatives evaluated in the plan/EIS. The actions are described in detail in the “Alternatives” chapter of the plan/EIS and summarized below.

#### ***Actions common to all alternatives***

**Mitigations** – Mitigations to reduce or eliminate the risk to public health and safety would include use of subsonic ammunition, which has a shorter range than conventional rounds, and shooting from elevated stands to establish shooting lanes and reduce the distance bullets could travel via backstops. Every action would involve the presence of agency spotters who would ensure that the area is clear of people and to prevent individuals from entering the area during lethal reduction activities. Temporary area closures would occur as needed for short-periods while management activities were occurring. Required safety procedures would be implemented and required personal protective equipment would be used during all management activities.

To mitigate impacts on visitor use of the park consideration would be given to the type of method used and the time of day actions to reduce the elk population would be taken.

To reduce the effects of fences on park visitors and resources the following mitigations would be implemented.

- Fences would be temporary and removed once monitoring indicates that vegetation has recovered.
- Fence design would allow access of other wildlife species to enclosed areas with the exception of large mammals such as moose.
- Fence material and design would be selected to minimize impacts on visitors and wilderness character.
- Fences would be designed to allow public access into enclosed areas via gates to the extent possible.

**Monitoring** – Monitoring would be conducted in the short- and long-term on geographic scales ranging from site-specific to landscape. Elk population size, densities, demographics, and distribution would be monitored annually. Vegetation changes would be monitored as needed to determine progress toward restoration goals and could be done annually and/or at 5- or 10-year interval depending upon vegetation type and parameter measured. Monitoring of vegetation communities would provide the information necessary to determine how many acres of aspen and/or willow habitat on the primary elk range need to be protected. Similarly, monitoring data would provide the information necessary to determine when fences can be removed once communities are restored.

**Adaptive management** – The action alternatives would incorporate the principle of adaptive management using monitoring and evaluation to determine if management actions were achieving objectives or having unacceptable levels of adverse impact on resources including wilderness value and character and adjusting actions accordingly.

**Information and education** – Public education efforts would be enhanced to provide additional information about elk and their role in the Rocky Mountain ecosystem. Educational materials would be developed to inform and increase public understanding of the management actions taking place in the park and the effects these actions have on vegetation, other wildlife, and visitors.

**Opportunistic research activities** – In coordination with elk and vegetation management activities, up to 120 elk would be subject to a research study evaluating procedures for testing for chronic wasting disease in live elk and the effectiveness of a multi-year fertility control agent. The elk would be tagged and/or marked for identification. The study would be conducted over a 3-year period.

## ***Alternative 2***

### **Description:**

The elk population would be reduced to the lower end of the natural range of variation. This alternative would involve the rapid reduction of elk in the first four years of the plan using noise suppressed and unsuppressed weapons, darting and euthanasia, and/or use of a temporary, non-permanent capture facility. In the first four years, approximately 200 to 700 elk would be removed annually. To maintain the target population range, 25 to 150 elk would be removed annually over the remaining 16 years of the plan. To allow management of both subpopulations of elk subject to the plan, lethal reduction actions could occur any time of year inside the park. However, to allow for the greatest opportunity to reduce the park subpopulation, most lethal reductions would likely take place between November and February.

Herding using trained dogs, riders on horseback, and/or people on foot with noisemakers or visual devices could encourage elk migration from the primary winter range to the primary summer range, to move elk from the Kawuneeche Valley to areas outside the park where they could be hunted, and to direct elk to a capture facility during the reduction phase to efficiently remove a high number of elk. If necessary, helicopters could be used adaptively during herding efforts if monitoring indicates that other methods are not effective.

Aversive conditioning as with visual devices, trained herding dogs, people on foot, riders on horseback, rubber bullets, cracker shot, or noisy weapons could be used as needed to prevent excessive concentrations of elk in unfenced areas. In wilderness areas, the use of non-mechanized tools would be implemented to the greatest extent possible. Given appropriate interagency cooperation, adaptive management could also include wolves as a redistribution tool. This would involve the installation of wolf pens which could require the use of horses, all-terrain vehicles (ATVs), or helicopters to transport materials. Using wolves as a management tool for elk would also require intensive monitoring to maintain wolves within the boundary of the park. This would involve use of helicopters and the need to radio-collar and permanently mark wolves for identification purposes. The pens would need to be located on the elk range in wilderness areas to inhibit easy accessibility by the public for the safety of the wolves and the visitor.

Aspen stands (up to 160 acres; 0.1% of total wilderness in the park) on the elk range would be fenced to exclude elk herbivory. These temporary fences would be installed adaptively, based on vegetation response to elk management actions as indicated through the monitoring program. Installation of fences in locations away from roadsides may involve helicopters or other motorized vehicles such as ATVs to transport materials. Fence options include the use of wooden and/or wire fence in a rail or page-wire fence design. The design would be most compatible with wilderness character to reduce intrusiveness on the wilderness landscape. Once an area is protected from herbivory, prescribed burning, mechanical vegetation thinning, and replanting of vegetation could occur. These activities could include use of hand held tools, chainsaws, trucks, portable pumps and generators.

Removal of carcasses from the field would be accomplished using techniques such as removal on foot; using a litter or sled over frozen ground; on a horse, all-terrain vehicle, or truck; or by winching and

dragging behind a horse, all-terrain vehicle, or truck to facilitate removal from remote areas of the park. In general, helicopters would not be used to remove carcasses except from remote locations if determined necessary due to disease management concerns. Due to concerns in wilderness, preference would be given to non-motorized removal techniques to the extent possible; however, because of the high number of elk removed during the first four years of the plan, mechanized equipment would likely be required.

Monitoring of the elk population and vegetation recovery would involve ground surveys using crews on foot and annual aerial surveys using helicopter or fixed wing air craft.

**Effects:**

**Wilderness character** - Management activities would have a variety of short-term adverse effects to wilderness character in limited areas of wilderness. Under this alternative, the frequency at which these disruptions would occur is greater in the first four years of the plan due to the intensive management of elk to reach management objectives and would take place potentially over a greater area of the wilderness. As fences would not be used to protect riparian willow, redistribution activities would be frequent resulting in periodic disruptions of solitude in these areas of wilderness. The short-term transient adverse impacts that would affect opportunities for outstanding solitude include:

- Reduced opportunities for solitude in limited areas of the wilderness due to presence of crews, horses, and/or trained herding dogs;
- Periodic use of helicopters to transport materials and monitoring and the potential for adaptive use of helicopters for carcass removal and herding activities;
- Use of motorized equipment such as ATVs, trucks, chainsaws, portable pumps, and/or generators;
- Use of firearms, shotguns, and/or darting equipment to lethally remove elk; and
- Redistribution activities using noisy aversive conditioning techniques such as cracker shot and rubber bullets. Visual techniques would have a lesser degree of adverse effect on opportunity for solitude.

The presence of a temporary capture facility for lethal reduction and holding pens for wolves under the adaptive approach would have a short-term effect on the scenic quality and would reduce the untrammelled, undeveloped character of wilderness.

The tagging or marking of elk and disruption of natural biological processes for those treated with fertility control agent for research purposes would negatively affect the natural quality of wilderness to a minimal degree. The small number of elk marked for research purposes would have a minimal effect on wilderness recreational opportunities for wildlife viewing.

Carcasses that result from management actions would be removed from the field to the extent possible given logistical constraints. Some carcasses would be left in the field to approximate natural conditions so as not to negatively affect wilderness character or values.

There would be overall long-term benefits to wilderness character from management of the elk population. Under this alternative, natural conditions in the elk population would be restored as elk are less habituated and exhibit natural behaviors and the density and size of the population would be within the natural range of variation. Restoration of natural conditions would provide benefit to promoting science of natural ecosystems and visitors to the wilderness would benefit from the ability to view elk that exhibit more wild behaviors.

Long-term but temporary impacts would result from the presence of fences around aspen habitat in less than 0.1 percent of wilderness that would reduce the undeveloped, untrammelled nature of wilderness for the 20 year planning period. The National Park Service would minimize to the extent possible the obtrusiveness of the fences through selection of fencing materials and where possible the placement of fences on a site specific basis. Which fence designs are used would depend on the location and the potential effects on wilderness, the viewshed, visitor access, and movement of other wildlife species. Informal visitor surveys would assess the effects of fences on the visitor experience, and monitoring

would assess the effects on other wildlife species. These factors would be used to evaluate the type of fence to be used given particular locations to minimize impacts on wilderness character and values. Long-term benefits however would result from preventing the potential loss of native plant communities within wilderness and restoring native ecological processes. Fire would also be restored as a natural process into wilderness areas that would result in a long-term benefit in treated areas. Restoration of native vegetative communities and potential benefits to other wildlife within wilderness would have a long-term benefit on the recreational use of wilderness by visitors and restoration of wilderness that does not reflect human influences.

If wolves are used adaptively to redistribute elk in the future, the presence within wilderness of this historic native predator would provide long-term benefit to the natural character of wilderness areas. Temporary structures would be constructed as holding pens and helicopters would be the only efficient means of monitoring and retrieving wolves to prevent crossing park boundaries. A small number of wolves would be released into the park in a phased approach and strictly managed to control their population size and behaviors. These tools and the intensive management of wolves however would detract from the natural wilderness character and reduce periodically the opportunity for solitude. It should be noted that release of wolves into the park would be considered experimental. It is uncertain whether wolves would establish within the park, whether they would remain within the park boundaries, whether they would redistribute elk on the primary winter range enough to allow vegetation to recover, and how they would react to frequent recapture and release, if needed.

#### **Heritage and cultural resources** – No effect

**Maintaining contrast and unimpaired character** – The use of mechanized equipment in wilderness would reduce the contrast between wilderness on the primary elk range and other areas for short periods of time in localized areas while activities were taking place. Fences in wilderness would result in a long-term contrast between wilderness and other lands, however this contrast would lessen as vegetation develops and fences are less visible.

This alternative would result in the prevention of loss of important vegetative communities within wilderness that provides habitat for a variety of wildlife and plant species. This alternative would promote wilderness character and values unimpaired for future generations. The restoration of vegetative communities and the natural condition and behavior of elk would promote contrast between developed areas particularly those outside of the park and wilderness areas.

#### **Special provisions** – None identified.

**Safety of visitors, personnel, or contractors** - With implementation of mitigation measures described in above in “Actions Common to All Alternatives”, the risks to the public and management personnel are minimal from elk and vegetation management activities. There is risk to herders and personnel from working in rugged terrain. This risk may be lessened to some degree by use of helicopters to transport materials, to remove carcasses from remote locations (most likely to occur in years one through 4) and under limited circumstances for herding elk. . There is also a benefit to visitors to the park and region as management activities would reduce habituation of elk and increase their wariness of people. This would reduce the potential over the long-term for human-elk conflict.

**Economic and time constraints** - Under this alternative, the use of motorized equipment including helicopters would increase costs of implementation particularly in the first four years of the plan. Use of this equipment would reduce the time required by crews to transport materials and to remove carcasses. Implementation of activities strictly by hand tools and ground crews would not allow for management objectives and purpose of the plan to be met. If wolves are used adaptively to redistribute elk, wolf behaviors and movements could not be strictly managed within the framework of the alternative without the use of mechanized equipment in wilderness. Mechanized equipment is needed to effectively monitor wolves and to reach wolves in remote areas efficiently and effectively reducing the risk of wolves

extending beyond park boundaries. Helicopters therefore are the minimum tool to manage wolves in the park.

### ***Alternative 3***

**Description:** This alternative would result in the gradual reduction of the elk population to the higher end of the natural range of variation. This alternative would use the same methods described above in Alternative 2 to reduce the elk population, redistribute elk, monitoring, and carcass removal. There are some exceptions. Because a smaller number of elk would be removed annually, it is less likely compared to Alternative 2 that helicopters would be necessary to remove carcasses from remote locations on the primary elk range due to the fewer number of elk removed annually under this alternative. Helicopters would be used adaptively to remove carcasses from remote locations only if necessary to due disease management concerns. Redistribution methods would be the same as described in Alternative 2. Because of the higher elk population target under this alternative, use of aversive conditioning and herding would likely be more frequent to reduce browsing pressure on vegetation. Although these activities would not occur over as large an area as Alternative 2 due the increased amount of fences to protect both aspen and riparian willow. .. Under Alternative 3 temporary fences would be used to protect up to 160 acres of aspen as described in Alternative 2. Fences would also be installed adaptively in wilderness areas on the primary elk summer and winter range to protect montane riparian willow habitat. This would require fences to protect up to 440 acres of willow on both the primary winter and summer ranges. This total amount of expected fencing would impact approximately 0.2% of the total park wilderness. Wolves could be used as an adaptive management tool in the future to facilitate elk redistribution as described above in Alternative 2 and fertility control agents could be implemented adaptively if logistically feasible to control the elk population in the future as described in Alternative 4 below.

**Effects:**

**Wilderness character** - The effects on wilderness character and value would be similar to Alternative 2. However, because of the lower annual reduction target the short-term effects would be less frequent and less intense as a result of fewer crews to conduct elk population management activities. Because of the fewer number of animals to be removed annually, this alternative may not require use of a capture facility. However based on the monitoring of the effectiveness of other removal methods, a capture facility may be required as an adaptive management tool resulting in impacts on the scenic, untrammled quality of wilderness as described in Alternative 2. Due to the fewer number of elk removed annually, the frequency of carcass removals and the potential use of mechanized equipment in wilderness areas would be less than other alternatives, having less adverse effects on the opportunity for solitude. As in Alternative 2, some carcasses would be left in the environment to reflect natural conditions to the greatest extent possible resulting in no negative effects on wilderness character or values.

The increased use of temporary fences to protect up to 600 acres of aspen habitat and suitable willow habitat would result in more frequent disturbance of solitude in wilderness due to the use of motorized equipment such as ATVs and helicopters to transport materials. Also, there would be increase presence of crews and noise during installation of fences. The use of fences to protect willow and aspen would result in a greater impact on wilderness character as the impact of human development would be more noticeable under this alternative. This effect would lessen over time as vegetation develops and the fences become less visible. The selection of fencing materials and where possible the placement of fences would be done on a site specific basis to minimize to the extent possible the obtrusiveness of fences in wilderness areas on the primary elk range while still allowing for achievement of vegetation restoration objectives. Which fence designs are used would depend on the location and the potential effects on wilderness, the viewshed, visitor access, and movement of other wildlife species. Informal visitor surveys would assess the effects of fences on the visitor experience, and monitoring would assess the effects on other wildlife species. These factors would be used to evaluate the type of fence to be used

given site-specific conditions to minimize impacts to the greatest degree on wilderness character and values.

Over the long-term, the use of fences to protect vegetation fully ensures protection from elk herbivory and would result in recovery of vegetation to natural conditions more rapidly than with use of redistribution activities. This alternative would also allow fire to be restored more rapidly as a natural component of the ecosystem. With a more rapid recovery of vegetation, the potential for beaver recolonization of the primary elk range whether naturally or through reintroduction would also occur faster.

The tagging or marking of elk and disruption of natural biological processes for those treated with fertility control agent as part of the research study or as an adaptive tool to control the elk population would negatively affect the natural value of wilderness and opportunities for recreational wildlife viewing in wilderness.

If wolves are used adaptively to redistribute elk in the future, the presence within wilderness of this historic native predator would provide long-term benefit to the natural character of wilderness areas. Temporary structures would be constructed as holding pens and helicopters would be the only efficient means of monitoring and retrieving wolves to prevent crossing park boundaries. A small number of wolves would be released into the park in a phased approach and strictly managed to control their population size and behaviors. These tools and the intensive management of wolves however would detract from the natural wilderness character and reduce periodically the opportunity for solitude. It should be noted that release of wolves into the park would be considered experimental. It is uncertain whether wolves would establish within the park, whether they would remain within the park boundaries, whether they would redistribute elk on the primary winter range enough to allow vegetation to recover, and how they would react to frequent recapture and release, if needed.

#### **Heritage and cultural resources** – No effect

**Maintaining contrast and unimpaired character** – The use of mechanized equipment in wilderness would reduce the contrast between wilderness on the primary elk range and other areas for short periods of time in localized areas while activities were taking place. Due to the low number of elk to be removed under this alternative, it is unlikely that helicopters would be necessary to remove carcasses. Helicopters could be used adaptively to remove carcasses from remote locations if necessary due to disease management concerns. Some carcasses would be left in the field to approximate natural conditions so as not to negatively affect wilderness character or values. Because of the fewer number of animals removed over time, the reduction in contrast due to management actions to reduce the elk population size would occur less frequently than the other alternatives. Fences in wilderness would result in a reduced contrast between wilderness and other lands across a greater area of wilderness for a longer period of time; however the contrast between wilderness and other areas would become more evident over time as vegetation develops and fences are less visible.

This alternative would result in the prevention of loss of important vegetative communities within wilderness that provides habitat for a variety of wildlife and plant species. This alternative would promote wilderness character and values unimpaired for future generations. The restoration of vegetative communities and the natural condition and behavior of elk would promote contrast between wilderness on the primary elk range and developed areas particularly those outside of the park.

#### **Special provisions** – None identified.

**Safety of visitors, personnel, or contractors** – Under this alternative, due to the fewer number of elk removed annually, crews would be in the field less frequently which would reduce the risk of injury to management crews and there would be less risk to visitors as actions are occurring less frequently. If fertility control agents are used adaptively in the future, there are some increased risks with handling and treating elk. With implementation of mitigation measures described in above in “Actions Common to All Alternatives”, the risks to the public and management personnel are minimal from elk and vegetation

management activities. For those in the field there would continue to be a risk to herders and personnel from working in rugged terrain. This risk may be lessened to some degree by use of helicopters to transport fence materials and under limited circumstances to herd elk to the summer range if necessary. There is also a benefit to visitors to the park and region as management activities would reduce habituation of elk and increase their wariness of people. This would reduce the potential over the long-term for human-elk conflict.

**Economic and time constraints** - Under this alternative, the use of motorized equipment in particular helicopters for the transport of large amounts of fence material would increase costs of implementation. However, use of this equipment would reduce the amount of time that would be required by crews to transport materials using less intrusive or non-motorized means and it would reduce the amount of time wilderness character and values are disrupted. Transportation of fence material by ground crews across difficult terrain would require extraordinary amount of staff resources and time, limiting the ability of management objectives for vegetation restoration to be met.

If wolves are used adaptively to redistribute elk, wolf behaviors and movements could not be strictly managed within the framework of the alternative without the use of mechanized equipment in wilderness. Mechanized equipment is needed to effectively monitor wolves and to reach wolves in remote areas efficiently and effectively reducing the risk of wolves extending beyond park boundaries. Helicopters therefore are the minimum tool to manage wolves in the park.

### **Alternative 4**

**Description:** This alternative would result in the gradual reduction of the elk population to the higher end of the natural range of variation emphasizing the use of fertility control agents to reduce and maintain the elk population. This alternative would use darting and anesthetizing or a capture facility to treat up to 400 female elk annually in the first four years of the plan, and 200 for each of the remaining 16 years. All elk treated would require marking or tags for identification purposes. In addition, if a short-term agent lasting only one year is used, 80 to 150 elk would be lethally removed using methods described in Alternative 2 to meet management objectives. Fences would be installed to protect up to 160 acres of aspen on the primary summer and winter ranges, and fences would be used to protect up to 260 acres of montane riparian willow on the primary winter range. In addition to the redistribution effects of fertility control activities, redistribution activities using methods described in Alternative 2 would be used to protect vegetation in unfenced areas.

**Effects:**

**Wilderness character** - The effects of lethal reduction activities, redistribution actions, carcass removal, installation and presence of fences would be as described in Alternative 3. Fences would not be used on the primary summer range to protect montane riparian vegetation and redistribution techniques would be employed to a greater degree in this area to protect vegetation from herbivory. The use of a temporary capture facility would be as described in Alternative 2. Under this alternative elk management activities would occur more frequently if a short-term fertility control agent is employed due to the high number of elk that would need to be treated and removed on an annual basis. These actions would reduce opportunities for solitude in wilderness frequently and the disturbance would occur in more areas of the wilderness. The marking of elk for identification purposes would adversely affect the scenic quality of wilderness and recreational opportunities by reducing the wildness of the treated animals. The treatment of elk with fertility control would disrupt natural processes of elk reproduction adversely affecting wilderness to a greater degree than other alternatives due the large number of elk to be treated.

**Heritage and cultural resources** – No effect

**Maintaining contrast and unimpaired character** – Intensive management activities early in the plan to treat and remove elk would result in reduced contrast between wilderness and other lands as the number of field personnel and noise producing activities would increase. The use of mechanized equipment in wilderness would reduce the contrast between wilderness on the primary elk range and other areas for short periods of time in localized areas while activities were taking place. Due to the lower number of elk to be removed annually, it is unlikely that helicopters would be necessary to remove carcasses. Helicopters could be used adaptively to remove carcasses from remote locations if necessary due to disease management concerns. Some carcasses would be left in the environment to reflect to natural conditions to the greatest extent possible resulting in no negative effects on wilderness character or values.

Fences in wilderness would result in reduced contrast between wilderness and other lands across a greater area of wilderness for a longer period of time; however this contrast would become more evident over time as vegetation develops and fences are less visible.

This alternative would result in the prevention of loss of important vegetative communities within wilderness that provides habitat for a variety of wildlife and plant species. This alternative would promote wilderness character and values unimpaired for future generations. The restoration of vegetative communities and the natural condition and behavior of elk would promote contrast between developed areas particularly those outside of the park and wilderness areas.

**Special provisions** – None identified.

**Safety of visitors, personnel, or contractors** – Under this alternative, due to the number of elk to be treated, handled, and removed annually; crews would be in the field frequently with an increased risk to personnel and/or contractors. With implementation of mitigation measures described above in “Actions Common to All Alternatives”, the risks to the public and management personnel are minimal from elk and vegetation management activities. For those in the field there would continue to be a risk to herders and personnel from working in rugged terrain. This risk may be lessened to some degree by use of helicopters to transport fence materials and under limited circumstances to herd elk to the summer range if necessary. There is also a benefit to visitors to the park and region as management activities would reduce habituation of elk and increase their wariness of people. This would reduce the potential over the long-term for human-elk conflict.

**Economic and time constraints** - Under this alternative, the use of motorized equipment in particular helicopters for the transport of large amounts of fence material would increase costs of implementation. However, use of this equipment would reduce the amount of time that would be required by crews to transport materials using less intrusive or non-motorized means and it would reduce the amount of time wilderness character is disrupted. Transportation of fence material by ground crews across difficult terrain would require extraordinary amount of staff resources and time, limiting the ability of management objectives for vegetation restoration to be met.

### ***Alternative 5***

**Description:** This alternative would release a two pair of wolves in the park to be intensively managed and allowed to increase to a maximum of 14 in a phased approach. A highly managed wolf population would be used to facilitate redistribution of elk in combination with the use of lethal control activities such as described in Alternative 2 to reduce the elk population initially to the higher end of the natural range of variation. Wolves would be transported to the park and acclimated in holding pens. Temporary pens would need to be constructed in remote wilderness areas of the primary elk range to reduce access by the public. Wolf movement and activity would be continuously monitored and their activities restricted to within the boundaries of the park. This would be accomplished using GPS-collars and helicopters. Because of the remoteness of the park, helicopters would be necessary for monitoring activities and possibly transport of staff to retrieve wolves near the park boundary.

Lethal reduction would remove 50 to 500 elk per year in the first four years and in the remaining 16 years up to 100 elk would be lethally removed each year to maintain the population, if needed.

Fences would be installed to protect up to 160 acres of aspen on the primary summer and winter ranges. No other redistribution actions would be used under this alternative. Depending on the number of elk lethally removed each year in the first four years, carcass removal could be accomplished as described in Alternative 2.

**Effects:**

**Wilderness character** - The effects of lethal reduction activities, carcass removal, and installation and presence of fences on wilderness character would be as described in Alternative 2. The presence of temporary capture facilities for lethal reduction and temporary holding pens for wolves would have a short-term effect on the scenic quality and reduce the untrammelled character of wilderness. Compared to other alternatives, this alternative would not result in the disruption of opportunities for solitude due to the presence of field crews, mechanized equipment, horses and trained herding dogs to redistribute elk. Over time the number of elk carcasses needing to be removed would decrease as elk population management would rely more on wolves with less reliance on lethal reductions and the short-term impacts on wilderness character and values would diminish. As in Alternative 2, some carcasses would be left in the environment to reflect to natural conditions to the greatest extent possible resulting in no negative effects on wilderness character or values.

The presence of wolves, and historic native predator, within wilderness areas of the elk range would provide long-term benefit to the natural character of wilderness. Wolves would restore to wilderness the natural condition and behavior of elk by making them less sedentary and more wary. This would provide improved recreational viewing of natural elements and processes within wilderness. However, the presence of temporary holding pens, use of helicopters, and the intensive management of wolves would detract from the natural wilderness character and reduce the opportunity for solitude. Depending upon the movements of wolves, the use of helicopters and field crews to monitor and retrieve wolves could be frequent and would extend to wilderness areas outside of the primary elk range.

The tagging or marking of study elk and disruption of natural biological processes for those treated with fertility control agent would negatively affect the natural quality of wilderness to a minimal degree and the small number of elk marked for research purposes would have a minimal effect on wilderness recreational opportunities for wildlife viewing.

**Heritage and cultural resources** – No effect

**Maintaining contrast and unimpaired character** – The use of mechanized equipment in wilderness would reduce the contrast between wilderness on the primary elk range for short periods of time in localized areas while activities were taking place. The use of helicopters for monitoring and management of wolves however would reduce the contrast between wilderness and other lands over a wider area as wolves would be expected to use larger areas of habitat in the park. Although the reduction in contrast between wilderness and other lands due to wolf management activities would be for short periods, it may occur frequently depending upon the movements of wolves. Fences in wilderness would result in a long-term contrast between wilderness and other lands, however this contrast would lessen as vegetation develops and fences are less visible.

This alternative would result in the prevention of loss of important vegetative communities within wilderness that provides habitat for a variety of wildlife and plant species. This alternative would promote wilderness character and values unimpaired for future generations. The restoration of vegetative communities and the natural condition and behavior of elk as well as the presence of a historically native predator would promote to the greatest extent the contrast between developed areas particularly those outside of the park and wilderness areas.

**Special provisions** – None identified.

**Safety of visitors, personnel, or contractors** – Management personnel would be exposed to increased risk under this alternative due to the handling and intensive management of wolves in addition to lethal reduction activities. With implementation of mitigation measures described in above in actions common to all alternatives the risks to the public and management personnel are minimal from elk and vegetation management activities. For those in the field there would continue to be a risk to personnel from working in rugged terrain. This risk may be lessened to some degree by use of helicopters to transport fence materials. Safety concerns related to presence of wolves would be mitigated using public education efforts.

**Economic and time constraints** - Under this alternative, the use of motorized equipment in particular helicopters for the transport of fence material and to monitor and manage wolves would increase costs of implementation. However, use of this equipment would reduce the amount of time that would be required by crews to transport materials using less intrusive or non-motorized means and it would reduce the amount of time wilderness character is disrupted. Transportation of fence material by ground crews across difficult terrain would require extraordinary amount of staff resources and time, limiting the ability of management objectives for vegetation restoration to be met. Wolf behaviors and movements could not be managed without the use of mechanized equipment in wilderness. Mechanized equipment is needed to effectively monitor wolves and to reach wolves in remote areas efficiently and effectively reducing the risk of wolves extending beyond park boundaries. Helicopters therefore are the minimum tool to manage wolves in the park.

## **Step 2 Decision: What is the Minimum Activity?**

### **The selected alternative is: Alternative 3**

Gradual reduction of the elk population would occur using mechanical methods of noise suppressed and unsuppressed weapons to remove a low number of elk annually to achieve a population at the high end of the natural range. To minimize impacts in wilderness, noise suppressed weapons would be used to the greatest extent while allowing management objectives for vegetation restoration to be met. Redistribution activities would be conducted using the least intrusive methods in an adaptive approach. Non-mechanical means in wilderness would be employed first and results monitored. To the greatest extent possible, management activities to reduce the elk population would be conducted during periods of the day when visitation is low, would be done in areas not frequented by visitors, and would use noise suppressed weapons. Due to the fewer number of elk to be removed annually, it is less likely under this alternative that helicopters would be used to remove carcasses from the field. If necessary, helicopters would only be used adaptively to remove carcasses from remote locations due to disease management concerns. Some carcasses would be left in the environment to approximate natural conditions so as not to negatively affect wilderness character or values. Fences would be installed using the least intrusive design for the site-specific conditions in wilderness areas on the primary elk range and to minimize impacts on visitors to wilderness. To reduce safety risks, improve efficiency, and limit the frequency of intrusion on wilderness character, helicopters and motorized equipment would be used to transport fence materials. Prescribed burning and mechanical removal to stimulate vegetation recovery would involve the use of hand tools to a large degree; however chain saws may be used to effectively and safely treat large pieces of woody material. Portable pumps and generators would be used during prescribed burns as needed to ensure the containment of fires and prevent risks to public health and safety. A small number of wolves and fertility control could be used adaptively in the future to control elk distributions and population size.

### **Describe the rationale for selecting this alternative:**

This alternative allows the National Park Service to meet management objectives with the minimum use of motorized equipment. Due to the lower number of elk to be removed annually the frequency of management actions to control the population and to remove carcasses would be less compared to other alternatives. Overall, this alternative reduces to a greater degree impacts on opportunities for solitude and visitor recreation within wilderness. Although this alternative requires more fences in wilderness which would adversely impact the character of wilderness on the primary elk range over a longer period, fences would not be permanent and they would not prevent public access and use of wilderness areas or access to habitat by other wildlife. Increased use of fences would reduce the amount of unfenced areas in wilderness that redistribution activities would need to take place, thus reducing the extent of adverse impacts of these activities on wilderness character. The use of fences provides a higher level of certainty that native vegetative communities would be restored to natural conditions more rapidly than other alternatives. As a result, fire as a natural part of the ecosystem could be restored more quickly to a large expanse of wilderness on the primary elk range. The restoration of vegetation and protection from herbivory would increase the potential for natural recovery of beaver or the reintroduction of beaver back into the wilderness area. This alternative also provides for adaptive management of elk and vegetation using wolves or fertility controls. If management objectives are not being met, a highly managed wolf population could be used to more effectively redistribute elk which would reduce the need for fences in wilderness. If administration of a fertility control agent becomes logistically feasible in the future, the treatment of elk by darting would be less intrusive on wilderness character than lethal removal using firearms.

**Describe any monitoring and reporting requirements:**

Monitoring would be conducted in the short and long-term on geographic scales ranging from site-specific to landscape. Elk population size, densities, demographics, and distribution would be monitored annually. Vegetation changes would be monitored as needed to determine progress toward restoration goals and could be done annually and/or at 5- or 10-year interval depending upon vegetation type and parameter measured. Informal and formal visitor surveys would be conducted to monitor public reaction to management actions. Under the adaptive management approach which this alternative would be implemented, if impacts of management activities on wilderness resources are occurring at unacceptable levels, the National Park Service would apply additional mitigations or select a different tool to reduce or eliminate the effect.

Please check any Wilderness Act Section 4(c) uses approved in this alternative:

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> mechanical transport | <input checked="" type="checkbox"/> landing of aircraft       |
| <input checked="" type="checkbox"/> motorized equipment  | <input type="checkbox"/> temporary road                       |
| <input checked="" type="checkbox"/> motor vehicles       | <input checked="" type="checkbox"/> structure or installation |
| <input type="checkbox"/> motorboats                      |   |

Be sure to record and report any authorizations of Wilderness Act Section 4(c) uses according to agency procedures.

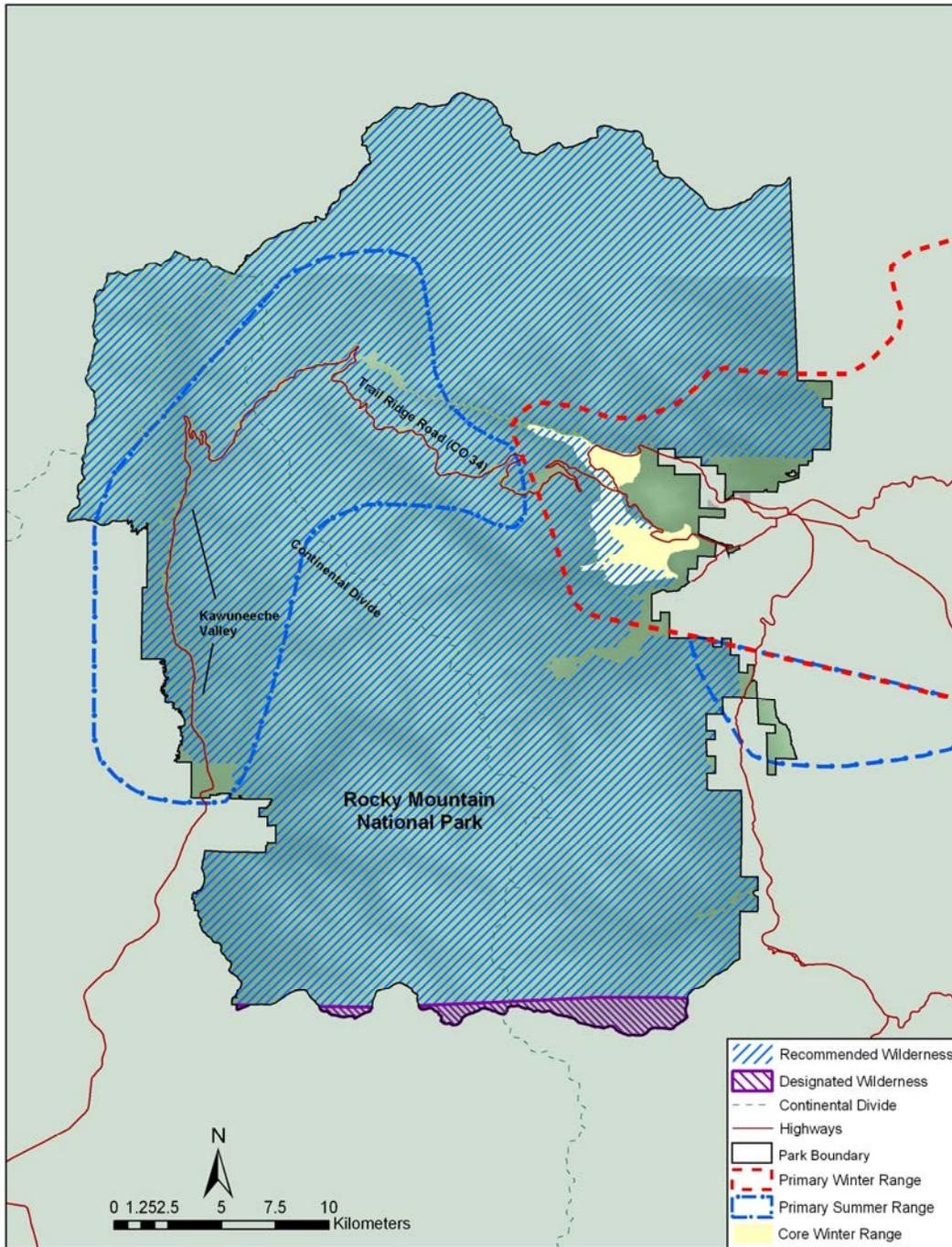
**APPROVAL**

Recommended by:

*Mark Magnum*  
 \_\_\_\_\_  
 for Wilderness Specialist, Rocky Mountain National Park 12/03/07  
Date

Approved by:

*Vaughn Baker*  
 \_\_\_\_\_  
 Superintendent, Rocky Mountain National Park 12/03/07  
Date



**FIGURE 1: PRIMARY ELK RANGE AND WILDERNESS TYPES IN ROCKY MOUNTAIN NATIONAL PARK**

**APPENDIX H: DIFFERENCES BETWEEN CULLING AND  
HUNTING AND DESCRIPTION OF AUTHORIZED AGENTS**

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## APPENDIX H –DIFFERENCES BETWEEN CULLING AND HUNTING AND DESCRIPTION OF AUTHORIZED AGENTS

**Hunting** is a recreational activity that includes the elements of fair chase and personal take of the meat, as well as being a conservation tool. Hunting is administered by the state fish and game agency, which licenses hunters. If areas of the park were to be opened to hunting those areas would need to be closed to visitor use while hunting was taking place. The NPS would need to absorb the costs of managing hunters, visitors and the media during a hunt.

**Culling** is used as a conservation tool to reduce populations that have exceeded the carrying capacity of their habitat. As opposed to hunting, culling is done under very controlled circumstances in order to minimize impacts on park operations, visitors, private inholdings and neighbors. Culling is also an efficient and humane way to reduce herds of animals that are habituated to the presence of humans. Culling is not recreational and does not incorporate the concept of fair chase. Culling would be administered by the NPS and carried out by NPS personnel and their authorized agents, and would not require licensing by the state. The personnel doing the shooting would be responsible for killing and processing several animals in any session. Carcasses from culling operations would be tested for chronic wasting disease and to the extent possible carcasses and/or meat would be donated through an organized program to eligible recipients, including members of tribes, based on informed consent and pursuant to applicable public health guidelines. Short-term road closures (a few hours most likely early in the morning) could be needed while culling activity is ongoing.

NPS management policies (2006) allow destruction of animal populations (culling) under certain circumstances:

### 4.4.2.1 NPS Actions That Remove Native Plants and Animals

... Where visitor use or other human activities cannot be modified or curtailed, the Service may directly reduce the animal population by using several animal population management techniques, either separately or together. These techniques include relocation, public hunting on lands outside a park or where legislatively authorized within a park, habitat management, predator restoration, reproductive intervention, and destruction of animals by NPS personnel or their authorized agents....

All of these techniques including culling have been evaluated in the Environmental Impact Statement on the Elk and Vegetation Management Plan for possible use at Rocky Mountain National Park.

For purposes of this plan, “authorized agents” could include: professional staff from other federal, state or local agencies or tribes; contractors; or qualified volunteers. National Park Service personnel would be responsible for culling operations. There may be circumstances when additional personnel are needed to achieve annual population goals. National Park Service personnel would be augmented by authorized agents who would be afforded the opportunity to assist in culling operations under the direct supervision of NPS personnel. Cost, efficiency and effectiveness would be the factors that determine when supplemental personnel are needed.

NPS personnel and their authorized agents would cull inside Rocky Mountain National Park removing mostly female elk for the purposes of population reduction. During the winter (October to May) elk are concentrated on the east side of the park and adjacent public and private land in and around the Town of Estes Park. Any action taken inside the park would affect adjoining lands and neighbors as would any action taken outside the park affect park lands. Cooperation among the park, local communities, Colorado Division of Wildlife, and U.S. Forest Service is thus essential in

## APPENDIX H

managing the herd. The National Park Service would continue to encourage the Colorado Division of Wildlife and neighboring communities to consider taking further actions outside of the park in addition to public hunting to manage the elk of the larger town subpopulation that spend most of their time outside of the park (e.g., Estes Park subpopulation).

The number of animals removed and the costs would vary each year based on annual population surveys and hunter success outside the park. The level of management action that would be taken to control the population size would be adjusted annually based on the current population size estimates. Based on adaptive management, management actions to control the population would not be taken if the population size was within the range specified within the final plan and vegetation objectives were being met.

Those responsible for population reduction would focus on removing female elk and would cull multiple animals in any one event. Cullers would not be allowed to keep the animal in part or in whole.

Cullers would be expected to assist in processing the animals in preparation for disbursement. These activities could include: gutting, skinning, quartering, boning, and packing animals (sometimes long distances) to holding facilities or locations. Cullers including NPS personnel and authorized agents would be certified in firearms training, specially trained in wildlife culling, and be required to pass a proficiency test in order to qualify to participate in culling activities. Cullers would be expected to work in teams under the supervision of a NPS team leader, cull and process multiple animals in any one culling event, and spend the time necessary to ensure humane dispatch and quality meat recovery.



As the nation’s principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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National Park Service  
U.S. Department of the Interior

United States Department of the Interior  
National Park Service  
Rocky Mountain National Park, Colorado