National Park Service
United States Department of the Interior Region 7
RECORD OF DECISION

Ungulate Management Plan and Environmental Impact Statement

Great Sand Dunes National Park and Preserve

Alamosa and Saguache Counties, Colorado

INTRODUCTION

The Department of the Interior (DOI), National Park Service (NPS), has prepared this Record of Decision (ROD) for the Great Sand Dunes National Park and Preserve (GRSA[1]) Ungulate Management Plan (UMP). This ROD identifies the decision/selected action, including mitigation measures; describes other alternatives analyzed; identifies the environmentally preferable alternative; and includes a brief discussion of the rationale for the decision reached. Complete references for in-text citations used in the ROD and non-impairment determination may be found in the UMP Draft Environmental Impact Statement (EIS). The non-impairment determination for the selected action is included as Attachment A.

PURPOSE OF THE PLAN

The purpose of this UMP is to determine the appropriate future management of elk and bison in GRSA that supports long-term protection of resources and is compatible with conditions and management activities across the broader eastern San Luis Valley landscape, to the extent practicable.

NEED FOR ACTION

This planning effort is needed because of the following:

- Elk and bison are currently on the landscape and there is no plan to address their management and impacts, both positive and negative, in support of desired habitat conditions.
- Disproportionate elk use in sensitive and highly productive/diverse areas of the Park is leading to adverse impacts, particularly in wetland vegetation communities. In addition, the existing bison herd spends a disproportionate amount of time using these same vegetation communities, particularly during winter when elk overconcentration is the highest (NPS 2015a; Schoenecker et al. 2015; Schoenecker and Lubow 2016; Wockner et al. 2015). Bison are currently managed by The Nature Conservancy (TNC) on the Medano Ranch and portions of the Park and a decision is needed to determine whether to have bison at GRSA in the future and, if so, how to manage them.
- The DOI Bison Conservation Initiative combined with additional information about bison and bison habitat in the San Luis Valley, provides an opportunity to reexamine the potential for bison conservation following the 2007 General Management Plan (GMP).

[1] Hereafter referred to as GRSA when referring to the park and preserve, Park when referring only to the Park, and Preserve, when referring only to the Preserve.

OBJECTIVES IN TAKING ACTION

The following management objectives were identified relative to elk and bison management at GRSA.

Elk and Bison

- Identify effective management tools and develop a framework to guide how and when they would be used.
- Support the attainment of desired habitat conditions as specified in this plan.
- Enhance agency understanding of ungulate habitat selection and the influence of ungulate herbivory.

Visitor Experience

- Enhance public awareness and understanding of the ecological role of elk and bison on the landscape.

Park Management and Operations

- Develop and implement an adaptive management program to increase understanding of ungulate-habitat relationships and incorporate that information into future management.

DECISION

The NPS will implement Alternative 3, which was identified as the NPS preferred alternative in the Draft and Abbreviated Final EIS. The next section summarizes the selected action which was described in detail in Chapter 2 of the Draft EIS. In addition, mitigation measures not described in the Draft EIS were identified during consultation under Section 106 of the National Historic Preservation Act; these measures did not result in substantive changes to on-the-ground impacts described in the Draft EIS. These and other mitigation measures are described later in the ROD.

SUMMARY OF THE SELECTED ACTION

Under the selected action, which includes all practical means to avoid or minimize environmental harm, the NPS would use the following tools to manage elk and bison at GRSA.

Public Hunting in the Preserve

Elk hunting, per NPS policies, Colorado Parks and Wildlife (CPW) objectives, and state regulations, will continue in the Preserve during the elk hunting season, but will not be allowed in the Park per the statutory authorities for GRSA.

Elk Management

The NPS will use lethal removal and non-lethal hazing throughout the Park to redistribute elk from areas of overconcentration. Implementation will be coordinated with the U.S. Fish and Wildlife Service (USFWS) and CPW in an effort to increase opportunities for hunter harvest outside of the Park, and will be monitored to determine redistribution success (see Monitoring and Data Collection section). If elk quickly reoccupy the areas where redistribution efforts were focused then the intensity of lethal removal actions will increase. If elk redistribute to undesirable areas, including neighboring agricultural lands, particularly those in Data Analysis Unit (DAU) E-55 where CPW's population objective for elk is zero (see Figures 2 and 10 in the Draft EIS), redistribution efforts would cease immediately and NPS would coordinate with its partners to address the situation.

Lethal removal will be conducted by NPS staff with support from authorized agents and trained volunteers, which could include other agency personnel and members of American Indian tribes. Actual numbers of elk to be lethally removed will be evaluated annually in collaboration with partners such as the USFWS and CPW, taking into account redistribution goals. Avoidance of active elk management during calving season (late May through early July), and while the calves are still very young or during severe winter (January through February), will minimize animal welfare issues. Non-lethal hazing methods will include the utilization of hazing by horseback, motorized vehicle, shooting non-lethal rounds, and other noisemaking. Potential impacts from motorized vehicle use will be minimized by limiting motorized vehicle travel to existing roads to the maximum extent practicable. Elk management activities that occur in proposed or designated wilderness and include uses prohibited by Section 4(c) of the Wilderness Act (i.e., motorized vehicle and noisemaking) will be subject to a minimum requirements analysis prior to implementation to determine if these prohibited uses are necessary to meet minimum requirements for the administration of the area as wilderness.

Bison Management

The NPS will amend the GMP and manage a bison herd in the Park after acquisition of the Medano Ranch. For the first 5–7 years after acquisition of the Medano Ranch, the NPS intends to partner with TNC to manage the bison herd and ultimately reduce it to 25-50 animals before the NPS assumes full management. At that point, the NPS will manage bison at between 0.001 and 0.01 bison per acre, with a lower limit of 80 bison (as recommended in Plumb et al. 2016). Given there are currently approximately 26,000 acres available to bison, this would result in a herd of approximately 80-260 bison. Over time, depending on several variables (e.g., future funding for construction and maintenance of new fencing, appropriate staffing, and the ability to appropriately monitor outside of the existing fence), the NPS will consider expanding the bison range. Applying the upper limit of the density range to this expanded area means the NPS could eventually manage between 80 and 580 bison in the Park (i.e., 0.01 bison per acre across 58,000 acres). Ultimately, resource monitoring and subsequent adaptive management will inform the size of the bison herd to be managed in the Park.

In general, bison management tools will include roundup and removal, bison monitoring and data collection, and escape procedures. The National Park Service will conduct additional planning and compliance as necessary to develop the details of implementing these tools, and will also consider opportunities to expand the area where bison can roam to include the adjacent Baca National Wildlife Refuge (NWR) as part of USFWS research study (USFWS 2015).

Roundup and Removal. National Park Service staff or authorized agents, or both, will round up and drive bison to the existing handling facility on the Medano Ranch for the purpose of processing for translocation, and when needed, for monitoring and data collection to determine the status and health of the species.

From the handling facilities, bison would be translocated to willing recipients outside of GRSA. This could potentially include future agreements with the InterTribal Buffalo Council or other tribal partners wishing to obtain bison for herd enhancement and for spiritual and cultural practices. Bison could also be rounded up and sent to processing facilities if translocation of live bison is not possible.

Bison Escape Procedures. If bison get outside of the bison fence, the NPS will work with land owners and other agencies, as needed, to move the animal back onto NPS land using hazing or capture techniques. If this action is unsuccessful, or there is potential for wildlife/vehicle conflicts or game damage to adjacent properties, NPS staff will lethally remove the animal and donate the meat, to the extent practicable.

Bison Fencing and Infrastructure. In the first phase of bison implementation, the existing bison fencing will remain upon NPS acquisition of the Medano Ranch. Depending on whether or not the NPS and USFWS collaborate on a bison research study on the Baca NWR, it is possible the NPS will need to construct new bison fence along the western boundary of the Park. In addition, if the bison range is expanded in the park, additional fencing will be needed as described on page 47 of the Draft EIS.

Existing bison infrastructure on the Medano Ranch will be maintained, including various corrals for holding and weaning, barns, and sheds, to support roundups, translocation, and other bison management actions as deemed necessary.

Use of Authorized Agents and Trained Volunteers for Specific Actions

Great Sand Dunes National Park and Preserve expects to solicit the help of authorized agents and trained volunteers, including tribal members, to assist in management actions including lethal removal of elk and possibly bison. The NPS will only select qualified volunteers who meet a number of predetermined requirements, including a demonstrated level of firearm proficiency for those involved in lethal removals, and knowledge of public safety and protection policies. Compliance with all relevant NPS directives related to firearm use in parks, as well as federal firearm laws administered by the Bureau of Alcohol, Tobacco, Firearms, and Explosives will be required. Great Sand Dunes National Park and Preserve will develop specific guidelines for firearm use, including use of non-toxic ammunition.

Adaptive Management

The initial phase of this plan focuses on managing elk to alter their high concentrations at certain times during the Park and TNC's management of bison. Over the long-term, the NPS will not manage elk and bison solely based on numbers in the Park, but rather in such a way as to ensure desired habitat conditions in the Park (described in Chapter 1 of the Draft EIS) are met as well as to support NPS and CPW goals for elk management. As described below, the NPS will develop quantitative metrics of ecological integrity and vegetative condition representative of these desired habitat conditions, and will use these as additional triggers to adaptively manage elk and bison. Therefore, this plan is divided into initial and long-term adaptive management.

Initial Management. During the initial management phase, the NPS will focus on altering the high concentrations and large group sizes of elk that currently exist in the Park, to reduce wintering elk population (i.e., those elk in the park from December 1 to April 15) to 40 percent of the total DAU elk population.

Long-term Adaptive Management. Long-term management of elk and bison will seek to achieve an appropriate range of ungulate use in wetlands that is representative of the historical usage versus the current levels that have resulted in negative impacts on wetland vegetation communities (Schweiger et al. 2017). The goal of this long-term adaptive management framework is to continually evaluate the effectiveness of the ungulate management plan; inform uncertainties; improve management over time; and ensure that impacts of elk and bison, and their management inside the Park, remain within the range of impacts predicted in Chapter 4 of the Draft EIS.

To this end, over the first 3 to 5 years after signing this ROD, GRSA will conduct additional monitoring, use statistical modeling for wetland ecological integrity, and analyze the data to determine the most relevant indicators and quantitative ecological and vegetation thresholds. Using this information, the National Park Service will develop a structured decision making tool for ungulate management to guide implementation of future ungulate management actions.

If monitoring shows that impacts to wetland ecological integrity are a result of the overall elk population density and abundance in the Park being too high, then the NPS will likely use similar tools as described in Draft EIS to affect a larger reduction in the number of elk in the Park. Any additional planning and compliance needed to do so would be completed, as appropriate.

Monitoring and Data Collection

Ecological Monitoring. The National Park Service will continue enhanced wetland ecological integrity monitoring to 1) inform the development of quantitative ecological and vegetation thresholds; 2) inform whether ungulate management activities are helping to move wetlands towards desired conditions; and 3) better understand how other drivers, such as hydrology and climate, influence wetland health. This involves monitoring wetland vegetation communities, groundwater hydrology, soils, natural disturbance (including type and level of ungulate use), and human disturbance (including groundwater diversion and other modifications and uses).

Elk and Bison Monitoring. Monitoring of elk distribution will occur through outside research, cooperation with CPW, and by the NPS as funding becomes available, and could include the following:

- annual winter classification flights;
- installation of stationary cameras and conducting scat and track counts in areas of overconcentration;
- use of radio-telemetry collars and/or standardized on the ground counts of the elk populations during all seasons; and/or
- use of remote monitoring techniques.

Additional annual monitoring of the bison population will likely occur concurrently with elk monitoring using the techniques described for elk.

Exclosure Fencing

Existing exclosure fencing will be maintained and new exclosures will be constructed, as needed, to exclude elk and bison from important resources and allow for habitat restoration or protection of sensitive species in specific locations. Exclosures will be designed following CPW guidelines (Hanophy 2009) to preclude access of elk or bison, or both but to allow for maximum ingress/egress for other wildlife, and avoid effects on migration.

Agency Coordination

Great Sand Dunes National Park and Preserve will coordinate development of an annual operations plan and implementation of elk management actions with neighboring agencies, including USFWS, U.S. Forest Service, and CPW. The annual operations plan will address topics such as data sharing opportunities, sequencing of tools and how many animals will be removed each year, and training, certification, and safety. Coordination with other neighboring agencies will also be conducted to ensure that implementation of management actions are complementary to neighboring agency actions rather than counterproductive.

Disease Management and Testing

Any elk killed as a result of any management action will be tested for Chronic Wasting Disease. Any bison transported in or out of state or killed as a result of NPS management actions will also be tested, as needed. This and any other testing for other wildlife diseases will be based on protocols established by the NPS Biological Resource Division Wildlife Health Group.

Carcass Handling and Processing

Elk and bison that are lethally removed will be handled and processed in a manner that minimizes potential exposure to disease as well as maximizes the amount of an animal that can be donated. Park staff will employ appropriate recommendations for field dressing procedures and carcass handling to minimize exposure to possible infectious material.

Donation for Consumption or Disposal of Carcasses

For elk and bison that are lethally removed, GRSA will donate carcasses and/or meat, to the extent possible. Other elk or bison parts (e.g., hides, heads, horns) will be either donated to tribal partners or federal or state agencies or cooperators for non-monetary uses (e.g., tribal ceremonial uses, public or educational display, research), or they will be left in the field. The Park will consult with the NPS Public Health Program, as well as CPW, to ensure meat is handled and stored properly for consumption.

Education and Coordination

The selected action will provide the public with an opportunity to see bison and learn about bison conservation and management. Great Sand Dunes National Park and Preserve will work with tribal partners on education programs that focus on the historical and cultural uses of bison and the significance of bison to the tribes.

MITIGATION MEASURES

The following mitigation measures will be implemented as part of the selected alternative:

- Minimize the potential to introduce exotic species by requiring that all horses brought in to the park are fed only weed-free hay and all motorized vehicles are pre-washed prior to entry into the Park.
- Minimize impacts to wetland vegetation from fencing activities by adjusting the amount and alignment of any fencing.
- Additionally, direct adverse effects on archeological properties will be minimized or entirely mitigated through avoidance and monitoring measures including identification surveys conducted prior to fence construction to ensure that historic properties are avoided and monitoring during fence construction to ensure that inadvertent effects to historic properties do not occur. Should unidentified archaeological resources be discovered in the course of the project, work will be stopped until the resources have been evaluated in terms of the National Register eligibility criteria (36 CFR 60.4) in consultation with the SHPO. Additional mitigation for archeological properties will include installing additional exclosure fencing as identified and needed, providing opportunities for visitor education regarding bison; and allowing opportunities for tribal cultural practices related to harvesting elk and bison.

ALTERNATIVES CONSIDERED BUT NOT SELECTED

Alternative 1 (No Action)

A standalone elk management plan would be developed under Alternative 1 (no-action) in accordance with the 2007 GMP Record of Decision. Under this alternative, TNC would continue to graze bison on the Medano Ranch until government acquisition and would be responsible for removing its bison and associated fencing prior to NPS acquisition of the Medano Ranch. The NPS would remove the current bison fencing on NPS lands.

Alternative 2

Alternative 2 would include the same elk management actions as the selected alternative, and would follow the current direction in the GMP for bison, as described for Alternative 1.

Alternative 4

Alternative 4 would include the same elk management actions as the selected alternative. Under this alternative, the NPS would acquire the Medano Ranch with no bison, but would amend the GMP so that after a period of 5–7 years, the NPS would establish a new conservation herd to be managed within the recommended density. Tools used to manage bison abundance and distribution in the future would include those described for the selected action.

RATIONALE FOR THE DECISION REACHED

The NPS selected Alternative 3 because it addresses the GMP requirement to develop an elk management plan, and positions GRSA to participate in Department of Interior bison conservation efforts by amending the 2007 GMP to allow for bison in the park after acquisition of the Medano Ranch. As evidenced during tribal consultation and in public comments received during scoping and on the Draft EIS, bison are a culturally significant resource and ensuring continuity of bison on the landscape during the transition from TNC to NPS management was an important factor in selecting this alternative.

The selected action as described herein and in the Draft EIS also meets the purpose, need, and objectives of the Great Sand Dunes National Park and Preserve Ungulate Management Plan and Final Environmental Impact Statement. It is expected to support the long-term protection of resources and is compatible with conditions and management activities across the broader eastern San Luis Valley landscape. These include the elk management goals of CPW and the opportunity to collaborate with the USFWS on bison research on the Baca NWR that may not be available if the National Park Service removes bison from the landscape.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

Alternative 3 has been identified as the environmentally preferable alternative. Although both bison and elk would be on the landscape under this alternative, Park wetlands coevolved with these animals over thousands of years, and some level of native ungulate use is likely necessary for ecologically healthy wetland communities. Managing elk overconcentration, reducing the number of bison on the landscape, and monitoring and adaptive management are intended to restore balance to these ecological processes and support the attainment of desired habitat conditions for an historical array of ecologically healthy plant communities used by these ungulates across the Park's landscape. Additionally, although bison and elk together have a greater potential to trample surface archeological resources, there would be fewer bison and elk on the GRSA landscape compared to today, minimizing this potential. Finally, this is the only alternative that ensures the continuity of bison on the landscape, providing the best opportunity to protect, preserve, and enhance a resource that is culturally significant to tribes and the broader American public.

RECOMMENDED:

PAMELA RICE Digitally signed by PAMELA RICE
Date: 2019.09.03 13:53:22 -06'00'

Pamela Rice, Superintendent — Date
Great Sand Dunes National Park and Preserve

APPROVED:

9/4/2019

Palmer L. Jenkins, Acting Regional Director — Date
National Park Service Regional Office
Serving Department of Interior Regions 5, 6, 7, 8 & 9

ATTACHMENT A
NON-IMPAIRMENT DETERMINATION

By enacting the National Park Service (NPS) Organic Act of 1916 (Organic Act), Congress directed the U.S. Department of Interior and the NPS to manage "to conserve the scenery, natural and historic objects, and wild life in the [National Park] System units and to provide for the enjoyment of the scenery, natural and historic objects, and wild life in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (54 USC 100101(a)). Congress reaffirmed this mandate in 1978 by stating that NPS must conduct its actions in a manner that will ensure no "derogation of the values and purposes for which the System units have been established, except as directly and specifically provided by Congress." (54 USC 100101(b)(2)).

NPS Management Policies 2006, Section 1.4.4, explains the prohibition on impairment of park resources and values:

> While Congress has given the Service the management discretion to allow impacts within parks, that discretion is limited by the statutory requirement (generally enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. This, the cornerstone of the Organic Act, establishes the primary responsibility of the Nation Park Service. It ensures that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them.

The NPS has discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of a park (NPS 2006 sec. 1.4.3). However, the NPS cannot allow an adverse impact that would constitute impairment of the affected resources and values (NPS 2006 sec 1.4.3). 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 2006 sec 1.4.5). To determine impairment, the NPS 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 2006 sec 1.4.5).

This determination on non-impairment has been prepared for the selected action described in this Great Sand Dunes National Park and Preserve (GRSA[1]) Ungulate Management Plan UMP) Record of Decision. An impairment determination is made for all resource impact topics analyzed for the selected action; i.e., wetland vegetation, elk and bison, and archeological resources. An impairment determination is not included for impacts to visitor use and experience, socioeconomics, game damage, public health and safety, environmental justice, land use, wilderness, and park operations as these do not constitute park resources and values subject to the non-impairment standard.

Wetland Vegetation

There are 588 documented plant species within diverse vegetation communities (including rare communities) in GRSA (https://irma.nps.gov/NPSpecies/). However, this analysis focuses on wetland vegetation communities, which include marshes, salt flats, wet meadows, and riparian wetlands. These vegetation communities are integral to maintaining the wetlands in the Parkthat perform vital “ecosystem services” such as providing habitat for diverse wildlife species

including ungulates. Impacts to these vegetation communities threaten the desired condition of GRSA supporting a diverse array of ecologically healthy and minimally disturbed wetland communities across the landscape.

Vegetation in these wetlands has been shown to be disproportionately preferred and used by both elk and bison for foraging, wallowing, resting, thermal cover, and shading (Zeigenfuss and Schoenecker 2015). These behaviors can become a disturbance when it results in negative impacts from how and when ungulates use habitat. These disturbances might include, removal of select plant species, erosion and soil compaction caused from hoof punching, wallows or trails, and introduction of invasive species (Schweiger et al. 2017). These disturbances have been documented in most of the wetland vegetation communities resulting in reduced ecological integrity of many wetland sites in the Park.

Under the selected alternative, the NPS will amend the GMP and manage a bison herd in the Park after acquisition of the Medano Ranch. Until acquisition, however, the Nature Conservancy (TNC) will continue to graze bison on the Medano Ranch under the current density. Negative impacts from the current bison density of 0.03 to 0.05 bison per acre within the Medano Ranch, will likely continue during this time. However, redistribution of elk from the current areas of overconcentration, which will also be occurring at this time, will result in improved ecological integrity of wetland vegetation communities including approximately 1,013 acres of marsh, 1,025 acres of riparian, and approximately 2,644 acres of salty meadow wetland.

For the first 5–7 years after NPS acquisition of the Medano Ranch, the NPS intends to partner with TNC to manage the bison herd and ultimately reduce it to 25-50 animals before the NPS assumes full management. A reduction in bison density towards the end of the first 5–7 years to 0.001 and 0.01 bison per acre will result in additional beneficial impacts by reducing the impacts that bison are currently having on the wetland vegetation communities.

The potential to expand the range and distribution of a wild bison herd on GRSA could create competition for forage in areas currently inaccessible to bison resulting in offtake of herbaceous plant species, increased compaction and erosion resulting from two large ungulates in salt flat, wet meadow, and riparian communities, spread of invasive species, and reduction in height, structure, and sapling survival in woody-dominated communities. However, impacts from the expanded range, in addition to the lower density of bison across the range, could be beneficial if it results in reduced pressure in the currently over-used areas.

While there is uncertainty in precisely how wetlands will respond to the above changes in bison and elk density and distribution, the NPS will collect and analyze data to ensure wetlands are moving toward or are already at desired conditions. For example, Rocky Mountain Inventory & Monitoring Network (ROMN) Wetland Ecological Integrity (WEI) research and monitoring will inform adaptive management for desired conditions by identifying the differences between how and where elk and bison are using the different vegetation communities being impacted. Data collected during the initial management phase and over time will be coupled with longer-term data to inform and adjust, if necessary, elk and bison density and abundance ranges to support the desired conditions for wetland vegetation communities related to impacts from ungulates. Ensuring wetlands are moving toward or are at desired conditions will preserve wetlands for the enjoyment of future generations.

Management actions to redistribute elk and reduce elk overconcentration, which include non-lethal hazing and lethal removal for dispersal, will be used across the different wetland vegetation communities that are being adversely impacted by ungulate use. Non-lethal and

lethal actions utilizing horses across all of the wetland vegetation communities (or approximately 6,314 acres) has the potential to introduce exotic species through defecation of seeds of such plants by the horses. This could lead to the establishment or expansion of non-native plants that have the potential to outcompete and reduce abundance and cover of native plants in wetland vegetation communities. This risk will be greatly minimized through the requirement that all horses brought in for hazing be fed only weed-free hay. Non-lethal and lethal actions utilizing motorized vehicle could result in wetland vegetation impacts from the crushing of plants during any off-road vehicle use that could occur. These impacts will be managed by limiting motorized vehicle travel to existing roads to the maximum extent practicable. Impacts resulting from the frequency and duration of management actions will be limited to the timeframe of up to twice per week over one to four hours, avoiding the calving season (late May through early July) and severe winter (January through February). While the frequency could result in the impacts discussed above from weekly activities over six months of the year, the avoidance of management actions during calving coincides largely with the growing season for many plants in the wetland vegetation communities; thereby, reducing the severity of the potential impacts.

Adverse impacts associated with bison management actions, such as bison roundup and removal include crushing of plants, the potential to introduce invasive species, and an increase in trampling and grazing (increased plant offtake and soil disturbance/compaction) along the travel route. However, roundups are presently conducted no more than once annually, and because the bison herd will be managed initially at a very low density, it is not expected that these actions will be needed for several years (following the transition from TNC to NPS management) and will occur on a very infrequent basis thereafter. The resulting impacts to vegetation will be minimal because of the short duration (a three-day time period) during which the roundups will occur and vegetation is expected to recover before subsequent roundups are conducted.

Construction of up to 500 acres of additional exclosures could result in the localized loss of vegetation during fence construction. To quantify, the total area of potential impacts is approximately 4.3 acres which is a small portion (approximately 0.068 percent) of the approximately 6,300 acres of wetland vegetation. Exclosures will be constructed as determined through ROMN WEI monitoring and guided through the adaptive management framework to protect wetland vegetation communities being impacted by ungulate disturbance. Therefore, although there will be some localized impacts to less than 1 percent of the wetland acreage, over the long-term the condition of up to 500 acres (or approximately 8 percent) of wetland vegetation will improve. Similarly, potential adverse impacts associated with the construction and removal of bison fencing will be limited to the localized loss of vegetation. Under the various fencing scenarios, the affected area that could be impacted relates to an approximate disturbance area of 2.2 acres within wetland vegetation communities. Planning for all fencing alignments will take wetland vegetation into account and severe impacts will be avoided, to the extent possible, by adjusting the amount of and alignment of any fencing needed to achieve the desired vegetation management objectives.

Overall, implementation of all management actions for the redistribution of elk (both lethal and non-lethal) and management of a lower density of bison in the Park and adherence to restrictions described above will limit adverse effects on wetland vegetation communities both spatially and temporally. As a result, while there could be a loss of individual plants in very limited areas; these areas will recover through natural growth over time and not result in permanently reduced wetland ecological condition. Implementation of research and monitoring and the adaptive management framework to inform management actions could allow for improved ecological integrity of wetland vegetation communities. Additionally, although other

actions (e.g., water diversion, groundwater pumping, agricultural activities) have contributed to adverse cumulative impacts on wetlands, the improvement in ecological integrity of approximately 6,300 acres of wetland vegetation under the selected alternative is expected to result in an overall beneficial cumulative impact on wetland vegetation communities.

Ultimately, the long-term beneficial impacts expected under the selected alternative will improve the natural integrity of GRSA and the resources it strives to conserve. As such, wetlands will persist in the park and will be available for the enjoyment of future generations. Therefore, the selected alternative will not result in impairment of wetland vegetation resources.

Elk and Bison

Elk. The Park is considered year-round habitat for elk. They may seasonally migrate up into montane meadows or alpine tundra in the Preserve, but some herds stay on the valley floor year-round (NPS 2015a). Areas to the west and north of the dunefield are considered winter concentration habitat. With the exception of the dunefield, the majority of the Park is considered severe winter range. Twenty percent of severe winter range for the entire Sand Dunes herd (Colorado Parks and Wildlife [CPW] Data Analysis Unit [DAU] E-11) is on NPS land. Based on winter classification flights between 2006 and 2017, an average of 75 percent of elk classified in the CPW DAU E-11 winter in GRSA, which is a disproportionate percentage and a much higher than anticipated population. In early 2017, an 8-hour winter classification flight classified 2,925 elk inside GRSA and another 825 elk adjacent to GRSA (within 10 miles). There are several factors presumably contributing to the uneven distribution of elk on winter range, including more wetlands and more standing forage in the Park that has not been removed for hay and lack of grazing cattle or sheep in the Park, which occur on adjacent lands; as well as proximity of habitat to roadways and other human disturbances. Studies have found that this uneven distribution has resulted in concentrations of elk that are currently having negative impacts on vegetation (Schweiger et al. 2017*;* Schoenecker 2012; Zeigenfuss and Schoenecker 2015*)*.

Actions taken to redistribute the herd are expected to improve habitat quality in areas that are currently overbrowsed. Increased survival of woody species and canopy height in cottonwood and willow dominated riparian communities will increase the availability of hiding, resting and thermal cover for elk. Increased dispersal and decreased elk density in the Park could also decrease intraspecific competition. The improved habitat quality, combined with reduced elk density and intraspecific competition could support herd productivity and reproductive potential over the long term.

Installation of exclosure fencing will exclude elk from up to 500 acres, which will prevent elk from foraging in some of the more productive areas of the Park (wetland vegetation communities) while vegetation is recovering, but the overall reduction in forage is small compared to total available habitat in the Park (6,314 acres in wetland vegetation communities alone) and is not expected to have any measurable effect on the elk population. Eventually, allowing these areas the opportunity to recover will improve forage quality and quantity available to elk once the fences are removed.

Active management tools associated with dispersal (i.e., hazing and lethal removal for dispersal) will disrupt and displace individual elk and groups of elk. It is assumed that over the life of the plan, approximately 35 percent of GRSA's predicted wintering elk population (or approximately 2,000 elk) will be permanently impacted by lethal removal. Use of horses, motorized vehicles, helicopter, etc. will result in increased movement and stress for individual elk. Elk moving to off-site areas could also be subject to hunting and increased mortality.

Avoidance of active elk management during calving season (late May through early July), and while the calves are still very young or during severe winter (January through February), will reduce stress to the animals during these important times.

Elk distribution monitoring and data collection to guide long-term management of elk population levels could result in impacts similar to those described for hazing activities, including disturbance and increased stress to individual animals. Techniques for elk distribution monitoring and data collection could include radio-telemetry studies, standardized ground counts, and/or winter classification flights. Radio-telemetry studies require capture and handling of individual elk (up to 60 animals over a period of 3 to 5 years) for short periods of time over the life of the plan (to replace/refurbish collars, if needed) resulting in stress and possible inadvertent injury or death. Standardized ground counts can increase elk vigilance and stress in individual elk or groups due to increased human presence. Winter classification flights will generally occur once per year (no more than three times), with each flight lasting approximately 6–8 hours, and impacts would not persist once the activity stops.

Although bison will remain on the landscape following NPS acquisition of the Medano Ranch, the substantial reduction of the bison herd at the conclusion of 5–7 years will reduce interspecific competition in areas where bison and elk currently use the same habitat. Reduced competition could further improve foraging opportunities for elk and support long-term productivity of the elk herd. Roundup of bison could increase stress and temporarily alter elk herd behavior and movements. However, roundups are presently conducted no more than once annually, and because the bison herd will be managed initially at a very low density, it is not expected that these actions will be needed for several years (following the transition from TNC to NPS management) and will occur on a very infrequent basis thereafter. In addition, round-ups would only last approximately three-days and it is expected elk would recover before subsequent roundups are conducted.

The potential to establish and expand the range and distribution of a bison herd in the Park will likely alter the locality of interspecific competition between elk and bison. However, even within the expanded bison range, the bison herd will be managed at a much lower density than current conditions, likely resulting in marginal adverse impacts to elk and elk habitat.

While actions associated with active elk management (hazing, fencing, lethal removal for dispersal) will result in increased disturbance and stress for individual animals and the direct mortality of 40–200 individual elk each year (from lethal take), these impacts will not affect the viability of the population, and elk will remain in the park. Ultimately, dispersal of elk will allow wetland vegetation communities to recover, resulting in improved habitat quality and ecological integrity by increasing the quantity and quality of forage. Additional habitat improvements for elk are expected from the substantial reduction in the number of bison on the landscape. The improved habitat quality, combined with reduced elk density and competition (both intraspecific and interspecific) could support long-term productivity of the remaining elk in the Park. Additionally, although elk management and other actions (e.g., infrastructure development/ maintenance, water diversion, groundwater pumping, livestock grazing) contribute some adverse cumulative impacts on elk and their habitat, the reduced competition and improvement in elk habitat and forage under the selected alternative is expected to result in an overall beneficial cumulative impact on elk. As a result, elk will remain on the GRSA landscape for the enjoyment of future generations, and the selected alternative will not cause impairment of the elk population.

Bison. A population of TNC bison ranging in size from 1,200 to 2,000 ranges freely in the 39,784-acre Medano Ranch. Under the selected alternative, TNC will continue to graze bison as a livestock herd on the Medano Ranch until government acquisition, at which time management of the bison herd will likely continue by TNC for 5–7 years under the current density. Following a 5–7 year period after NPS acquisition of the Medano Ranch, the NPS ultimately plans manage a bison herd of 80–260 bison in the existing fence or 80–580 within a potentially expanded range. Although the herd could grow to 580 bison, this still represents a substantial reduction compared to the current herd size; therefore, it is expected to result in reduced overall competition and improved foraging opportunities. Bison will further benefit from increased foraging opportunities if the bison range within GRSA is expanded within the life of the plan.

The primary tools to be used by the NPS to manage a bison herd within the preferred density range are fencing, roundup and translocation of live bison, and lethal removal. Roundup could involve providing feed to attract bison to an area suitable for handling, driving the bison into corrals from horseback or vehicles and processing for transport. Roundup and processing activities could result in harassment, increased stress on individual animals, and/or result in injury or death. For both roundup and lethal removal activities, increased stress could temporarily alter herd behavior and movements. However, the purpose of these activities is to maintain the bison population size within the proposed density range to help meet desired conditions, and lethal removal would be used on a limited basis, and roundups are presently conducted no more than once annually. Because the bison herd will be managed initially at a very low density, it is not expected that these actions will be needed for several years (following the transition from TNC to NPS management) and will occur on a very infrequent basis thereafter. In addition, round-ups would only last approximately three-days and it is expected bison that remain on the landscape would recover before subsequent roundups are conducted.

Impacts to bison from the installation of exclosure fencing are the same as those described for elk (preventing bison from foraging in some of the more productive areas of the Park but will result in an improvement in forage quality and quantity). Interior or perimeter fencing to keep bison within suitable areas and prevent movement onto neighboring private lands will restrict bison movement and possible access to forage and other resources. While this could result in excessive grazing and habitat degradation in areas accessible to bison within the Park, the NPS would have the tools to manage bison distribution and abundance if desired conditions are not being met in these areas. Ultimately, managing bison and elk to meet the desired conditions is expected to improve habitat quality and quantity on a broader scale. Additionally, installation of fencing could temporarily displace bison during construction, but it is expected bison would return to these areas once construction is complete.

Indirect adverse effects to bison could result from disturbance during elk hazing activities and lethal removal of elk, including increased stress from human disturbance, displacement from preferred habitat, and increased movement. However, impacts from these activities will be temporary; lasting from several hours per week to several days depending on the activity. The redistribution and removal of 40–200 elk per year in the Park could allow for recovery of wetland vegetation and improved ecological condition, increasing habitat quality and the quantity of forage available for bison.

Distribution monitoring and data collection techniques could be used to monitor bison as well as described above for elk. These activities could result in impacts similar to those described above for hazing activities: increased stress, movement, and displacement.

Tools used to manage the bison population could result in harassment and injury or direct mortality of individual bison. Similar indirect adverse impacts (increased stress from human disturbance, displacement from preferred habitat and increased movement) could result from tools used to actively manage the elk population in the Park. However, under this alternative bison will remain on the landscape at GRSA and the intent of these actions is to maintain the populations within a density range that allows GRSA to meet desired conditions and improve forage quantity and quality available to bison. Ultimately, bison will likely benefit over the long term from the redistribution of elk across the landscape and the subsequent improvements to habitat and ecological integrity. Bison will further benefit from increased foraging opportunities with decreased intra-species competition as a result of smaller herd; and if the bison range is expanded. Additionally, although elk management and other actions (e.g., water diversion, groundwater pumping, livestock grazing, big game hunting on adjacent lands) contribute some adverse cumulative impacts on bison and their habitat, the reduced competition for resources and improvement in habitat and forage under the selected alternative is expected to result in an overall beneficial cumulative impact on bison. Therefore, bison will remain on the GRSA landscape for the enjoyment of future generations, and the selected alternative will not result in impairment to the bison herd.

Archeological Resources

Great Sand Dunes National Park and Preserve is rich in archeological resources, which include both the remains of prehistoric American Indian and historical (post A.D. 1821) sites. Twelve archeological resources have been documented in the area of concern associated with the fencing alignment. Of the 12 archeological sites in the area of concern for the fencing alignment, 10 are potentially eligible for listing on the National Register of Historic Places (NRHP). The eligible archeological sites qualify under Criterion D (36 Code of Federal Regulations 60.4) for their potential to provide information important to the interpretation of prehistory or history. Data provided by GRSA shows that there are 347 documented archeological resources in the valley floor area of concern (excluding those documented in the fencing alignment). The vast majority of these resources are prehistoric American Indian and many are likely to be eligible for listing on the NRHP. Data is not available regarding eligibility status for the 347 archeological resources on the valley floor area of concern. However, for resources where eligibility is unknown, the NPS treats the resources as if they were eligible. Like the archeological resources along the fencing alignment, the archeological resources of the valley floor are likely significant under Criterion D, defined as the potential for archeological sites to provide information important to the interpretation of prehistory or history.

Overconcentration of ungulates contributes to near surface sediment erosion, which can expose archeological sites to deflation and loss of integrity, and lead to illicit artifact collection by the public. Some of the most significant archeological properties in the Park are located in areas of ungulate overconcentration, including wetlands and along streams.

Active elk management, including hazing and additional exclosure fencing, as well as lethal removal for dispersal and construction of additional exclosure fencing could pose a potential direct adverse effect on archeological properties, but the effects will be minimized or mitigated through identification, monitoring and avoidance measures, and protection of resources using fencing, as needed. Identification surveys will occur prior to fence construction to ensure that historic properties are avoided; fence construction will be monitored to ensure that inadvertent effects to historic properties do not occur.

The indirect benefit of reduced elk concentrations in areas of overuse will minimize any potential effects that may be occurring to archeological properties currently from prolonged trampling, such as artifact breakage and erosion that exposes artifacts and makes them susceptible to further damage. The redistribution of elk also minimizes effects that could be occurring to archeological properties from erosion by redistributing elk over a larger area thereby minimizing erosion and subsequently the overall adverse effects to archeological properties. This could support natural stabilization of archeological sites over the long term and preservation of information significant to the interpretation of prehistory or history.

The long-term impacts of bison management are expected to be minimal, as the substantial reduction in the number of bison from the current herd will greatly reduce on-going adverse effects from bison overconcentration in archeologically sensitive areas, such as artifact breakage and erosion that exposes artifacts and makes them susceptible to further damage. Effects from proposed bison fencing are the same as those described for exclosure fencing and will be minimized using the same methodology. Overall, bison management will not diminish the ability of archeological properties in the Park to convey significance and to contribute information important to the interpretation of prehistory.

Additionally, although ungulate management and other actions (e.g., infrastructure development/maintenance, water diversion, groundwater pumping, agricultural activities, livestock grazing) contribute some adverse cumulative impacts on archeological resources, the reduction in elk and bison overconcentration under the selected alternative is expected to reduce trampling and erosion that affects archeological resources, resulting in an overall beneficial cumulative impact. Therefore, despite some potential for impacts, these resources will still continue to be present in the park, and the selected action will not result in an impairment of archeological resources.

Conclusion

In the professional judgement of the NPS decision-maker, the adverse impacts that may result from implementing the selected action will not rise to levels that would constitute impairment. This determination is based on consideration of GRSA's purpose and significance, relevant scientific studies and a thorough analysis of the environmental impacts described in the UMP Draft Environmental Impact Statement, the comments provided by the public and others, and the professional judgment of the decision maker guided by the direction of the NPS Management Policies 2006 (NPS 2006).