

Final Elk and Vegetation Management Plan/Environmental Impact Statement Rocky Mountain National Park - Colorado

Purpose of and Need For Action

The National Park Service is obligated by law and policy to maintain and restore, to the extent possible, the natural conditions and processes in the park. 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.

The National Park Service policies 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 maintain the closest possible approximation of the natural condition. Natural conditions are defined as the condition of resources that would occur in the absence of human dominance over the landscape. Natural conditions occur when the components and processes of the natural system are intact. Natural change is recognized as an integral part of the functioning of natural systems; that is, resource conditions are not static, but fluctuate in response to natural processes, such as weather conditions. Recognizing such fluctuations, 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 computer 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 with 200 to 800 in the subpopulation that winters inside the park and 1,000 to 1,300 in the subpopulation that winters outside the park.

These subpopulations are referred to as the park and town subpopulations, respectively, throughout the text. With an intact predator base, elk would be less sedentary and more wary, resulting in lower concentrations of elk on the elk range. With elk less concentrated and less sedentary, montane riparian willow and aspen would be more abundant with increased stand size and complexity; that is, stands would have a variety of age classes and stems of differing sizes.

Under natural conditions with suitable levels of montane riparian willow habitat available, beaver would be more abundant on the elk range and as a result, water levels on the primary elk winter and summer ranges would be higher, further encouraging the establishment and growth of willows. These natural conditions represent the overall desired future condition for elk and vegetation on the elk range.

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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. The absence of an intact predator base is a key reason the elk population size, density and behavior are 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. 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. Other factors that likely contributed to a lower elk population under natural conditions are the effects of American Indian hunters and the presence of bison. 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. 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. 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 patterns: 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

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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. 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. The town subpopulation is variously estimated to be at or below carrying capacity, based on different researchers' results. 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.

Elk densities are variable in the park, with high (76 to 170 elk/mile²) to very high (171 to 285 elk/mile²) concentrations on about 7% of the primary winter range, centered in Moraine Park / Beaver Meadows. The remainder of the primary winter range generally has moderate (26 to 75 elk/mile² on 11% of the primary winter range) to low (less than 26 elk/mile² on 82% of the primary winter range) densities. 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/mile² are the highest concentrations ever documented for a free-ranging population in the Rocky Mountains. 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 spongiform encephalopathy that primarily occurs in free ranging deer and elk in northeastern Colorado and southeastern Wyoming. 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.

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.

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

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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. Elk browsing currently stunts the growth or kills all young aspen trees (i.e., less than 8 feet in height, also called suckers or shoots) on the core elk winter range and in some parts of the Kawuneeche Valley. 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. 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. 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 and provides wildlife habitat for a large number of bird, butterfly, and plant species. 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. 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. Since then, beaver on the primary winter range have declined by more than 90%, with a resultant decline of surface water in the area by nearly 70%, which has led to a decline in montane riparian willow. 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. 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.

Elk consumption at extremely high rates may result in the alteration of herbaceous plant communities on the elk range. Annual herbaceous 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. The majority of offtake in willow and upland areas occurred during the summer and winter periods, respectively. Herbaceous plants in willow communities may be particularly vulnerable because the majority of grazing occurs during the growing season.

This document was adapted from the RMNP Final Elk and Vegetation Management Plan/Environmental Impact Statement; retrieved from: http://www.nps.gov/romo/learn/management/upload/evmp_exec_sum_dec_07.pdf

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