Purpose of and Need for Action

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PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

This chapter explains why the National Park Service (NPS) is taking action at this time to evaluate a range of alternatives for the management of elk (*Cervus elaphus*) and vegetation in Rocky Mountain National Park. This elk and vegetation management plan and environmental impact statement (plan/EIS) presents four action alternatives for managing elk and vegetation within the park and assesses the impacts that could result from continuation of the current management strategies or from implementation of any of the four action alternatives. On completion of the plan/EIS and decision-making process, one of the five alternatives would become the park's elk and vegetation plan and guide future actions over a 20-year period.

The focus of this plan/EIS is the elk population that winters on the eastern side of Rocky Mountain National Park, the geographic areas used by that population throughout the year, and the vegetation associated with the population. This elk population is known as the Rocky Mountain National Park / Estes Valley population. Estes Valley in this plan/EIS refers to a geographic area. It is not a formal name and is used here to differentiate the larger valley (which covers portions of the park and Estes Park) from the Town of Estes Park (see Figure 1.1). The area of effect for the plan includes the primary winter and summer ranges and transitional areas, plus the area east of the primary winter range where potential changes in elk distribution have been observed, although the causes of these potential changes are uncertain.

The Rocky Mountain National Park / Estes Valley Elk population migrates seasonally between the primary winter range and primary summer range. Figure 1.1 shows the approximate bounds of these ranges. Elk use the primary summer range – which includes the Kawuneeche Valley and subalpine and alpine areas within the park as well as areas outside the park – primarily during June, July, and August. 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. Within this primary winter range, some elk concentrate in areas within the park in the vicinity of Moraine Park / Beaver Meadows and Horseshoe Park, referred to as the core winter range (Figure 1.2). In May and September, elk begin to migrate between these two ranges. These ranges represent the primary areas that elk frequent seasonally, although elk from this population use areas outside these ranges to a limited extent. The "Affected Environment" chapter includes a detailed discussion of elk movements within the range.

Elk are native to the Rocky Mountain National Park area, having lived in the vicinity for thousands of years. By the 1870s, heavy, unregulated hunting had eliminated elk in the area. Around 1900, the gray wolf, the only significant predator of elk in the area, had also disappeared. Elk were reintroduced to the area in 1913 and 1914, shortly before Rocky Mountain National Park was established in 1915.

Elk feed on a wide variety of plant species in a wide variety of habitats. Grasses usually make up most of the diet, followed by woody shrub species such as willow (*Salix spp.*), with aspen (*Populus tremuloides*) and forbs making up a small portion. In the absence of significant

predation and hunting, and with the presence of abundant forage, the elk population in the park flourished. By the early 1930s, elk numbers had increased to the point that National Park Service (NPS) managers expressed concern about deteriorating vegetation conditions due to elk herbivory in aspen stands associated with grassland areas and in montane riparian willow communities on the primary winter range. Starting in 1944, rangers used lethal reduction (killing elk by shooting) to control the elk population in the park. To a lesser degree, they also used trapping and transplanting to control elk numbers. For the next 25 years, the number of elk using Rocky Mountain National Park was maintained between 350 and 800 animals. *Note to the reader: Aspen in the park grow in association with pine trees (conifers) such as lodgepole pine (Pinus contorta) and in grassland areas. This plan/EIS focuses on aspen in grassland areas of the elk range, and throughout the text, "aspen" refers only to these non-conifer-associated aspen. The plan/EIS also considers willow types affected by elk herbivory, which include montane riparian willow found on the primary winter and summer ranges and subalpine and alpine riparian and upland willow found on the primary summer range.*

In 1969, a management era marked by little to no intervention on elk populations began. Park staff believed that hunting in adjacent areas would control the elk population in and near the park. Since then, the size of the elk population has more than tripled. Elk population studies conducted in the mid- to late-1990s showed that generally about 1,000 elk wintered in low-elevation areas inside park boundaries on the east side of Rocky Mountain National Park, and another 2,000 elk wintered outside park boundaries in the Town of Estes Park and on adjacent private and U.S. Forest Service lands (Lubow et al. 2002).

Research conducted in the park indicates that the Rocky Mountain National Park / Estes Valley elk population is larger, less migratory, and more concentrated than it would be under natural conditions and has created a host of problems in the area. The most prominent is the alteration of plant communities in the core winter range and the potential for substantial declines in biodiversity within aspen and montane riparian willow communities. Other problems include property damage, safety issues associated with human-elk interactions, and traffic problems.

PURPOSE OF AND NEED FOR ACTION

This section explains what the plan/EIS would accomplish and why action is necessary at this time. Summaries of both the purpose and the need appear here, with more detailed information available in the "Background" section of this chapter.

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

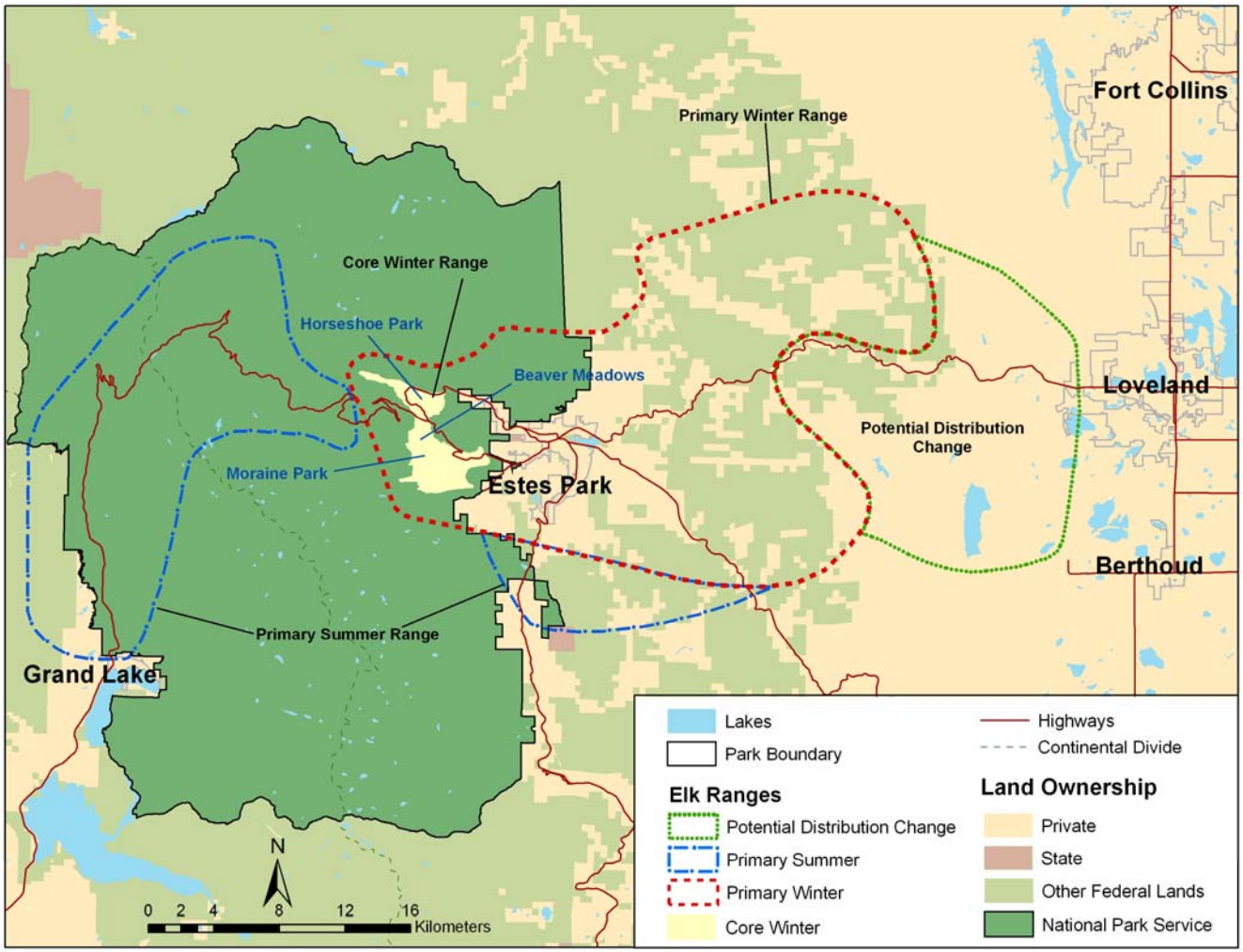

FIGURE 1.1: ELK RANGES ADDRESSED BY THIS PLAN IN ROCKY MOUNTAIN NATIONAL PARK, ESTES PARK, AND VICINITY

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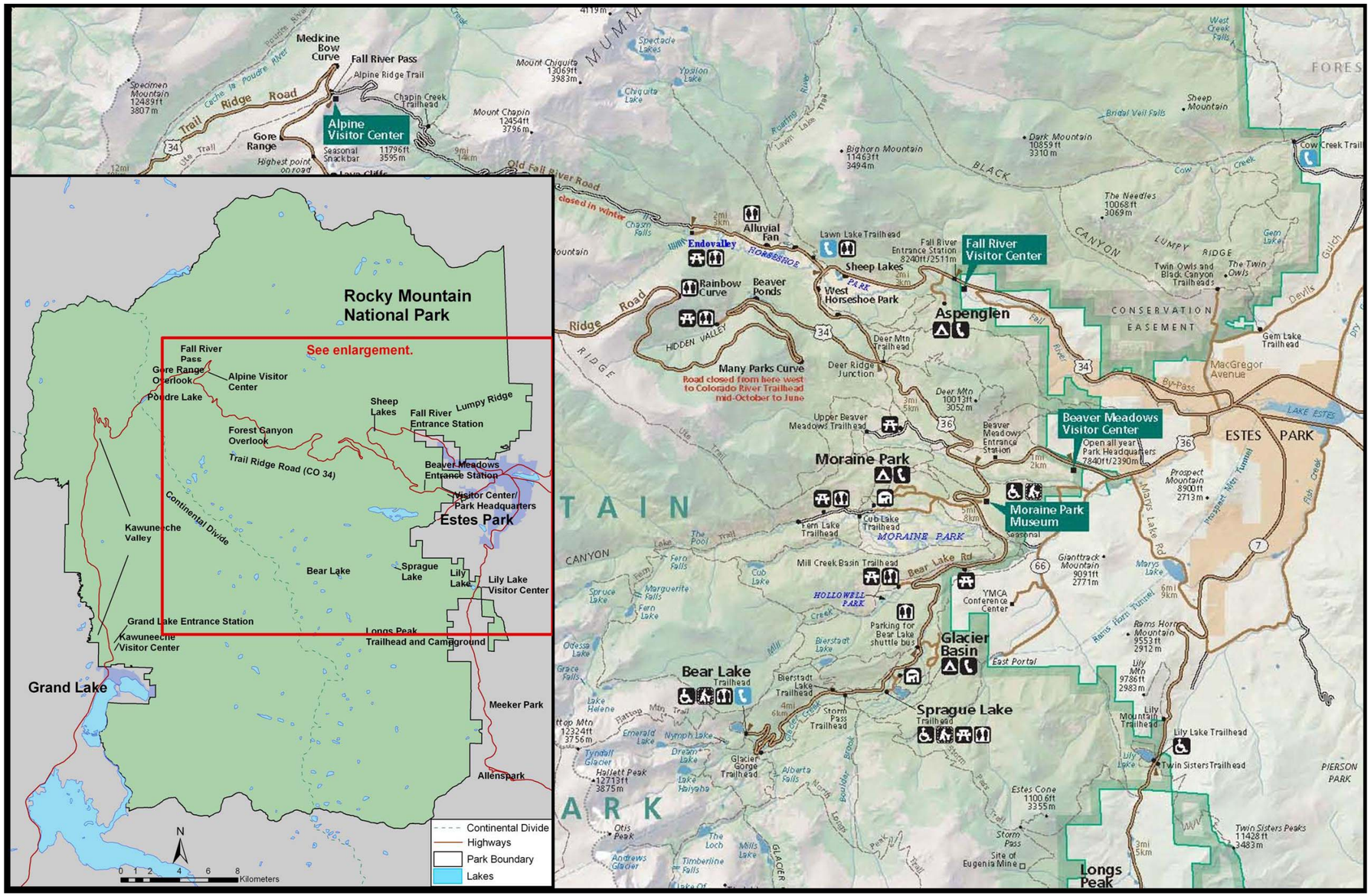

FIGURE 1.2: MAP OF ROCKY MOUNTAIN NATIONAL PARK

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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, this document 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 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 this plan/EIS is to guide management actions in Rocky Mountain National Park to achieve these desired 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.

Although the overall desired elk population size and distribution could be achieved within the 20-year life of this plan, achieving the desired future conditions for aspen and montane riparian willow on the elk range would take longer. However, strides would be made toward reaching that overall goal.

Several features of the elk population are considered to be outside the natural range of variation, such as its density in some parts of the park (particularly in the core winter range), its overall size, and its behavior (Monello et al. 2005). The absence of an intact predator base is a key reason the elk population size, density and behavior is considered to be outside the natural range of variation. The gray wolf, which was extirpated from the Rocky Mountain National Park area before the park was established, represented a key component in the food chain and in defining the natural condition. Ecosystem simulation modeling indicates that fewer elk would likely be present if wolves lived in the Rocky Mountain National Park area (Coughenour 2002). Empirical evidence from areas with intact wolf populations, such as Yellowstone and Banff National Parks, indicates that elk would be more wary and less sedentary, resulting in lower densities. Grizzly bears, which were native to the park but also extirpated, would also probably contribute to reducing elk numbers; research shows that wolves more effectively limit elk populations in the

presence of multiple predators (Gasaway et al. 1992 and Orians et al. 1997, cited in Monello et al. 2005). Other factors that likely contributed to a lower elk population under natural conditions are the effects of American Indians hunters and the presence of bison (reviewed in Monello et al. 2005). The prohibition of hunting inside the park and the town of Estes Park while adjacent areas outside the park are open to hunting has created a "sanctuary" that has contributed to the high elk concentrations and more sedentary behavior.

Elk are gregarious animals, meaning that they tend to form groups with other elk, unlike other wildlife species that are intolerant of high densities. Because elk can congregate in high densities, especially during the winter, an overabundant or over-concentrated population could have a large and detrimental effect on vegetation conditions, in particular aspen and montane riparian willow communities in the core winter range, and on the wildlife that depend on these areas as habitat (Monello et al. 2005). Such effects are becoming increasingly evident in the park.

The elk population reached a high point between 1997 and 2001, with annual estimates ranging from about 2,800 to 3,500 (Lubow et al. 2002). Since 2002, winter estimates in the park and Estes Valley area outside the park have declined, ranging from about 1,700 to 2,200. The dynamic nature of wildlife populations makes population estimates of a wide-ranging, mobile species such as elk variable. Because of these uncertainties, elk population size estimates in the research and in this document use ranges rather than exact numbers. However, the general ranges of population estimates reflect important trends relevant to the analyses of elk population effects on resources.

The elk population includes three subpopulations that exhibit different population dynamics and migration patters (Larkins 1997, Lubow et al. 2002): 1) Moraine Park / Beaver Meadows (referred to as Moraine Park), 2) Horseshoe Park, and 3) the Town of Estes Park. The Moraine Park and Horseshoe Park subpopulations exhibit the same population dynamics and will be collectively referred to here as the park subpopulation. The Town of Estes Park population exhibits different dynamics and is referred to as the town subpopulation.

The elk in the park subpopulation are estimated to be at the food-limited carrying capacity (Coughenour 2002, Singer et al. 2002). The food-limited carrying capacity is the average maximum number of elk that the primary winter range forage base can support (also referred to as ecological carrying capacity). Assuming existing habitat and continuation of weather patterns that occurred in the second half of the 20th century, the park subpopulation is expected to continue to fluctuate between 800 and 1,100 animals (Coughenour 2002). The town subpopulation is variously estimated to be at or below carrying capacity, based on different researchers' results (Coughenour 2002, Lubow et al. 2002). Population estimates for the town subpopulation from 2001 to 2005 have ranged between about 1,000 and 1,400 elk in the Estes Valley area.

If the elk population is at or within the carrying capacity of its habitat, it does not necessarily mean that the elk-to-habitat relationship is balanced or within the natural range of variation. Factors affected by humans such as elk distribution over time and area, a missing predator (i.e., gray wolf), and a refuge effect (i.e., no hunting in the park and in much of the Estes Valley) can have a large influence on habitat conditions even though the ecological carrying capacity may be adequate to support the elk population. Ecosystem simulation modeling indicates that with wolves present, the elk population was 15% to 40% below the food-limited carrying capacity (Coughenour 2002).

Elk densities are variable in the park, with high (76 to 170 elk/mile^2) to very high (171 to 285 elk/mile^2) concentrations on about 7% of the primary winter range, centered in Moraine Park /

Beaver Meadows (Singer et al. 2002). The remainder of the primary winter range generally has moderate (26 to 75 elk/mile^2 on 11% of the primary winter range) to low (less than 26 elk/mile^2 on 82% of the primary winter range) densities (Singer et al. 2002). Although elk use lower-density areas of the primary winter range to rest or as they move between areas, most of their foraging time is highly concentrated on a small percentage of the primary winter range. Elk densities on core winter range areas greater than 260 elk/mile^2 are the highest concentrations ever documented for a free-ranging population in the Rocky Mountains (Monello et al. 2005, Singer et al. 2002). Evidence from various research conducted in the park indicates that the high densities of elk in specific areas on the core winter range are as significant as the total population size in terms of causing adverse impacts on vegetation.

Increased concentrations of elk could potentially increase the risk of spreading chronic wasting disease in the elk population. Chronic wasting disease is a transmissible spongioform encephalopathy that primarily occurs in free ranging deer and elk in northeastern Colorado and southeastern Wyoming (Miller et al. 2000). Elk and deer in the park have tested positive for this disease. Based on modeling predictions, chronic wasting disease has the potential to severely affect deer populations (Miller et al. 2000, Gross and Miller 2001).

The elk population, over the years, has also become less migratory, with 10% to 15% of the elk remaining on the primary winter range during the summer. Under natural conditions, all of the elk in the population would seasonally migrate from the primary winter range to the primary summer range. These non-migratory elk can severely inhibit the growth of plants, as high levels of herbivory are taking place during the growing season (Augustine and McNaughton 1998).

FIGURE 1.3: ASPEN STAND EXHIBITING EFFECTS OF ELK HERBIVORY

Changes in migration patterns have also resulted in increasing numbers of elk that spend the entire year on what traditionally was only winter range in both the park and town areas. Over the

years, more elk are calving near areas where the public recreates in the Estes Valley, which increases the risk of human-elk conflicts. In addition, increased concentrations of elk in developed areas inside and outside the park also increase the potential for human-elk conflict as elk become more habituated and less fearful of humans. This may result in increased safety risks and property damage.

Research consistently indicates that a continuation of the high elk densities in Rocky Mountain National Park would result in the complete loss of aspen trees or, at best, existence in a shrub-like state on core winter range areas (W.L. Baker et al. 1997, Olmsted 1997, Suzuki et al. 1999, Coughenour 2002, Weisberg and Coughenour 2003). Elk browsing currently stunts the growth or kills all young aspen trees (i.e., less than eight feet in height, also called suckers or shoots) on the core elk winter range and in some parts of the Kawuneeche Valley (W.L. Baker et al. 1997; Olmsted 1979, 1997). Accordingly, aspen regeneration is suppressed, resulting in overmature, deteriorating aspen stands with no small or mid-size trees. These stands will likely be permanently lost if the current level of elk herbivory continues, although it is difficult to predict when this would happen.

Elk are severely inhibiting the ability of montane riparian willow to reproduce, as few willow plants on the primary winter range produce seed, and seedling survival is almost non-existent (Cooper et al. 2003). Elk are also suppressing the growth of willow plants, so that few plants can attain a height greater than the herbaceous layer, which is the layer of non-woody plants such as grasses, forbs, and herbs (Peinetti et al. 2002, Zeigenfuss et al. 2002). Willow is the dominant woody shrub on almost all wet meadow or riparian areas in Rocky Mountain National Park.

FIGURE 1.4: HEAVILY BROWSED WILLOW ON THE ELK WINTER RANGE

FIGURE 1.5: RESEARCH EXCLOSURE SHOWING THE DIFFERENCE BETWEEN BROWSED AND UNBROWSED WILLOW

It is an important food source for elk (Hobbs et al. 1981, Singer et al. 2002) and provides wildlife habitat for a large number of bird, butterfly, and plant species (Connor 1993, Simonson et al. 2001). Elk herbivory has contributed to a transition of tall willow areas to short willow areas over the last 60 years in Moraine Park and Horseshoe Park (Peinetti et al. 2002, Zeigenfuss et al. 2002, B. W. Baker et al. 2005). Figures 1.4 and 1.5 show the effects of heavy browsing on montane riparian willow. Declines in montane riparian willow over the last 50 to 60 years are attributed to various factors, but the current condition and trend of montane riparian willow communities is primarily due to the effects of elk.

Another factor contributing to the decline in montane riparian willow on the elk range is a decrease in surface water, which is believed to be a consequence of reduced beaver activity. Beaver are a critical component of the primary winter range in the park. Under natural conditions, they would be present in higher numbers; currently very few beaver are found on the elk primary winter range. In 1939 and 1940, it was estimated that more than 300 beavers occupied Moraine Park (Packard 1947). Since then, beaver on the primary winter range have declined by more than 90%, with a resultant decline of surface water in the area has by nearly 70%, which has led to a decline in montane riparian willow (Packard 1947, Peinetti et al. 2002, Zeigenfuss et al. 2002). The lack of beaver is accelerating montane riparian willow declines by inhibiting the development of appropriate sites for willow seedling establishment and limiting recharge of the shallow aquifers in Moraine Park and Horseshoe Park (Cooper et al. 2003). Recovery of beaver on the primary winter range is unlikely, as suitable habitat for beaver is currently lacking there due to the poor condition of the montane riparian willow communities (B.W. Baker et al. 2005).

Elk herbaceous consumption at extremely high rates may also result in the alteration of herbaceous plant communities on the elk range. Annual consumption rates in montane riparian willow and upland shrub communities on the primary winter range have occurred at a high level, on average 55% to 60%, respectively. Most offtake in willow and upland areas occurred during the summer and winter periods, respectively (Singer et al. 2002). Herbaceous plants in willow

communities may be particularly vulnerable because most grazing occurs during the growing season (Augustine and McNaughton 1998).

OBJECTIVES

Objectives are specific statements of purpose that describe what should be accomplished, to a large degree, for the plan to be considered a success. Development of the objectives was done with legal and regulatory mandates in mind and with an awareness of the complexity of relationships between the numerous species, ecosystems, and ecological processes that future management actions would affect. Several objectives refer to the "natural range of variation" or "natural conditions." The concept of natural range of variation in resource conditions was discussed earlier in the "Purpose of and Need for Action" section of this chapter, along with the reasons why the elk population and vegetative conditions on the primary winter range are thought to be outside the natural range of variation. Based on these objectives, the "Adaptive Management" section of Chapter 2 presents specific desired future conditions for elk and vegetation on the elk range to be achieved over the next 20 to 50 years. The objectives for the Rocky Mountain National Park elk and vegetation management plan are to

1. Restore and/or maintain the elk population to what would be expected under natural conditions to the extent possible.

    Maintain a free-roaming elk population.

    Decrease the level of habituation to humans exhibited by elk.

    Restore the elk population size to a level allowing it to fluctuate within the natural range of variation, between 1,200 and 2,100 elk with 200 to 800 wintering inside the park and 1,000 to 1,300 outside the park.

    Redistribute elk to disperse high densities of elk.

2. Restore and/or maintain the natural range of variation in vegetation conditions on the elk range, to the extent possible.

    Prevent loss of aspen clones within high elk use areas.

    Restore and maintain sustainable montane riparian willow.

        Increase montane riparian willow cover within suitable willow habitat on the primary winter range.

        Maintain or improve the condition of riparian and upland willow on the primary summer range.

    Reduce the level of elk grazing on herbaceous vegetation.

3. Opportunistically collect information to understand chronic wasting disease prevalence in the park within the framework of the alternative.

4. Ensure that strategies and objectives of this plan/EIS do not conflict with those of chronic wasting disease management.

5. Continue to provide elk viewing opportunities.

6. Recognize the natural, social, cultural, and economic significance of the elk population.

PARTICIPATING AGENCIES

Figure 1.1 shows the approximate bounds of the primary summer range and primary winter range of the elk population addressed by this plan. As shown in the figure, elk move outside the park onto other federal, state, and private lands.

Because of the migratory nature of the elk population, a regional approach is essential to develop a meaningful, long-term plan. Therefore, the National Park Service is committed to working in partnership with nearby land managers and other federal, state, and local agencies to effectively manage elk and vegetation in and near the park.

Development of this plan and environmental impact statement involved the cooperation of multiple agencies at various levels of participation. The National Park Service is the lead agency and is responsible for all aspects of developing the plan/EIS, including selecting a preferred alternative and preparing a record of decision.

Cooperating agencies on the core planning team participate in all aspects of developing the plan/EIS. These agencies include the Town of Estes Park and the Estes Valley Recreation and Parks District.

Cooperating agencies on the extended planning team have agreed to provide expertise and data on pertinent topics and to review appropriate portions of the plan and environmental impact statement. These agencies include the Colorado Division of Wildlife, Grand County, Larimer County, the Town of Grand Lake, the U.S. Bureau of Reclamation, and the U.S. Forest Service.

The National Park Service and the cooperating agencies have signed a memorandum of agreement to establish how the plan and environmental impact statement would be prepared. The memorandum, which is included in Appendix A, delineates the roles and responsibilities of each agency. The National Park Service will be responsible for publishing and distributing the draft and final plan/EIS and the record of decision.

The National Park Service is solely responsible for managing elk inside park boundaries according to federal laws and policies. Outside the park, wildlife-management and wildlife-damage cases are supervised by the Colorado Division of Wildlife. This authority extends onto Arapaho-Roosevelt National Forest on the east and northern boundaries of the park. The U.S. Forest Service has the authority to manage wildlife habitat on the national forest, but the management of the wildlife itself is the responsibility of the Colorado Division of Wildlife.

BACKGROUND

Elk in the Rocky Mountain National Park Region

Prior to colonial westward expansion, elk inhabited the area that became the Rocky Mountain National Park and the Estes Valley. There is no historic information on the range of variability in elk numbers prior to the era of European settlement. Estimates based on the SAVANNA ecosystem simulation model (Coughenour 2002) indicate that the historic elk population during winter in the Estes Valley probably fluctuated between 1,500 and 3,500 animals, depending on factors such as available food resources, weather, and wolf predation.

The gray wolf, which was extirpated from the Rocky Mountain National Park area before the park was established, represented a key component in the food chain and in defining the natural condition. Ecosystem simulation modeling indicates that wolves would have helped limit elk

numbers (Coughenour 2002), and empirical evidence from areas that currently have intact wolf populations indicates that elk would have been more wary and less sedentary, resulting in lower densities. Grizzly bears, which were native to the park but also extirpated, would also probably also have contributed to reducing elk numbers and research shows that multiple predators more effectively limit elk populations (Gasaway et al. 1992 and Orians et al. 1997, cited in Monello et al. 2005). American Indian hunters and the presence of bison would probably have also helped limit elk numbers (Monello et al. 2005).

There is little information on where elk spent summer and winter prior to settlement of the Estes Valley. Some have suggested that elk spent summers in and around the park and migrated to the plains during the winter (Clarke et al. 1994). However, Estes (1939), in referring to animal migrations during the 1860s, stated "winter drove all the game down to the foothills, except the elk, they would remain in the park [referring to the Estes Valley] until summer, then they went up over the range or mountains." While this suggests that elk stayed in the Estes Valley throughout the winter, there is no definitive evidence either way. Within Rocky Mountain National Park, the comparison of historic game drives and current elk migration patterns suggests that elk use the same routes today as they did historically (Benedict 1996; Larkins 1997).

After European settlement of the Estes Valley in the mid-1800s, the elk population was rapidly reduced by market hunting. Abner Sprague, one of the first settlers in Moraine Park, described the decline (1925):

> Our [elk] only lasted about three years. They came down from their high range just before Christmas, 1875, by the thousands and were met by hunters with repeating rifles and four horse teams; hauled to Denver for three or four cents per pound. In 1876 fewer came down; in '77 very few were seen on [the east] side of the divide. In 1878 I killed my last elk, and to get him had to go over Flat Top [Mountain].

Although claims of "thousands" of elk cannot be verified, it is clear that elk were extirpated (or nearly so) from the Estes Valley by 1880. No viable population existed again until elk were reintroduced in 1913-14.

Elk Reintroduction and Management from 1913 through 1968

The U.S. Forest Service and Estes Valley Improvement Association reintroduced 28 elk into the Estes Valley in 1913-14. These elk were heavily protected by prohibiting hunting (i.e., no hunting was allowed in or near the Estes Valley until 1939). Under this protection, along with the creation of the park in 1915, the population grew from 30 animals in 1915 to approximately 350 animals by 1930 (Stevens 1980a).

Concern about the size of the elk population first arose in the early 1930s because elk started eating the bark of live aspen trees (McLaughlin 1931 cited in Guse 1966). G. Wright et al. (1933) suggested that this indicated that "the elk population was reaching the limit of its food supply and that range abuse and starvation were in the offing." This was likely one of the first indications that elk were approaching the park's carrying capacity.

G. Wright et al. (1933) suggested that a major cause of poor range conditions was that the most important elk winter range areas, such as Beaver Meadows, were privately owned. These areas were heavily grazed by cattle and horses during the summer, leaving little forage for elk in the winter. To remedy the situation, in 1932 the United States government purchased about five square miles of private land in core elk winter range areas and added them to the national park.

These areas included Moraine Park, Beaver Meadows, and Horseshoe Park (Ratcliff 1941): the areas referred to as the core winter range.

An elk and deer management plan written in 1943 (Condon 1943 cited in Guse 1966) was prepared in response to continuing increases in the elk population and the belief that range conditions were deteriorating (Dixon 1939, Ratcliff 1941). The plan stated, "300 elk and 200 deer should be removed from the actual populations of 705 elk and 717 deer counted in April 1943." Direct reductions (shooting) carried out in December 1944 and January 1945 removed 301 elk and 113 deer from the park winter range areas (Grater 1945). The goal of the reductions was to reduce the grazing and browsing effects on native vegetation.

The 1943 management plan and subsequent reductions produced controversy. Grater (1945) stated that the population reductions were not necessary because browse plants such as montane riparian willow were not seriously damaged except in localized areas where elk concentrated to feed. Additionally, the Assistant Director of the National Park Service, Hillary A. Tolson, wrote to the park in 1946, stating that the Director's office had a "strong dislike" for reduction programs either inside or adjacent to NPS units. Accordingly, further reductions were halted until 1949.

A report by Fred Packard, the park's full time wildlife technician, was based entirely on work done prior to the initial reduction programs in 1944 and 1945 (Packard 1947). The park's annual reports from 1945 to 1947 generally remained optimistic about range conditions. However, in a 1949 report, the park again focused on reducing the number of elk and deer to improve range conditions: "The major wildlife problem at this time is the overused condition of winter range by deer and elk. It is anticipated that a reduction of elk and deer will be effected during the winter of 1949-50." Such conclusions were generally based on personal, subjective observations; quantitative data on range conditions were not collected again until 1954 by Buttery (1955).

Direct reductions resumed in 1949-50, removing 340 elk and 100 deer from Rocky Mountain National Park. Annual removal of on average 60 elk and 40 deer continued until 1962 and 1959, respectively. Population estimates during this period indicated that 350 to 800 elk and 300 to 700 deer remained in the park during the winters between 1950 and 1962 (Stevens 1980a).

The National Park Service discontinued direct elk population reductions in the park in 1962 for several reasons. Researchers provided evidence that upland shrubs and willow were displaying signs of recovery and overall primary winter range conditions were improving (Buttery 1955, R. Wright 1992). More importantly, a memorandum of understanding in 1962 among Rocky Mountain National Park, the Colorado Department of Game and Fish (now known as the Colorado Division of Wildlife), and the U.S. Forest Service set the framework for a cooperative elk study program that would determine the distribution and migration routes of elk in and around Rocky Mountain National Park. The control program ended as a result. Additionally, the state initiated a hunt in January and February 1963. The goal of these cooperative research efforts was to determine if there was any time of year when large numbers of elk from the park were outside park boundaries to allow hunters (rather than park rangers) to harvest park population surpluses (Denney et al. 1967).

Large numbers of elk were documented to move east of the park boundary once during a five-year cooperative study in the early 1960s (Denney et al. 1967). Several factors likely contributed to this unusual elk migration out of the park, including significant snowfall during January to March 1963 and avoidance of the park's primary winter range by elk as a result of lethal control actions during the previous 10 to 15 winters. (Elk avoid areas where they are disturbed or hunted [Altmann 1956].) This single large migration also coincided with the first January and February 1963 hunt, which removed more elk (more than 500) from the hunt units adjacent to and surrounding Rocky Mountain National Park than any previous National Park Service control

effort (Stevens 1980a). However, many of these animals were harvested at sites more than 20 miles from the park border, and the National Park Service trapping report from 1967-68 suggested they were not part of the Rocky Mountain National Park elk population. Harvests throughout the rest of the study (Denney et al. 1967) were markedly reduced, averaging fewer than 75 animals per year (Stevens 1980a). Nevertheless, the agencies moved ahead with a long-term management plan to control elk numbers with public harvests outside Rocky Mountain National Park boundaries.

The long-term elk management plan (1967 supplement to the 1962 memorandum of understanding) agreed to:

Dispose of surplus elk by public hunting outside of the park,

Establish a hunt in January and February adjacent to park boundaries, and

Trap and transplant animals if the public hunt was not effective.

The park used trapping and transplanting to supplement hunting harvests outside the park in efforts to reduce the elk population. However, even with relatively high harvests and trapping (268 and 175 elk, respectively) in 1967-68, elk numbers appeared to nearly double in size the following year (Stevens 1980a). January and February hunts outside the park continue today, but the 1967-68 transplants were the last time Rocky Mountain National Park directly reduced the population. This marked the beginning of a management era that has become known as “natural regulation.”

Natural Regulation (1969 to Present)

The management era from 1969 to the present, marked by little to no management intervention on ungulate populations, has become widely known in the media and scientific literature as "natural regulation" (Huff and Varley 1999). The concept implies that a population will self-regulate, which means that population growth tends to slow as the population fills the available habitat and to increase if their numbers decline. Natural regulation in Rocky Mountain National Park always included the provision that hunting adjacent to the park or some other type of control was necessary to help control the elk population and to fulfill the role of extirpated predators (Stevens 1980a).

The elk population in the park was never greatly influenced by public hunting outside the park. Instead, population growth only slowed as it approached the food-limited carrying capacity in the 1980s (Lubow et al. 2002).

Extensive development in and around Estes Park has decreased hunting opportunities there, and elk have increasingly concentrated in Rocky Mountain National Park and Estes Park, where hunting and/or the discharge of firearms is not allowed. Despite this concentration in areas where hunting is prohibited, the total number of elk harvested in Game Management Unit 20 (mostly east of the park) has generally not declined. In fact, in recent years, harvest numbers have been at their highest historic levels.

Over time, the elk population has become less migratory, as recent surveys indicate that 10% to 15% of the elk population in the Rocky Mountain National Park area spend the summer on the primary winter range. During summer, at least 100 to 200 animals stay on the primary winter range in the park and as many as 550 animals stay on the primary winter range areas in town. Under natural conditions, all of the elk would migrate from the primary winter range to the primary summer range. These elk cause concern because non-migratory elk can severely inhibit the regrowth capabilities of important winter forage species (Augustine and McNaughton 1998).

The only large group of elk (more than 300 animals) that do not migrate tend to use the Meadowdale Ranch and 18-hole golf course on the east end of Estes Park. This herd has stayed in this area since at least the 1970s (Stevens 1980a), although their numbers appear to have increased over the last 30 years.

Aspen Community

Aspen occupies less than 5% of the habitat within Rocky Mountain National Park. However, it is ecologically important because it supports a large number of plant and animal species compared to other plant communities in the park (Mueggler 1985; Simonson et al. 2001; Turchi et al. 1994). Aspen is a preferred browse species for elk, and regeneration of aspen shoots is being suppressed as a result of elk herbivory (Olmsted 1979 and 1997).

Park-wide, aspen are present in numerous, healthy stands and are not overly affected by elk herbivory (Suzuki et al. 1999). However, there are severe problems with the condition of aspen stands on the core winter range and in the Kawuneeche Valley, where elk densities are high. Continuation of the current "natural regulation" management approach for elk in Rocky Mountain National Park could result in the complete loss of aspen trees or their existence in a shrub-like state on core winter range areas (W.L. Baker et al. 1997, Olmsted 1997; Suzuki et al. 1999, Coughenour 2002, Weisberg and Coughenour 2003).

Throughout the western United States, aspen reproduction is almost always vegetative (through suckers) rather than by seeds. Vegetative reproduction occurs when interconnected roots give rise to an adventitious sucker that eventually becomes an aspen tree. Aspen trees that are connected by their roots are referred to as a clone. Almost all aspen stands that have been studied in the western United States are made up of a single clone or mosaic of clones. Few individual aspen trees live more than 200 years (Jones and Schier 1985), but aspen clones often are hundreds or thousands of years old (Kay 1997a). Aspen suckers are vulnerable to elk and mule deer browsing, which can result in the death or stunted growth of the aspen clone if the rate of browsing exceeds the rate of sprout survival over a long period. When browsing is intense enough, no aspen suckers within a clone can reach tree size. This could eventually result in the loss of the clone because photosynthesis will cease as the older trees die, and the root systems become malnourished. Death of aspen clones in localized areas may indicate that the supporting ecological system is experiencing conditions outside its range of normal variability.

In the core winter range on the east side of Rocky Mountain National Park, researchers have not documented unprotected aspen suckers that have matured into trees with a height greater than 8 feet since 1970 (W. L. Baker et al. 1997, Olmsted 1997, Suzuki et al. 1999). Olmsted (1979) and W. L. Baker et al. (1997) found inverse correlations between aspen regeneration on the core winter range and elk population size. The latter study concluded that aspen stands only produced a new cohort of trees when the elk population was less than 600 animals.

Research almost two decades apart (Olmsted 1979 and 1997, W. L. Baker et al. 1997) suggested that elk population size is the primary factor controlling aspen regeneration and cohort establishment on the core elk winter range in and near Rocky Mountain National Park. However, other research suggests that elk distribution (density) may be equally or even more important for successful aspen regeneration than overall population size (Stevens 1980a, Weisberg and Coughenour 2003).

Elk also can damage aspen by stripping the bark off live trees (see Figure 1.6). Because elk prefer more nourishing grasses, twigs, and leaves, this occurs most often when other vegetation in an area has already been eaten or is buried by deep snow. Bark stripping does not usually kill aspen, but it can create inoculation sites for pathogens that lead to aspen mortality (Hinds 1985).

FIGURE 1.6: ELK HERBIVORY DAMAGE ON AN ASPEN TRUNK

Montane Riparian Willow Community

Willow is the dominant woody shrub on almost all wet meadow or riparian areas in Rocky Mountain National Park. It is an important food source for elk (Hobbs et al. 1981, Singer et al. 2002) and provides wildlife habitat for a large number of wildlife species (Connor 1993, Simonson et al. 2001). Montane riparian willow declines in Moraine Park are visibly correlated to a large reduction (69%) in surface water that has been attributed to an almost complete loss (greater than 90% decline) of the area's beaver population since 1940 (Packard 1947, Peinetti et al. 2002, Zeigenfuss et al. 2002). Beaver are highly effective at building dams that create ponds and additional stream channels.

The relationships between montane riparian willow, beaver, and elk are complex. Under natural conditions, with an intact predator base, beaver and elk establish a competitive balance in which each species' willow herbivory does not ultimately exclude each other or annual regeneration of montane riparian willow (B.W. Baker et al. 2005). However, because most of the beaver population was trapped from the park in the 1940s (B.W. Baker et al. 2004), hydrological support for montane riparian willow declined (i.e., less surface water and lower water table). In turn, the increasing numbers and concentrations of the elk population produced higher rates of willow herbivory on the core winter range. Because montane riparian willow growth and survival in Rocky Mountain National Park primarily depend on ground water from streams and snowmelt instead of rainfall (Alstad et al. 1999), it is not surprising that large expanses of montane riparian willow have died where streams have become totally dry and water tables have apparently experienced dramatic decreases. Many stream channels in Moraine Park that were filled with water and bordered by live willow in 1937 are now dry, with large, dead willow on the old stream banks. Continued high rates of elk herbivory and the absence of beaver and their associated habitats are decreasing the available suitable sites for willow seed germination and associated montane riparian willow reproduction (Cooper et al. 2003).

Herbaceous Vegetation

Herbaceous vegetation (grasses) make up a large component of the elk diet, between 58% and 76% (Monello et al. 2005). Herbivory of herbaceous vegetation in montane riparian willow and upland shrub communities on the elk range occurs at a high level. Annual herbaceous consumption rates in montane riparian willow and upland shrub communities on the primary winter range in the park averaged 55% to 60%, respectively. Most offtake in willow and upland areas occurred during the summer and winter periods, respectively (Singer et al. 2002). These herbaceous consumption rates by elk in the park are extremely high, exceeding most areas in North America. This has not altered herbaceous coverage, but comparison with consumption rates in similar type ecosystems indicates that herbaceous communities on the primary winter range may not be able to be maintained under such grazing pressures (Singer et al. 2002).

Socioeconomic Importance of Elk to the Area

Elk are an important part of the socioeconomics of the Estes Park area. Their importance derives from three primary contributions:

Many visitors come to the park and valley hoping to see elk.

Many area residents feel that the presence of the elk enhances their personal quality of life. In some cases, it contributed to their decision to live or work in the area.

Recreationists appreciate the presence of elk in the forests and parks of the region and some, such as elk hunters and wildlife photographers, base their experience on the existence of elk.

Elk contribute to the economy of the Estes Valley by attracting visitors to the park and the Town of Estes Park. Visitors enjoy viewing and photographing elk, especially during the autumn elk rutting season. While a few visitors come primarily to see elk, most consider the elk as part of the overall experience of the area. The visitors contribute to the economy through expenditures on lodging, food, entertainment, gifts, souvenirs, and other items, all of which contribute to the local sales tax base. They also often pay entrance fees to Rocky Mountain National Park, increasing National Park Service revenues.

Elk play a role in the economy of the area by contributing to its overall attractiveness to new and existing residents and employees. Quality of life is difficult to quantify but is important in the economic vitality of a region. The aesthetic perceptions associated with the presence of elk may enhance property values in the town, and the presence of elk may play a role in encouraging some people to live and work in the area. On the other hand, some consider elk a nuisance. They can damage landscaping and hinder traffic or impede the ability to use golf courses or participate in other recreational activities such as walking, running, or biking on the Lake Estes Trail or Fish Creek Trail which may discourage visitors use of the area.

Elk contribute to the economy around the park by providing a focal point for hunters and other recreationists in the region. Hunting elk, especially mature bull elk, is an important activity for many Colorado residents and out-of-state visitors. Hunting license fees contribute to the state coffer, and hunters' purchases of lodging, food, sporting goods, and other supplies contribute to the local economy. Recreationists, who sometimes make similar local expenditures, may have an enhanced enjoyment of their hiking, biking, and other recreational activities because of the presence of elk in the area.

Chronic Wasting Disease and Elk

Chronic wasting disease first appeared in cervids over 30 years ago. In elk, it first appeared in 1979 (Williams and Young 1982). Chronic wasting disease occurs in free-ranging deer and elk in northeastern Colorado and southeastern Wyoming (Miller et al. 2000), and has recently been detected in moose (CDNR 2005). It also has been documented in deer and/or elk in other western, Midwestern, and eastern states as well as in Saskatchewan and Alberta, Canada. Elk and deer in the populations in Rocky Mountain National Park have tested positive for chronic wasting disease. No other wildlife species or domestic animals are known to be susceptible to the disease, under natural conditions.

Chronic wasting disease causes behavioral changes, emaciation, excessive salivation, weakness, and death in infected animals. The disease can remain latent (i.e., no symptoms are apparent) for months and potentially years, and it is fatal in all cases. It is unknown how the disease originated; but knowledge of its presence in Colorado began about 35 years ago (Miller et al. 2000). Although the origin of the disease is unknown, it is believed to be an exotic disease that is the result of human influences, such as loss of habitat from encroaching development and extirpation of predators, that has resulted from concentrated ungulate populations.

Prevalence estimates for chronic wasting disease for elk inside Rocky Mountain National Park have not been determined. In the late 1990s, chronic wasting disease prevalence in elk in adjacent areas was estimated to be less than 1%, based on surveillance from mandatory elk head submission from hunters (Miller et al. 2000). More recent estimates taken from Colorado Division of Wildlife data analysis units adjacent to the park range between 0 and 2.8% (Miller 2006).

Recent research indicates that chronic wasting disease can be contracted through environmental contamination with excreta or carcasses and directly through animal-to-animal contact (Miller et al. 2004). In captive situations, up to 71% (five of seven) of adult elk deaths were due to the disease (Miller et al. 1998), and simulation modeling predicts that chronic wasting disease has the potential to cause drastic population reductions in deer (Miller et al. 2000; Gross and Miller 2001).

ISSUES AND IMPACT TOPICS

According to the guidance provided in Director's Order #12 (NPS 2001c), an "issue" under the National Environmental Policy Act describes the relationship between actions (proposed, connected, cumulative, similar) and environmental resources, including natural, cultural, and socioeconomic resources. Issues are usually problems that the current management practices have caused or that any of the proposed alternatives might cause. They also may be questions, concerns, problems, or other relationships, including beneficial ones.

Issues need to be addressed in the analysis of the proposed management actions and alternatives. The following issues were identified by the Environmental Impact Statement Team and by the public during the public scoping period. Initial analysis showed that some of these issues were not problematic; the section "Issues Considered but Not Evaluated Further" at the end of this chapter explains why each was dismissed. In addition, research and analysis raised further problems, questions, or concerns related to some of these issues. Relevant aspects of those issues that were retained are discussed in detail under the appropriate impact topics in Chapter 3 "Affected Environment" and Chapter 4 "Environmental Consequences." See Chapter 5

"Consultation and Coordination" for a description of public and agency involvement that took place during the development of this plan.

Effects of Existing Elk Population

Elk Population and Density: Effects on Vegetation, Wildlife, Population Health, and Biodiversity

Since active management of elk within Rocky Mountain National park ended in 1969, the increased abundance and densities of elk has placed stress on the local ecosystem:

> Research in Rocky Mountain National Park indicates that, without an intact predator base, the elk population size is larger and the population is more concentrated, more sedentary (i.e., less mobile), and less migratory (i.e., remaining on primary winter range in summer). As a result, some plant species, particularly montane riparian willow and aspen, are browsed to the point that they cannot regenerate. This has altered aspen and montane riparian willow plant communities in the park, primarily in the core winter range, which has potential to reduce the biodiversity of plants and animals in those communities. The vegetation community-level changes are exacerbated by reduced water levels and the significant decrease in the beaver population in the park, which contribute to changes in water levels. High elk populations and densities may contribute to an increase in erosion, water quality degradation, and an increase in exotic plant establishment.
>
> The public identified a need to address restoration of an intact ecosystem in addition to focusing on elk and vegetation. Within this context, the issue of habitat restoration to benefit all species rather than just elk was recognized. By considering ecosystem restoration as a goal rather than a species- or community-specific approach, biodiversity would be bettered served.
>
> Although there is no direct evidence to suggest that elk in Rocky Mountain National Park are negatively affecting native biodiversity on a landscape scale, there is indirect evidence to support such a concern. Aspen and montane riparian willow communities support a diversity and abundance of wildlife not seen in other habitat types in Rocky Mountain National Park. Further declines of the montane riparian willow and aspen communities on the core winter range would likely result in localized declines or losses of bird, butterfly, and plant species in Rocky Mountain National Park.
>
> Montane riparian willow declines over the last 50 to 60 years are attributed to a variety of factors, but the current condition and trend of montane riparian willow communities is primarily due to the effects of elk. Elk are severely inhibiting the ability of montane riparian willow to reproduce, for few willow plants on the primary winter range are able to produce seed, and seedling survival is almost non-existent. Elk are also suppressing the growth of willow plants, so that few plants can attain a height greater than the herbaceous layer. Montane riparian willow communities on the core winter range are expected to continue to decline under current browsing levels.
>
> The localized decline or loss of aspen stands may indicate an ecosystem that is outside its natural range of variability. Elk are the proximate factor in aspen declines, as elk browsing severely inhibits aspen reproduction and growth on the primary winter range.
>
> Herbaceous consumption rates by elk in the park are extremely high and comparison with consumption rates in similar type ecosystems indicates that herbaceous communities on the primary winter range may not be able to be maintained under such grazing pressures.

Recent surveys indicate that up to 25% of the elk population remains on primary winter range areas year-round and nonmigratory elk can severely inhibit the regrowth capabilities of important winter forage species.

High levels of elk herbivory in upland shrub areas have inhibited the ability of fire resource managers in the park to use prescribed fire to reduce fuel levels. High levels of herbivory by elk and mule deer following a fire can result in the permanent loss of shrubs.

The elk population has increased over the past 30 years to a high ranging from 2,800 to 3,500 animals between 1996 and 2001. There have been concerns that the town subpopulation would continue to grow as some estimates showed it to be below carrying capacity. Recent estimates, however, indicate that the town subpopulation may be at or within the carrying capacity of the habitat, although this does not necessarily mean that the elk and the habitat are in balance or that the population is within the natural range of variation. Other factors such as elk distribution, a lack of natural predators, and hunting prohibitions in the park or Estes Park can have a large affect on habitat conditions although the carrying capacity is adequate to support the population. Research indicates that as a result, the elk population is now limited primarily by density-dependent factors. The large and highly dense elk population may affect elk behavior during the breeding season, when energy expenditures, particularly for bulls, may affect survival and fitness (i.e., ability to reproduce).

Effects on Property and Safety

Increasing elk numbers and concentrations have the potential to increase health and safety risks for humans as well as for elk:

Elk have concentrated in "safe zones" where they cannot be hunted, including Rocky Mountain National Park and the Town of Estes Park. As a result, property damage from elk in the Town of Estes Park has increased. Elk eat shrubbery, gardens, and lawns on private and public property, including the town golf course, its parks, and school grounds.

Migratory and calving patterns have changed, with more elk calving in town. This has resulted in an increased safety risk for people in town who inadvertently or intentionally disturb cows or their calves. Increased elk concentrations may also increase risk of human contact with bull elk or other dangerous individuals outside calving season.

It is believed that increased concentrations of elk can increase the rate of transmission of chronic wasting disease in the elk population.

Increased abundance and concentrations of elk in the park and town cause visitors driving automobiles to slow down or stop as they seek to view elk, which increases traffic congestion and accidents.

Habitat Conflicts

Estes Park and the region around the park are being increasingly developed for summer and year-round homes. Both the human population and the elk population have increased over recent years. This has displaced elk onto open areas in the town, and has increased elk-human contact in the town and entire project area. This increase in contact can result in the following problems:

Elk may have become more habituated to humans and be less fearful of them. This can mean not only safety risks and property damage, as described in the preceding issue, but also the perception of elk as pests. The requirement that dogs be leashed has helped habituate elk to humans.

New residents may not be as tolerant of elk as those who have lived with them for many years. Some citizens want elk removed or the population reduced or restrained and others want to keep them as they are now. This reflects a difference in social values.

Effects on the Local Economy

Changes in the size and density of the elk population in the park and the Estes Valley could impact various sectors of the area economy.

Elk are a major visitor draw for Estes Park and Rocky Mountain National Park. Town business owners depend in large part on the money spent by visitors who come to view elk to support their business.

Local employment can be directly affected by elk management strategies. Hunting contributes substantially to the Estes Valley economy, and changes in elk population management strategies could affect hunting.

The overpopulation of elk has potential effects on agricultural operations in the Estes Valley as a result of competition between livestock and elk for natural vegetation and supplementary feedstocks (i.e., hay).

Effects on Visitors

Because some people visit the park to view elk, the increase in visitors can impact the experience for all visitors. In some cases, the large number of visitors who come to the park to view elk can cause traffic congestion and noise in popular elk-viewing areas. This can detract from the values typically associated with the national park experience, such as solitude and quiet.

Effects of Potential Management Actions

Lethal Reduction Management Actions

The use of park staff or personnel assisting the National Park Service to remove elk using lethal means such as firearms or injection raised the following issues:

Lethal reduction could be an effective population control measure with substantial support, but a segment of the public does not want to see a lethal management tool employed in a national park. Opposition to lethal reduction could adversely affect tourism. This issue is distinct from hunting in a national park because the lethal reduction would be done under controlled circumstances by agency or contracted personnel and would not allow for the "fair chase" ethic associated with hunting.

There are concerns that lethal reduction activities, including an elk-capture facility, use of equipment and personnel to access backcountry or wilderness areas of the park, and removal of elk carcasses, could affect vegetation as well as other wildlife species, their habitats, or their behavior.

Lethal reduction activities could pose safety risks to the public and staff implementing the actions.

Hunting of Elk Outside the Park as a Population Control Measure

Although hunting is illegal in the park, hunting outside the park has traditionally been used to manage elk populations. However, there are concerns associated with hunting as a means of population control for the Rocky Mountain National Park / Estes Valley population:

Colorado Division of Wildlife hunting harvest objectives may not have the same goals as the National Park Service with respect to the size and distribution of the elk population.

Hunting has the potential to reduce localized populations; however, because of limitations on hunter access to the elk population of concern, hunting may not be effective in controlling the population in areas where impacts are taking place (e.g., Estes Park).

Redistribution Methods

Concerns were raised that methods used to redistribute the elk population such as aversive conditioning and the use of unsuppressed (noisy) weapons may result in more elk movements outside the park that may exacerbate problems in areas adjacent to the park such as Estes Park.

Chronic Wasting Disease

There is concern that high concentrations of elk may be associated with increases in the rate of transmission of chronic wasting disease in the elk population. The presence of chronic wasting disease has numerous ramifications. Some of these include questions about the safety of consuming elk meat and the long-term effects of the disease on the elk population. This plan will be limited to assisting in determining the prevalence of chronic wasting disease in Rocky Mountain National Park elk; actions will not conflict with chronic wasting disease management.

Education

Education of the public about elk, their habits, and how people can learn to adapt and share the environment with elk was identified as an issue. The plan will incorporate educational components to help deal with this issue.

Release of Wolves

Releasing an experimental gray wolf population in Rocky Mountain National Park is a controversial issue. Some people argue that it is the most effective way to manage the elk population, while others argue that conditions in the region make this approach infeasible:

Proponents of wolf release maintain that wolves would control elk populations and return a missing predator to the ecosystem.

Opponents posit that the region is too developed and that the wolf no longer has a suitable niche within this human-dominated system. Others question whether a plan to release wolves in the park could occur without cooperation from other agencies or if it would be consistent with the Colorado Wildlife Commission draft Wolf Management Plan. There is also concern that release of wolves in the park would result in depredation of livestock and/or domestic animals.

Fertility Control

Issues relating to use of fertility control as a management tool include ethical concerns as well as concerns about the biological effects of fertility control agents.

There are concerns that the use of fertility control to manage elk populations would be artificial and that humans do not have the right to interfere with the reproductive processes of wild animals.

There is also a concern that not enough is known about the long-term effects of fertility control agents on elk and other species that could be exposed to the control agent or its derivatives.

Concern was also raised regarding the consumption of elk meat that has been exposed to fertility control agents.

Fences

The use of fences to restrict elk access to vegetation and allow restoration of fenced vegetative communities is a polarizing issue. Some people feel that fences would have an adverse effect on the park visitor experience while others view fences as the solution to protecting and restoring degraded vegetative communities. Fencing in the park raises the concern that elk fenced out of preferred foraging habitat in the park would disperse to habitats in town and exacerbate existing problems. Concerns were also raised regarding the effects that fences would have on the movements of other wildlife.

Effects on Hydrology

Various management actions such as construction of fences, active replanting of montane riparian willow, or the recovery or reintroduction of beaver could affect water quality and hydrology on the elk range.

Effects on Soils

Soil resources could be affected by excess concentration of elk or by the actions taken to manage the elk population as a result of erosion, exposure of bare ground, compaction, changes in fertility and nutrients, and long-term sustainability and productivity.

Effects on Wilderness

Because 95% of Rocky Mountain National Park is managed as wilderness, elk and vegetation management actions could affect wilderness or wilderness values. Actions such as the transport and installation of fences and capture facilities, the use of helicopters, removal of carcasses, and use of firearms could degrade the wilderness within the park.

Effects on Natural Soundscapes

Natural soundscapes within the park could be disturbed by elk and vegetation management actions such as fence construction and the use of machinery, including helicopters, motorized vehicles, and firearms.

Effects on Public Health and Safety

Issues identified during scoping include potential safety risks for the public or personnel associated with elk and vegetation management actions such as darting, prescribed fire, and fence construction and maintenance.

Effects on Visitors

Some scoping participants expressed concerns that prescribed fire could generate smoke and odors or could close portions of the park, which could detract from the park experience.

Effects on Park Operations

The elk and vegetation management actions could have a substantial effect on the ability of the park staff to perform their duties.

ISSUES CONSIDERED BUT NOT EVALUATED FURTHER

Chronic Wasting Disease Management

Some members of the public requested that this management plan specifically address chronic wasting disease and focus on finding a solution for the problems associated with the disease. This plan/EIS does evaluate the effects that changes in the elk population size and distribution may have on chronic wasting disease in the population. Moreover, the National Park Service recognizes that management of elk populations requiring population reductions would present an opportunity for the park to gain knowledge on the prevalence of chronic wasting disease within the park, and under this plan, that information will be collected within the framework of the alternative chosen. In conjunction with the proposed elk management actions, the National Park Service would collect data regarding a field procedure that can serve as a diagnostic test for chronic wasting disease in live elk. However, this plan/EIS will not address efforts to manage chronic wasting disease, which is beyond the scope of this plan. If information collected through this plan shows that there is a need to manage the disease in elk, that need would be addressed by a separate chronic wasting disease management plan.

Mule Deer and Moose Management

During scoping, concerns were raised about the response of mule deer and moose populations as a result of changes in elk populations, the effects that such responses would subsequently have on sensitive upland shrub and willow habitat, and whether the park should also take action to control these other ungulate populations. This plan/EIS evaluates the indirect effects on moose and mule deer populations and the effects on vegetation; however, management of these other ungulates is beyond the scope of this plan. If monitoring of upland shrubs, which would be separate from elk and vegetation monitoring associated with this plan/EIS, and monitoring of willow as part of this plan/EIS indicate that mule deer populations and/or in moose populations are degrading vegetation, the park would develop separate management plans to address these concerns.

IMPACT TOPICS

Discussions during scoping examined the range of potential natural and cultural resources and elements of the human environment that might be of concern or might be affected by the implementation of an elk and vegetation management plan. This review led to the selection of impact topics to be analyzed in the environmental impact statement. The impact topics examined, along with rationales for their retention or dismissal, are presented in the following paragraphs. Relevant laws, regulations, and policies specific to given impact topics retained are described in Chapter 4, "Environmental Consequences." Those relevant to all topics are discussed in "Laws, Regulations, and Policies" later in this chapter.

The natural resource topics that were retained for detailed analysis follow:

Elk population: Retained as one of the primary resources to be managed by this plan.

Vegetation: Retained as one of the primary resources to be managed by this plan. This impact topic will include analyses of effects on wetland vegetation.

Special status species: Retained because actions taken by the plan could have effects on several listed species and on compliance with the Endangered Species Act.

Other wildlife species: Retained because of the potential of the plan to affect other species of wildlife and their habitats.

Water resources: Retained because of the relationships among vegetation (especially montane riparian willow), water resources, wetlands, and elk in the park's primary winter range. This topic also addresses wetland issues associated with hydrology.

Wetlands: Retained because much of the elk-preferred habitat is in montane riparian willow wetlands in the eastern portion of the park and the Kawuneeche Valley, but not addressed as a stand-alone impact topic. The hydrological and vegetative wetland components and issues are fully evaluated in the "Water Resources" and "Vegetation" sections, respectively.

Soils and nutrient cycling: Retained because of the impacts that existing elk populations have on soils in areas where elk congregate in high densities. Continuing current management could result in continued or increased soil erosion. Management actions to control elk and protect vegetation could also result in increased soil erosion. Alternatives that altered vegetative cover and hydrology by reducing elk numbers or restoring montane riparian willow, aspen, and other plant communities could improve soils and reduce erosion.

Natural soundscape: Retained because it could be affected by several of the potential management tools that could be used to manage the elk population. These include, but are not limited to, shooting and the use of vehicles and aircraft.

Wilderness: Retained because of the potential for management actions to affect designated and recommended wilderness in the park.

Socioeconomics: Retained because elk viewing contributes substantially to the Estes Park economy. Changes in the elk population's size, location, or behavior could affect these factors.

Public health and safety: Retained because of concerns associated with shooting, the consumption of elk meat, and human-elk interactions.

Visitor use and experience: Retained because elk are integral to the expectations and activities of visitors to the park. The actions implemented by the plan could affect how visitors would use and experience the park.

Park operations: Retained because the implementation of management actions in association with this plan would require changes in how the park is operated.

IMPACT TOPICS CONSIDERED BUT DISMISSED

A brief rationale is provided for each impact topic that was dismissed from further evaluation in this environmental impact statement.

Air quality: Under the alternatives considered, there would be short-term, transportation-related effects. Surface disturbance from transportation actions would be minimal, and fugitive dust would not likely affect visitors and staff. Emissions from vehicles would be minimized by best management practices such as restricting idling time. Therefore, there would be no appreciable impacts on air quality related to transportation.

The action alternatives could include prescribed fire activities, which emit smoke. As stated in the Rocky Mountain National Park Fire Management Plan, the intent of the Clean Air Act is not to manage the impacts of natural resources management activities or of singular events such as wildland or ecologically beneficial prescribed fires that would occur in Rocky Mountain National Park (NPS 2004a). Thus, temporary impacts on air quality and visibility in the park during ecologically essential fires are anticipated and managed for. Implementation of small-scale burns would be conducted according to specifications in the fire management plan incorporating best management practices and mitigation measures to reduce air quality effects. All necessary permits would be obtained to conduct any beneficial burn activities. As a result of the small-scale nature of burns that would occur with implementation of mitigations, the effects on air quality would be short-term and would not exceed a minor level. Therefore, air quality is not considered for further consideration.

Cultural resources: No fences or temporary capture facilities would be located near existing structures or built in National Register Historic Districts, cultural landscapes, or campgrounds. The park archeologist would be contacted prior to the construction of any proposed fences or capture facilities to ensure that work would not disturb historic or prehistoric archeological sites. Should any artifacts or bone be encountered in the construction of the fences, work would cease and the park archeologist would be contacted. There are no identified ethnographic resources in the park that would be affected by elk management activities. In addition, none of the park's museum collections would be affected by any of the alternatives under evaluation. It is possible that the presence of elk, particularly when they congregate, may expose archeological resources; however, this possibility is considered to be remote and would be difficult to detect, and the impact would be negligible. Therefore, cultural resources are dismissed from further consideration.

Ecologically critical areas or other unique natural resources: The alternatives being considered would not affect any designated ecologically critical areas, wild and scenic rivers, or other unique natural resources, as referenced in the Wild and Scenic Rivers Act, *Management Policies*, 40 *Code of Federal Regulations* 1508.27, or the 62 criteria for national natural landmarks.

Energy efficiency and conservation potential: Under any alternative, the National Park Service would continue to implement its policies of reducing costs, eliminating waste, and conserving resources by using energy-efficient and cost-effective technology (NPS 2006b). The National Park Service would continue to look for energy-saving opportunities in all aspects of park operations. Refer to the "Sustainability and Long-term Management" section in Chapter 4 "Environmental Consequences" for additional details regarding the dismissal of this impact topic.

Environmental justice: Executive Order 12898, General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that all federal agencies address environmental and human health conditions in minority and low-income communities to avoid disproportionate placement of any adverse effects from federal policies and actions on these populations. Residents within the surrounding communities of the park are not disproportionately minority or low-income. Changes in elk and vegetation management within the park would not disproportionately affect low-income or minority populations. NPS policy (NPS 2006a) and the need for informed consent of individuals who would consume elk meat resulting from management actions prohibits the donation of meat to groups or organizations that support individuals of low-income; see "Distribution of Carcasses" in the "Actions Common to All Action Alternatives" section of Chapter 2 for more detail. Minority and low-income individuals would not be prohibited from receiving meat if available. Therefore, this topic has been dismissed from further consideration.

Floodplains: Executive Order 11988 instructs federal agencies to avoid, to the extent possible, the long- and short-term, adverse impacts associated with the occupancy and modification of floodplains and wetlands, and to avoid direct or indirect support of development in floodplains and wetlands wherever there is a practicable alternative. Director's Order # 77-2 addresses development in floodplains. None of the alternatives proposed in this plan would develop lands within any floodplain; actions taken in floodplains would be short term and support vegetation restoration objectives. As a result, floodplains were not retained for further analysis.

Indian trust resources: Indian trust assets are owned by American Indians but are held in trust by the United States. Requirements are included in the Secretary of the Interior's Secretarial Order 3206, American Indian Tribal Rites, Federal–Tribal Trust Responsibilities, the Endangered Species Act, and Secretarial Order 3175, Departmental Responsibilities for Indian Trust Resources. No Indian trust assets occur within Rocky Mountain National Park. Therefore, there would be no effects on Indian trust resources resulting from any of the alternatives.

Natural or depletable resource requirements and conservation potential: As directed by *Management Policies* (NPS 2006b), the National Park Service strives to minimize the short- and long-term environmental impacts of development and other activities through resource conservation, recycling, waste minimization, and the use of energy-efficient and ecologically responsible materials and techniques. Each of the action alternatives requires energy and materials for day-to-day operations. The use of energy is analyzed under the impact topic dismissed from further analysis "Energy efficiency and conservation potential." Specific impacts on the natural environment are addressed by impact topic.

Prime and unique farmland: The Council on Environmental Quality 1980 memorandum on prime and unique farmlands states that prime farmlands have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique agricultural land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land be available for farming uses. Lands within Rocky Mountain National Park are not available for farming and therefore do not meet the definitions.

LAWS, REGULATIONS, AND POLICIES

Numerous laws, regulations, policies, and planning documents at the federal, state, and local levels of jurisdiction guide the decisions and actions that can be taken under the elk and vegetation management plan. The following provides a summary of the laws, regulations, and policies that provide the authority and basis for this plan and that affect the alternatives that were considered.

NPS Organic Act of 1916 and the Requirement to Avoid Impairment

In the Organic Act of 1916, which established the National Park Service, Congress directed the Department of the Interior and the National Park Service to manage units "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (Title 16 United States Code, section 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the National Park Service must conduct its actions in a manner that will ensure no "derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically directed by Congress" (Title 16 United States Code, Section 1a-1).

Within these mandates, the Organic Act and its amendments afford the National Park Service latitude when making resource decisions that balance visitor recreation and resource preservation. By these acts, Congress "empowered [the National Park Service] with the authority to determine what uses of park resources are proper and what proportion of the parks resources are available for each use" (Bicycle Trails Council of Marin v. Babbitt, 82 F.3d 1445, 1453 [9th Cir. 1996]).

Courts have consistently interpreted the Organic Act and its amendments to elevate resource conservation above visitor recreation. For example, Michigan United Conservation Clubs v. Lujan, 949 F.2d 202, 206 (6th Cir. 1991) states, "Congress placed specific emphasis on conservation." The National Rifle Association of America v. Potter, 628 F. Supp. 903, 909 (D.D.C. 1986) states, "In the Organic Act Congress speaks of but a single purpose, namely, conservation." *Management Policies* also recognizes that resource conservation takes precedence over visitor recreation. Section 1.4.3 states that "when there is a conflict between conserving resources and values and providing for enjoyment of them, conservation is to be predominant" (NPS 2006b).

Because conservation remains predominant, the National Park Service seeks to avoid or minimize adverse impacts on park resources and values; however, the National Park Service has discretion to allow negative impacts when necessary to fulfill park purposes (NPS 2006b, 1.4.3).

While some actions and activities cause impacts, the National Park Service cannot allow an adverse impact that constitutes resource impairment (NPS 2006b, 1.4.3). The Organic Act prohibits actions that impair park resources unless a law directly and specifically allows the acts (16 USC 1a-1). An action constitutes an impairment when its impacts "harm the integrity of park

resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values" (NPS 2006b, 1.4.5). To determine impairment, the National Park Service must evaluate "the particular resources and values that would be affected, the severity, duration, and timing of the impact, the direct and indirect effects of the impact, and the cumulative effects of the impact in question and other impacts" (NPS 2006b, 1.4.5). This plan/EIS, therefore, assesses the effects of the management alternatives on park resources and values and determines if these effects would cause impairment.

NPS management policies require an analysis of potential effects to determine whether or not actions would impair park resources (NPS 2006b). The fundamental purpose of the national park system is to conserve park resources and values for the use and enjoyment of future generations. NPS managers have the discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. That discretion to allow certain impacts within the park is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible manager, would harm the integrity of park resources or values. An impact on any park resource or value may constitute an impairment, but an impact would be more likely to constitute an impairment to the extent that it has a major adverse effect on a resource or value whose conservation is

Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park

Key to the natural or cultural integrity of the park

Identified as a goal in the park's general management plan or other relevant NPS planning documents

Management Policies

Management Policies (NPS 2006b) establishes service-wide policies for the preservation, management, and use of park resources and facilities. These 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" (NPS 2006b).

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 2006b).

Numerous other sections of *Management Policies* are relevant to the elk and vegetation management plan. These sections include, but are not limited to, Section 4.3.6, Biosphere Reserves; 4.4.1, General Principles for Managing Biological Resources; 4.4.1.1, Plant and Animal Population Management Principles; 4.4.1.2, Genetic Resource Management Principles; 4.4.2.1, NPS Actions That Remove Plants and Animals; 4.4.2.2, Restoration of Native Plant and Animal Species; 4.4.3, Harvest of Plants and Animals by the Public; 4.9, Soundscape Management; and 6 Wilderness Preservation and Management. *Management Policies* is incorporated by reference to support the decisions made in association with this plan.

Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision-Making

Director's Order #12 and the accompanying handbook (NPS 2001c) lay the groundwork for how the National Park Service complies with the National Environmental Policy Act. Director's Order #12 and the handbook set forth a planning process for incorporating scientific and technical information and establishing a solid administrative record for NPS projects.

Director's Order #12 requires that impacts on park resources be analyzed in terms of their context, duration, and intensity. It is crucial for the public and decision-makers to understand the implications of those impacts in the short and long term, cumulatively, and in context, based on an understanding and interpretation by resource professionals and specialists. Director's Order #12 also requires that an analysis of impairment to park resources and values be part of the National Environmental Policy Act document.

Purpose and Significance of Rocky Mountain National Park

National park system units are established by Congress to fulfill specific purposes, based on the unit's unique and significant resources. A unit's purpose, as established by Congress, is the foundation on which later management decisions are based to conserve resources while providing "for the enjoyment of future generations."

The purpose and significance of Rocky Mountain National Park and its broad mission goals are derived from its enabling legislation and are summarized in the park's strategic plan (NPS 2005j). The purpose, need, objectives, and range of alternatives presented in this plan/EIS are grounded in the park's purpose and mission.

Excerpts relevant to the management of elk and vegetation in the park are provided below.

Establishment

Congress established Rocky Mountain National Park on January 26, 1915. The enabling legislation states (38 Stat. 798)

> Said area is dedicated and set apart as a public park for the benefit and enjoyment of people of the United States…with regulations being primarily aimed at the freest use of the said park for recreation purposes by the public and for the preservation of the natural conditions and scenic beauties thereof…"

Significance of Rocky Mountain National Park

As stated in the park's 2005-2008 strategic plan (NPS 2005j), Rocky Mountain National Park is significant because

> Rocky Mountain National Park provides exceptional accessibility to a wild landscape with dramatic scenery, opportunities for solitude and tranquility, wildlife viewing, and a variety of recreational opportunities.
>
> The fragile alpine tundra encompasses one third of the park and is one of the main scenic and scientific features for which the park was established. This is one of the largest examples of alpine tundra ecosystems preserved in the national park system in the lower 48 states.
>
> The park, which straddles the Continental Divide, preserves some of the finest examples of physiographic, biologic, and scenic features of the Southern Rocky Mountains. The park contains the headwaters of several river systems, including the Colorado River. Geologic processes, including glaciation, have resulted in varied and dramatic landscape. Elevations span from 7,630 feet to 14,259 feet atop Longs Peak, a landmark feature.
>
> The park's varied elevations encompass diverse ecosystems where wilderness qualities dominate. Varied plant and animal communities and a variety of ecological processes prevail.

In October 1976, Rocky Mountain National Park was recognized as an International Biosphere Reserve. This recognition highlights the significance of the park's natural ecosystems, which represent the Rocky Mountain Biogeographic Province. As an element of the Biosphere Reserve, Rocky Mountain National Park is part of a network of protected samples of the world's major ecosystem types, devoted to conservation of nature and genetic material and to scientific research in service of man.

RELATIONSHIP TO OTHER PLANS AND PROJECTS

Elk and vegetation management is only one of many management issues in Rocky Mountain National Park and the surrounding area. Ongoing planning at the federal, state, and local levels on other management issues may affect or guide NPS decisions made for elk and vegetation management in the park. Efforts were taken to maintain consistency between actions associated with elk and vegetation management and other ongoing planning and resource management efforts. However, the actions associated with this plan would be taken exclusively by the National Park Service. Plans and projects that were considered in the preparation of this plan and environmental impact statement are summarized below.

Rocky Mountain National Park Master Plan, 1976

The most recent master plan for this park was written in 1976 and, for the current analysis, serves as the park's general management plan. The master plan established guidelines for the overall use, preservation, management, and development of the park. It identified the purposes for the various areas of the park, its relationship to regional environs, its resource values, and which human-environment needs should be met, and it set forth park management objectives. This document established three management zones in the park, including the scenic viewing or drive-through zone, the day-use zone, and the primitive or backcountry zone, and established resource

management and development standards for each. It also contains a land classification plan and a general development plan.

The 1976 plan included the following management objective, relevant to the goals of elk and vegetation management:

> To provide management for the soil, water, flora, and fauna, native to this portion of the Rocky Mountains, so as to minimize the impact of man, and where desirable and feasible restore those ecosystems altered by man. Restoration will be aimed at presenting as close an approximation of primitive conditions as possible.

Rocky Mountain National Park Vegetation Restoration Management Plan, 2006

The vegetation restoration management plan provides the guidelines, procedures, and techniques to be applied in vegetation and ecological restoration activities taking place in the park, including classifying areas and determining an approach to treatment. The goals of the plan include using local genotypic plant material for restoration efforts, stabilizing disturbed sites before they deteriorate further, and controlling the establishment and perpetuation of non-native species. It states that each restoration effort should include preserving the genetic integrity of native plants, collection of baseline data, and carrying out a quantitative monitoring program throughout the life of the project.

The elk and vegetation management plan will be consistent with the park's vegetation restoration management plan. Specifically, both will work toward preserving the genetic integrity of native plants, reducing invasive plant species, collecting consistent monitoring data, and restoring native communities within the park. Both plans will work toward collecting consistent monitoring data and restoring native vegetation within the park.

Backcountry Wilderness Management Plan, 2001

This plan addresses the designated or recommended wilderness areas in Rocky Mountain National Park. The plan formalizes the management guidelines for non-developed areas of the park that are defined as backcountry. The plan provides direction for management of natural and cultural resources within the context of wilderness management policies. It also identifies the park's long-range management goals and objectives for backcountry wilderness areas and sets forth actions to meet those objectives. The plan formalizes management practices in the park for the protection of wilderness values and resources, including the requirement that a minimum tool analysis be conducted for management actions that take place in wilderness areas. Activities conducted as part of the elk and vegetation management plan will be consistent with the guidelines set fort in the backcountry wilderness management plan.

Rocky Mountain National Park Fire Management Plan, 2004

This plan is a detailed plan of action for all wildland fire activities, including preparedness, suppression, wildland fire use, fire prevention, fire monitoring, and fuels management activities. Included are the monitoring and evaluation processes, goals of the fire management program, and descriptions of the fire regimes, condition class, and ecosystem processes of the major vegetative associations found within each fire management unit at Rocky Mountain National Park.

The goals in the plan include such concepts as protecting life and property, using a variety of fire management tools, allowing wildland fire to achieve its natural role in the ecosystem, and avoiding unacceptable effects. Each of the eleven fire management units has unique natural attributes and has different objectives established by this plan.

The elk and vegetation management plan will coordinate and be consistent with the fire management plan to provide for vegetation restoration through the use of prescribed fire. These efforts would proceed when the elk population has been reduced to an acceptable level to allow protection of habitat from overuse by elk.

Arapaho and Roosevelt National Forests and Pawnee National Grassland, 1997 Revision of the Land and Resource Management Plan

This plan provides guidance for all resource management activities in the Arapaho and Roosevelt National Forests and Pawnee National Grassland. It establishes forest-wide, multiple-use goals and objectives; management requirements; direction for specific management areas and geographic areas; designation of land uses and management activities; and monitoring and evaluation requirements.

The plan provides for long-term health of the land and restoring of ecosystems. Multiple resource uses, including recreation and commodities, are managed within the capabilities of the ecosystems. The plan specifies that management actions will not result in the loss of any species, and identifies large blocks of land that will remain undeveloped and natural.

A Strategy for Accelerated Watershed/Vegetation Restoration on the Arapaho and Roosevelt National Forests and Pawnee National Grassland, 2004

This plan identifies the need to develop sustainable vegetative communities that fulfill the forest's stated desired future conditions. The goals of this plan are to increase the rate of vegetation management activities, rapidly restore vegetation, and treat areas containing hazardous fuels. The plan prescribes the use of low-intensity fire to treat low-elevation ponderosa pine forests, reduce tree density and fuels build-up, and encourage old-growth trees. Improving ecosystem sustainability through prescribed fire will improve habitat conditions for wildlife, reduce risks to watersheds, and reduce the expansion of noxious weeds. The plan's activities will encourage the restoration of degraded and recovering vegetative areas, strengthen the diversity of the ecosystem, and reduce the risk of future wildland fires. The goals of this plan complement those of the elk and vegetation management plan, as actions taken would result in improving habitat for wildlife species and restoration of native vegetation within the region.

Draft Colorado Wolf Management Plan

In May 2005, the Colorado Wildlife Commission adopted the recommendations of the Colorado Wolf Management Working Group for management of wolves that may migrate to Colorado. The working group's recommendations were in anticipation of the natural return of the wolf to Colorado. Some of the recommendations from the group include:

Wolves should be allowed to live without boundaries in suitable habitat in Colorado.

The management plan should be implemented within an adaptive management framework that will allow the state the maximum flexibility to manage wolves.

Coordination with other federal and state agencies should occur to determine wolf occurrence, status, and habitat use.

Voluntary non-lethal methods should be encouraged to prevent wolves from causing damage.

Livestock producers should be compensated when wolves kill or injure livestock.

Wildlife managers may control predators if they are inhibiting management of other wildlife populations as directed by a species management plan.

There should be ongoing efforts to assess public attitudes towards wolves and to keep the public informed and involved.

In November 2005, the wolf working group was tasked to continue discussions through 2006, focusing on who should make the decision about potential reintroduction of wolves to Colorado and how a compensation program should be structured. Decisions of the state's management of naturally occurring wolves and any future decisions regarding potential reintroduction of wolves is important to the Rocky Mountain National Park elk and vegetation management plan because one alternative includes using wolves to help manage elk in the park, and two other alternatives retain the potential to use wolves in an adaptive context as needed.

The Wildlife Commission established the wolf working group in anticipation of a change in the legal status of wolves. With the increasing numbers of wolves in Wyoming, Montana, and Idaho, the U.S. Fish and Wildlife Service was in the initial stages of delisting the wolf. This change in legal status would return management authority for wolves to the state wildlife divisions. However, in January 2005, a U.S. District Court judge ruled that the U.S. Fish and Wildlife Service rulemaking to identify the "distinct population segments" of wolves violated the Endangered Species Act (USFWS 2005b). This court ruling kept management of all wolves under the Endangered Species Act and under the authority of the U.S. Fish and Wildlife Service for the time being. As a result, the state's wolf management plan, and any supplementary document that may be generated, would guide the situation "if and when" the federal government turns over management of wolves to the state. While there are uncertainties about the management authority for wolves, for the purposes of this EIS analysis, it is foreseeable that the state wolf management plan would be implemented on land around the park within the 20-year lifespan of the elk and vegetation management plan.

Colorado Wildlife Commission Five-Year Big Game Season Structure, 2005-2009

The Colorado Wildlife Commission approves big game season structures in five-year blocks to guide the development of annual hunting regulations and harvest targets. The Commission provides this guidance for a number of reasons. For wildlife managers, multi-year season structures allow some consistency in the application of wildlife management practices and the opportunity to assess their effectiveness. The Data Analysis Unit and Game Management Unit elk harvest targets are developed by the Wildlife Commission within the season structure set out in the five-year season structure plan. The National Park Service would use the annual elk hunting harvest results in areas adjacent to the park to determine appropriate elk reduction target levels for actions that would be taken in the park.

Estes Valley Comprehensive Plan, 1996

This document provides direction for regional planning in the Estes Valley to accommodate growth and maintain the quality of life known to the valley's inhabitants. The plan addresses housing, the local economy, population growth, traffic, and retaining the overall quality of the town.

In preparing the plan, citizens participated in a lengthy process to decide the direction of the valley's growth. The goals identified in the plan include balancing the needs of visitors with those of full-time residents, encouraging tourism in the valley, accommodating the growing population of retired residents, and preserving natural resources.

The plan consists of five major components: a future land use plan and map, a transportation plan, economic overview, development of community-wide policies, and an action plan. The plan proposes limited development on steep slopes, visually sensitive areas, areas with significant wildfire hazards, wildlife migration routes and habitat, and flood-prone areas.

Estes Park Development Code, 2000

The regulations of this code implement the 1996 Estes Valley comprehensive plan. The code establishes development regulations to preserve the appearance and density of the area, coordinate the actions of other various plans, and encourage development of the downtown area.

In this document, the Town of Estes Park considers the presence of wildlife and the need to preserve their habitat while accommodating growth of the town. In the development of new trails or open space, the code states that priority is to be given to any area with known migration corridors. All residential developments and subdivisions containing five or more units must set aside a pre-set minimum percentage of total gross land area for private open areas for the protection of wildlife habitat.

Larimer County Master Plan, 1997

The Larimer County master plan establishes a long-range framework for decision-making for the unincorporated area of the county. It includes criteria for development decisions, decisions on public services and capital facilities, and decisions on environmental resources protection through its guiding principles and implementing strategies.

In the plan, new development is directed to be compatible with natural systems in the county and existing uses through environmental review and performance standards incorporated into the development review process. Information on wetlands, wildlife habitat, and other sensitive environmental areas will be included in the county's review process by their identification in county maps. New subdivisions will be required to plat houses in clusters, creating up to 80% open space (depending on existing zoning) to allow room for new rural residential areas while maintaining agricultural and natural areas. This document also contains the Larimer County land use code, which implements the directives set forth in the Larimer County master plan.

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