Mesa Verde National Park
Colorado

U.S. Department of the Interior
National Park Service

Livestock Removal

ENVIRONMENTAL ASSESSMENT

April 2018

TABLE OF CONTENTS

Chapter Page

TABLES

Page

FIGURES

Page

GRAPHIC

Page

APPENDIX

ACRONYMS AND ABBREVIATIONS

	Full Phrase
ACEC	Areas of Critical Environmental Concern
agl	above ground level
AVMA	American Veterinary Medical Association
CCC	Civilian Conservation Corps
CFR	Code of Federal Regulations
DOI	United States Department of the Interior
EA	environmental assessment
FR	*Federal Register*
MVNP	Mesa Verde National Park
NEPA	National Environmental Policy Act of 1969
NPS	United States Department of the Interior, National Park Service
NRHP	National Register of Historic Places
PAC	protected activity center
SHPO	State Historic Preservation Office
USC	United States Code
USFWS	United States Department of the Interior, Fish and Wildlife Service
UTV	utility terrain vehicle

This page intentionally left blank.

CHAPTER 1: NEED FOR THE ACTION

1.1 NEED FOR THE ACTION

The National Park Service (NPS) proposes to remove livestock from Mesa Verde National Park (MVNP) and prevent more from re-entering it (see **Figure 1-1**). Livestock need to be removed because the National Park Service does not have the legal authority under 36 Code of Federal Regulations (CFR), Subpart 2.60, to allow livestock use in the MVNP.[1] In accordance with NPS Management Policy 8.6.8.3, Trespass and Feral Livestock, livestock trespassing on park lands may be impounded and disposed of, in accordance with the provisions of 36 CFR, Subpart 2.60, with the owner charged for expenses incurred. Feral livestock having no known owner may also be disposed of, in accordance with 36 CFR, Subpart 2.60.

As of 2017, park programs and practices, including maintaining fencing along its boundary, have not been effective at removing and preventing livestock from entering the park. There are approximately 80 horses and 12 head of cattle distributed throughout the park; no burros, goats, sheep, or swine are currently in Mesa Verde National Park. The number of trespassing livestock, particularly horses, has increased in the past 20 years and the recruitment rate has surpassed the rate of removal for all livestock (Colyer 2004, NPS 2014).

1.2 IMPACT TOPICS RETAINED FOR FURTHER ANALYSIS

The following topics are carried forward for further analysis in this environmental assessment (EA):

- special status plant species (Chapin Mesa milkvetch, Cliff Palace milkvetch, and alkaline pepperweed only)
- special status wildlife species (Mexican spotted owl only)
- visitor use and experience
- cultural resources (archaeological resources only)

1.3 IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

Certain topics were initially thought to be relevant to this EA but, through an interdisciplinary approach and analysis, their relevance has since been determined to be minimal. They are Indian Trust Resources; Indian sacred sites; ethnographic resources; environmental justice; soils; vegetation; water quality; aquatic, wetland, and riparian communities; wildlife; soundscapes; and human health and safety.

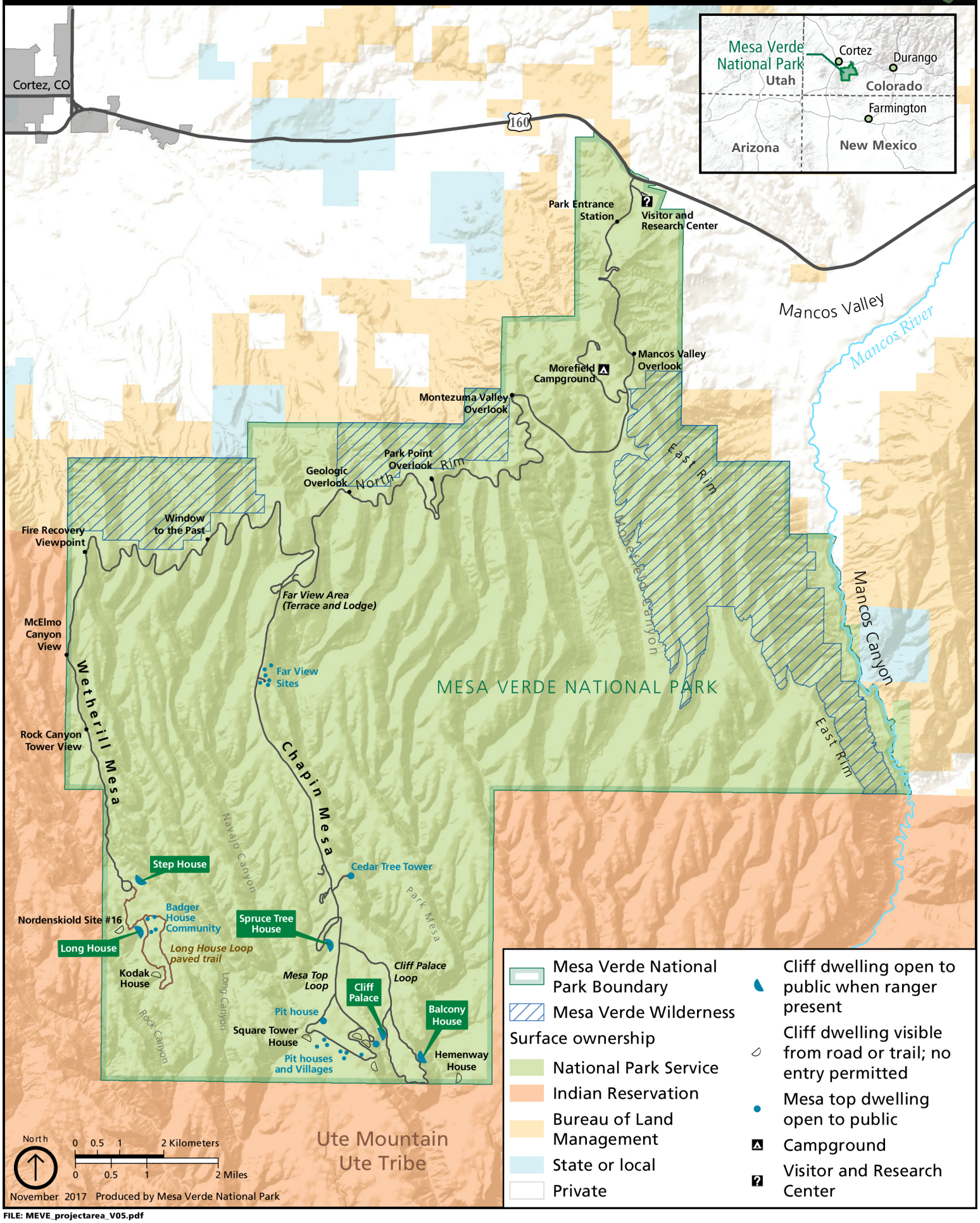
A brief rationale for dismissal of these topics follows.

[1] "The running-at-large, herding, driving across, allowing on, pasturing or grazing of livestock of any kind in a park area or the use of a park area for agricultural purposes is prohibited …" (36 CFR, Subpart 2.60)

Mesa Verde National Park

Figure 1-1, Mesa Verde National Park (Project Area)

National Park Service
U.S. Department of the Interior



November 2017 Produced by Mesa Verde National Park

FILE: MEVE_projectarea_V05.pdf

1.3.1 Indian Trust Resources

Indian trust resources are assets held in trust by the United States for American Indians. The Department of the Interior (DOI) Environmental Compliance Memorandum 97-2, Departmental Responsibilities for Indian Trust Resources and Indian Sacred Sites on Federal Lands, requires that any anticipated impacts on Indian trust resources from a proposed project or action by DOI agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights. It represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. There are no Indian trust resources in Mesa Verde National Park, so this topic was dismissed from further analysis.

1.3.2 Indian Sacred Sites

Executive Order 13007, Indian Sacred Sites, provides that, to the extent practicable, permitted by applicable law, and not clearly inconsistent with essential agency functions, agencies are required to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of the sites.

A sacred site is any specific, discrete, narrowly delineated location on federal land that is identified by an Indian tribe as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion. This is contingent on the tribe or appropriately authoritative representative of an Indian religion having informed the agency of the existence of such a site. The National Park Service has not been informed by any associated tribe or appropriately authoritative representative of an Indian religion of any sacred sites in Mesa Verde National Park. None of the tribes consulted during the scoping period identified concerns related to sacred sites; thus, this topic was dismissed from further analysis.

1.3.3 Ethnographic Resources

The National Park Service defines ethnographic resources in Director's Order 28 (Cultural Resources Management) as any "site, structure, object, landscape, or natural resource feature assigned traditional, legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it."

A traditional cultural property is an ethnographic resource that is eligible for listing on the National Register of Historic Places (NRHP). There are ethnographic resources in Mesa Verde National Park. Many American Indian people and groups continue their traditional cultural association with MVNP lands and resources. During the scoping process, the National Park Service contacted by mail the 26 American Indian tribes that the park currently consults with (see **Chapter 4**, Consultation and Coordination). Of the tribes that responded, none identified concerns about ethnographic resources that may be altered by either the No-Action Alternative or the Preferred Alternative; therefore, this topic has been dismissed from further analysis.

1.3.4 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires all federal agencies to incorporate environmental justice into their missions. This is done by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities.

Neither the No-Action Alternative nor the Preferred Alternative would affect these communities and demographics. This is because the No-Action Alternative would not occur in these communities or affect their health or environmental conditions. As a result, there would be no disproportionate health or environmental effects on minorities or low-income populations or communities, as defined in the US Environmental Protection Agency's guidance on environmental justice concerns in the National Environmental Policy Act of 1969 (NEPA) analyses (US Environmental Protection Agency 1998); therefore, this topic has been dismissed from further analysis.

1.3.5 Soils

Activities associated with both the No-Action Alternative and the Preferred Alternative would remove vegetation, thereby exposing soils to erosion by wind and water and compacting the soil. Examples of this are congregating livestock, using vehicles, and installing new structures, such as pen traps or fences. The collective impacts of capture facilities on soils would be negligible under the No-Action Alternative, amounting to less than 1 acre.

The impacts on soil resources would be greater under the Preferred Alternative than under the No-Action Alternative. Even so, the collective impacts of all capture and holding facilities on soils would also be negligible, amounting to less than 4 acres. The impacts would also be dispersed across multiple locations and would not be concentrated at one location. The disturbances would be temporary and intermittent, lasting from 1 to 6 weeks during the trespass livestock capture phase, several times between May and November. The disturbances would take place on relatively flat land, minimizing erosion by surface water runoff. Most of the existing and proposed baited pen traps and the holding facility would be on already disturbed sites, reducing the new disturbance footprint.

Under the No-Action Alternative, livestock would trample vegetation and soil during roundups. These impacts would be short in duration (less than 1 day for each event and 6 or fewer events per year) and distance (close to the nearest trap site). Trampling impacts (soil compaction) would be dispersed throughout the herding area, would affect only a few acres, and would be temporary. Under the Preferred Alternative, impacts from herding would be similar but would occur over a larger footprint. These impacts would still be minimal considering the overall footprint of the livestock trespass range (30,310 acres).

Mitigation measures requiring a review by an ecologist and restoration of impacted areas would also reduce impacts on soils; therefore, this topic was dismissed from further analysis.

1.3.6 Vegetation (Non-special Status Species)

Activities associated with the No-Action Alternative, such as livestock congregating at baited pen trap sites and constructing and repairing the boundary fence, would remove and trample vegetation. The impact would be negligible, however, as less than 1 acre of vegetation would be removed at the baited pen trap sites, and impacted areas would be restored within one to two growing seasons.

Activities associated with the Preferred Alternative would also remove and trample vegetation. The impact would also be negligible, however. This is because impacts would be dispersed across multiple locations and less than 4 acres of vegetation would be removed at these locations. Impacted areas would also be restored within one to two growing seasons. Also, the holding facility is in an area used for aggregate rock storage, and no native vegetation is present.

Under the No-Action Alternative, livestock would trample vegetation during roundups. These impacts would be short in duration (less than 1 day for each event and 6 or fewer events per year) and distance (close to the nearest trap site). Trampling impacts (soil compaction) would be dispersed throughout the herding area, would affect only a few acres, and would be temporary. Under the Preferred Alternative, impacts from herding would be similar but would occur over a larger footprint. These impacts would still be minimal considering the overall footprint of the livestock trespass range (30,310 acres).

Mitigation measures requiring review by an ecologist and restoration of impacted areas would reduce impacts on vegetation; therefore, this topic was dismissed from further analysis.

1.3.7 Water Quality

Activities associated with the No-Action Alternative, such as installing new baited pen traps or fence and trapping, would remove or trample essential soil-stabilizing agents and compact soil. This could reduce the soil's water retention and increase water erosion. Overland flow of water can transport sediment to water bodies, leading to increased turbidity and degraded water quality. The collective impacts of all baited pen trap sites on water resources would be negligible, amounting to less than 1 acre. Boundary fence replacement would disturb less than 1% of the total current livestock trespass range.

Impacts on water resources under the Preferred Alternative would be dispersed across multiple locations and would not be concentrated at one location. Even though there would be additional sites of disturbance under the Preferred Alternative, impacts would still be negligible, amounting to less than 4 acres. The disturbances would be temporary and intermittent, lasting from 1 to 6 weeks during active trapping, several times between May and November. The disturbances would take place on relatively flat land, minimizing erosion by surface water runoff. Most of the baited pen traps and the holding facility would be on already disturbed sites, reducing the new disturbance footprint; therefore, this topic was dismissed from further analysis.

1.3.8 Aquatic, Wetland, and Riparian Communities

Aquatic, wetland, and riparian communities make up a small part of Mesa Verde National Park, only a few hundred acres, mainly along the Mancos River. Even so, these environments have a disproportionately high level of ecological value by supporting native biological diversity. Wetland areas in the higher elevations of the park are few, small, disjunct, and declining, due to diminishing precipitation and groundwater.

The main type of wetland that would be affected is seasonally wet meadows, composed of Baltic rush and sedges, which grow in small parts of Mesa Verde National Park's high valleys. Most of the year there is no standing water in these meadows. By fall the ground surface is dry and firm, unless it has just rained or snowed a substantial amount. Livestock removal under the No-Action Alternative would have negligible impacts on these communities. This is because baited pen trapping would occur when these wetlands are dry, so as to minimize surface erosion, soil compaction, and vegetation trampling. Only a few total acres would be involved during any one trapping event lasting a day or less. Any surface erosion, soil compaction, and vegetation trampling would be short term, lasting less than 1 year.

Only one of the existing pen trapping locations is near a wetland. The Morefield Spring baited pen location would impact 0.02 acres of wetlands through trampling and the possible introduction and spread of nonnative, invasive plants; however, this spring is degraded and is one out of over 200 water sites in Mesa Verde National Park. Impacts under the Preferred Alternative would be similar to those under the No-Action Alternative, except that the holding facility would add an additional acre of disturbance near the Morefield Spring. Mitigation measures requiring a review by an ecologist and restoration of the affected area would reduce impacts on this spring. Moreover, the condition of the spring would improve when livestock removal ceases.

Under the No-Action Alternative, livestock would trample seasonally wet meadows during herding and roundups. These impacts would be short in duration (less than 1 day for each event and 6 or fewer events per year) and distance (close to the nearest trap site). Roundups would occur when these wetlands are dry, so as to minimize surface erosion, soil compaction, and vegetation trampling. Trampling impacts would be dispersed throughout the herding area, would affect only a few acres, and would be temporary. Under the Preferred Alternative, impacts from herding would be similar but would occur over a larger footprint. These impacts would still be minimal considering the overall footprint of the livestock trespass range (30,310 acres).

Mitigation measures requiring a review by an ecologist and restoration of the affected area would reduce impacts on this spring. Moreover, the condition of the spring would improve when livestock removal ceases. For the reasons stated above, this topic was dismissed from further analysis.

1.3.9 Wildlife (Non-special Status Species)

Protecting wildlife and habitat are expressed purposes of Mesa Verde National Park and the National Park Service. Under the No-Action Alternative, wildlife at the two existing, baited, pen trapping locations could be disturbed intermittently over several days. This could go on for several weeks at the trapping locations and along the park boundary, where fences would be replaced from

May through November. Wildlife could also be disturbed or flushed during herding activities. Wildlife in areas where they were flushed from could return in as little as minutes, in some cases, but normally not longer than the day after the disturbance. The presence of large animals, such as cattle and horses, and humans with vehicles would cause some wildlife species to evade the disturbance. Animals may be flushed from only several yards from the disturbance, or they may remove themselves from visual contact with it. The wildlife most likely to be temporarily disturbed would be widespread, common species, such as mule deer, cottontail rabbits, chipmunks, ground squirrels, scrub jays, towhees, and sparrows. Predators usually have larger home ranges; thus, being displaced from one part of their area means they would adjust by moving to another part of their home range.

Livestock would be removed outside of breeding seasons. This is because, during those weeks and months, animals are closely tied to small areas where young of the year are being raised. Also, adjoining habitat is often occupied by other breeding or rearing animals that are not receptive to competitors entering their territories. Displacing animals caring for young can kill the young, from exposure to the elements, predation, or starvation.

To comply with the Migratory Bird Treaty Act, vegetation that would be cleared for proposed fence repair or replacement would not be removed between April 15 and July 31; alternatively, a nest survey would be conducted to verify there are no nesting birds in this vegetation.

Outside of the breeding season, animals are typically capable of adjusting to displacement far more easily. This is because their main concern is foraging for themselves and adjacent habitat is usually very abundant and just as suitable as the areas from which they had been flushed. Except for predators, animals often group for protection during the nonbreeding season. At such times, it is not stressful for them to share the same patch of ground, unlike during the breeding season, when they defend their territory from rivals.

The collective impacts of baited pen trap sites on wildlife habitat under the No-Action Alternative would be negligible. It would amount to less than 1 acre of common and widespread habitat that either was previously disturbed or that does not include prime or unique qualities. Boundary fence replacement would disturb less than 1% of the wildlife habitat in the total current livestock trespass range. The species typically inhabiting these locations also are common and widespread.

The trapping and fence replacement locations would be disturbed only during limited trapping and fence replacement operations. These sites could undergo restoration when they are no longer needed or after the fence has been replaced.

The holding facility likely would be retained in the long term to manage future incursions of trespass livestock. The collective impacts of baited trap sites and the holding facility on wildlife habitat under the Preferred Alternative would also be negligible. It would amount to fewer than 4 acres of common and widespread habitat that either was previously disturbed or that does not include prime or unique qualities; therefore, this topic was dismissed from further analysis.

1.3.10 Soundscapes

Experiencing natural sounds and quiet are important values at Mesa Verde National Park, except for the developed areas, which occupy about 10% of the park's lands. This is because human sounds and noise dominate this soundscape. The activities proposed under both alternatives include the use of motorized equipment, which would be used mostly in developed areas. Vehicles, such as pickup trucks and utility terrain vehicles (UTVs), used for transporting equipment, personnel, and captured livestock, would generate mechanical noise. This could occur at any time of the day, but primarily during daylight hours. These vehicles would be used no more than 4 hours per day during livestock removal operations.

Vehicles used for the proposed activities, under both alternatives, would be driven on paved public roads that receive constant traffic, in addition to administrative roads that do not receive any public traffic. Vehicles move slowly on administrative roads, and their engines would be audible only for a matter of minutes as they pass by any one location. Once the vehicles are parked, the engines would be turned off. Even though motorized vehicles would be used under both alternatives, the Preferred Alternative would use a greater number of vehicles during a shorter length of time.

Under the Preferred Alternative, use of helicopters is also proposed for aerial surveys of trespassing livestock, transporting materials, during reconnaissance before removal and possibly during removal. The use of a helicopter and related noise impacts would be limited to daylight hours and, at most, 7 days a year. In general, helicopters would take off and land outside the park; however, they could land on an existing helispot in the park, if necessary, for example, to refuel. For aerial surveys, helicopters would fly no closer than 150 feet above ground level (agl). For transportation of supplies, such as fencing, helicopters would fly 100 feet agl, depending on sling cable[2] length. During roundups, helicopters could fly as low as 25 feet agl.

Helicopters travel faster but are louder, and their altitude allows sound waves to be audible for several minutes as they pass. The noise level dissipates after a mile, but it stays audible for several minutes. A helicopter would be used along planned flight paths and more in the backcountry areas of the park where four-wheel vehicle access is difficult. The helicopter would spend less time flying over the front country; nevertheless, the farther its noise travels, the more it would be audible over remote parts of the park, although not as loud. In all cases that motorized equipment are used, the noise generated would dissipate in a mile or less and in a matter of minutes or hours, depending on the activity. The existing soundscape would return immediately after the activity was completed; thus, the topic of soundscapes was dismissed from further analysis.

1.3.11 Cultural Landscapes

The National Park Service defines a cultural landscape as a "geographic area (including both cultural and natural resources and the wildlife or domestic animals therein), associated with an historic event, activity, or person or exhibiting other cultural or aesthetic values. There are four general types

[2] A sling cable is used as a hoist system on a heavy lift type helicopter. The sling is of fixed length, is attached to the belly of the aircraft before it takes off, and remains hanging there until the aircraft returns.

of cultural landscapes, not mutually exclusive: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes" (NPS 1996).

Cultural landscapes at Mesa Verde National Park are primarily designed landscapes. Examples are those constructed during the Civilian Conservation Corps (CCC) and Mission 66[3] eras and historic vernacular landscapes, such as those created by the Ancestral Puebloan people. Four designed cultural landscapes have been documented in MVNP in cultural landscape inventory reports (Shapins Associates 2012a, 2012b, 2012c, 2012d). These are the Civilian Conservation Camps, the Entrance Road Corridor, the Headquarters Area, and the Utility Area. Additional areas in the park have been identified as potential designed cultural landscapes, but they have not been evaluated: Mission 66 development on Navajo Hill and the Morefield Campground development in Morefield Canyon.

The historic vernacular landscapes include all backcountry and front country prehistoric sites. Some of the more definable vernacular landscapes are Far View Community, Cliff Palace, Balcony House, Battleship Rock, and Morefield Canyon Community. There are several historic-era homesteads and ranching sites, but none that retain enough integrity to be considered a vernacular cultural landscape.

There may be unidentified ethnographic resources, including landscapes, in MVNP. Although MVNP contacted the American Indian tribes currently associated with the park (see **Chapter 4**, Consultation and Coordination), none expressed concerns about ethnographic resources or landscapes that may be altered by either the No-Action Alternative or the Preferred Alternative.

The existing baited pen trap near Morefield Spring is the only such trap within the boundary of a cultural landscape under both alternatives. The Morefield Spring baited pen trap would impact 0.2 acres of land, approximately 370 feet to the west-northwest of Morefield Spring.

The Morefield Spring is an important feature of the Morefield Canyon Community Cultural Landscape. To encourage livestock to take water from inside the baited pen trap, temporary corral panels may be used to exclude them from the spring. The corral panels and the baited pen trap are both temporary. Once removed, all visual impacts on the cultural landscape would cease. The vegetation around the spring site is already degraded; excluding livestock from the spring and removing them from the park would improve the condition of the spring. Moreover, horse and cattle were not part of the prehistoric Morefield Community, and their presence does not contribute to the integrity of the cultural landscape; therefore, this topic was dismissed from further analysis.

1.3.12 Cultural Resources— Historic Architectural Resources

Historic architectural resources are defined as districts, buildings, structures, and objects that are listed on or eligible for listing on the NRHP. Both prehistoric and historic sites are an archaeological property type and are addressed in Section 3.5, Cultural Resources—Archaeological Resources."

[3] Mission 66 was an NPS 10-year program that was intended to dramatically expand NPS visitor services and facilities by 1966, in time for the 50th anniversary of the establishment of the National Park Service.

Park staff have conducted surveys of all architectural resources in the MVNP. Within the boundaries of MVNP, there are 105 buildings that are 50 years old or older,[4] as follows:

- Seventy-five of the MVNP's historic buildings have been determined eligible for listing on the NRHP, and the Colorado State Historic Preservation Office (SHPO) has concurred.
- Thirty-four historic buildings do not have a SHPO consensus determination on eligibility and are being treated as eligible for the NRHP, pending further evaluation.
- One building has been determined not eligible for the NRHP, with a SHPO consensus determination.

Most of these resources are concentrated in one of the 14 identified historic districts in MVNP. The Administrative District, which includes 6 historic Pueblo Revival buildings, dating from the 1920s to the 1930s, is the only non-prehistoric resource in the park that is listed on the NRHP. It is also designated as a National Historic Landmark.

Additionally, the park contains historic structures, such as trails, water systems and associated features, roads and associated features, sidewalks, parking areas, a tennis court, a quarry, and a playground. All are eligible for listing on the NRHP or contribute to a listed or eligible NRHP district.

Sections of the Mesa Verde National Park boundary fence date to the 1960s. The entire fence line has been evaluated for the NRHP, and the National Park Service determined that it is not eligible for the NRHP under any criteria. The SHPO concurred with this determination.

The historic districts, buildings, and structures have areas and periods of significance that sometimes overlap, but may include the earliest development of the park (1906 into the early 1930s), the construction work of the CCC (1933 to 1942), and the National Park Service's Mission 66 program (1956 to 1968).

Historic districts, buildings, and structures tend to be concentrated in the front country of the park. Trespass livestock trapping and roundup activities would take place away from the front country; thus, none of the existing or proposed baited pen traps, holding pens, or roundup areas coincide with the property boundaries of any historic district or building under either of the alternatives. Under the Preferred Alternative, the baited pen trap closest to a historic district or building is the Quarry Road baited pen trap site, which is about 0.1 miles south of the historic quarry.

Historic roads, which are considered structures, will be used for parking trucks and livestock trailers, as staging areas for holding corral panels, as roundup corridors for driving horses, and for driving on with trucks and livestock trailers. None of these uses have the potential to damage a historic paved or dirt road.

None of the baited pen traps, holding pens, or roundup activities take place close enough to historic districts or buildings to cause impacts. Such activities as driving trucks and trailers, temporarily

[4] Fifty years old is the accepted threshold date for defining a historic-aged resource that warrants further evaluation for NRHP eligibility.

storing corral panels, and herding livestock, have no potential to impact historic dirt or paved roads; therefore, the topic was dismissed from further analyses.

1.3.13 Special Status Species—Plants

The Endangered Species Act requires the National Park Service to identify and manage federally listed threatened or endangered species. As required under NEPA guidelines, the National Park Service is preparing a biological assessment and consulted with the United States Fish and Wildlife Service (USFWS) for this plan. Conservation measures developed during consultation will be incorporated into the Preferred Alternative.

The federal and state special status designations are defined as follows:

- **Federal endangered**—An animal or plant species in danger of extinction throughout all or a significant portion of its range
- **Federal threatened**—An animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range
- **Federal candidate**—Plants and animals that have been studied and the US Fish and Wildlife Service has concluded that they should be proposed for listing on the federal endangered and threatened species list
- **Colorado endangered**—A species in immediate jeopardy of becoming extinct throughout all or a significant portion of its range
- **Colorado threatened**—An animal that is not in immediate jeopardy of extinction but is vulnerable because it exists in small numbers or is so extremely restricted throughout all or a significant portion of its range that it may become endangered
- **Colorado species of special concern**—A species that may be at risk of becoming threatened or endangered in Colorado
- **Colorado S1 plant species**—Critically imperiled in Colorado because of extreme rarity (five or fewer occurrences), or there are very few remaining individuals, or because of some factor of its biology making it especially vulnerable to extirpation from the state
- **Colorado S2 plant species**—Imperiled in Colorado because of rarity (6 to 20 occurrences) or because of other factors demonstrably making it vulnerable to extirpation from the state
- **Colorado S3 plant species**—Vulnerable in Colorado because it is rare and uncommon (21 to 100 occurrences), or found only in a restricted range, or because of other factors making it vulnerable to extirpation from the state

Seven species considered globally or locally rare occur in the livestock trespass range in Mesa Verde National Park (see **Table 1-1**, below). Many of these rare and endemic plants are associated with unique soils, creating soil-flora relationships that are still not fully understood. Mesa Verde National Park has 226 species that staff have identified as sensitive.

Table 1-1
List of Mesa Verde Rare Plants of Highest Conservation Priority

Scientific Name	Common Name	State Rank	Acres within Current Livestock Trespass Range**
Astragalus deterior	Cliff Palace milkvetch	S1, S2	110.1
A. schmolliae	Chapin Mesa milkvetch*	S1	1,825.7***
Collomia grandiflora	Large-flowered collomia	S1	219.8
Epipactis gigantea	Giant hellebore	S2, S3	0.1
Grindelia arizonica	Arizona gumweed	S2	1.1
Hackelia gracilenta	Mesa Verde stickseed	S1	257.5
Lepidium crenatum	Alkaline pepperweed	S2	183.7

Sources: NPS GIS 2017; NPS 2015b

* Formerly known by the common name Schmoll's milkvetch
** Rounded to a tenth of an acre
*** High and low density area

Four special status plant species with an S1 ranking are known to occur in the Mesa Verde National Park livestock trespass area. They are listed in **Table 1-2**, along with their habitat preferences.

Table 1-2
List of Critically Imperiled Rare Plants in Mesa Verde National Park and Their Preferred Habitats

Common Name	Preferred Habitat
Cliff Palace milkvetch	Sandstone rimrock, shallow sandy soil at mesa edges of the pinyon/juniper woodlands
Chapin Mesa milkvetch	Aeolian mesa topsoil of pinyon-juniper woodlands on Chapin Mesa and a few on Park Mesa and adjoining canyon edges
Large-flowered collomia	Woodlands and canyons
Mesa Verde stickseed	Shady canyons and mesa tops, in deep loamy or sandy-loam soils associated with pinyon/juniper woodlands or montane shrublands

Source: NPS 2015b

Chapin Mesa milkvetch, Cliff Palace milkvetch, and alkaline pepperweed have the potential to be directly impacted by holding pens, baited pen traps, or drift fences under one or both of the alternatives. As such, these species are analyzed in detail in **Section 3.2**.

The other special status plant species in **Tables 1-1** and **1-2** would be avoided. Under the No-Action Alternative and the Preferred Alternative, the National Park Service would avoid these special status plants by conducting a survey in advance of baited pen placement and marking special status plants. Workers would be taught how to identify special status plants to ensure that they avoid these species. Similarly, workers would avoid special status plants during construction and repair of the boundary fence.

There would be wrangler roundups in the park under both alternatives. The frequency of roundups is not specified under the No-Action Alternative, but under the Preferred Alternative, roundups could occur once or twice a year. During these events, livestock and wranglers on horseback would

temporarily affect special status plant species by trampling, potentially reducing the extent or vigor of special status plant populations; this could affect the viability of certain special status plant populations.

Roundups would occur anywhere within the 30,310 acres of current livestock trespass range, so the potential for impacts would be widespread; however, given the localized nature of most special status plant populations, the likelihood for impacts is low. If they were to occur, impacts would be specific to the areas where livestock and wranglers are conducting the roundup.

While livestock would continue to be removed under the No-Action Alternative and fencing would be installed or repaired, these activities have not been effective in preventing livestock from entering the park, as described in **Section 1.1**. As a result, livestock would continue to affect special status plant species in the park by trampling and browsing. This could reduce the extent or vigor of special status plant populations and could affect the viability of certain special status plant populations. Impacts would occur throughout the 30,310 acres where livestock trespass. It is not known to what extent this is occurring, but impacts are likely limited due to the localized nature of special status plant populations.

In contrast, implementing a comprehensive, continuous program to remove livestock and prioritize construction and repair of the boundary fence under the Preferred Alternative would likely be more effective, compared with the No-Action Alternative, under which livestock would be removed periodically and opportunistically. As a result, trampling and browsing impacts on special status plant populations in the park would be reduced as livestock are removed; however, impacts would continue if the target or goal is not achieved or if new trespass occurs. Reducing impacts from livestock could contribute to increased extent and vigor of special status plant populations in the park over time.

1.3.14 Special Status Species—Wildlife

For this analysis, the National Park Service reviewed a species list from the US Fish and Wildlife Service, dated August 8, 2017. It listed all federally listed and candidate species in Mesa Verde National Park. **Table 1-3**, below, includes those species from the USFWS official species list that are known to occur or that could occur in the project area, species having the potential to occur in the project area based on habitat requirements and known locations, and those that have been excluded from further analysis, with rationale. A brief description of their range and habitat is also included. (Species not known or with no potential to occur in the project area are not discussed further in this document.)

There is no proposed or designated critical habitat for any federally listed species in the project area addressed in this assessment; therefore, there would be no direct, indirect, or cumulative impacts. Critical habitat is not addressed further in this assessment.

Table 1-3
Threatened, Endangered, Candidate/Proposed Wildlife with the Potential to Occur in the Project Area and in Critical Habitat

Species' Common and Scientific Name	Status[a]	Potential to Occur	Critical Habitat	Rationale for Exclusion[b]	Habitat Description and Range in Action Area
Mammals					
New Mexico meadow jumping mouse *Zapus hudsonius luteus*	E	No	No (location is outside designated critical habitat)	HAB	Wide and extensive riparian communities along rivers and streams, springs and wetlands, or canals and ditches; persistent emergent herbaceous wetlands, dominated by beaked sedge or reed canarygrass, scrub-shrub riparian areas, dominated by willows or alders, and flowing water that saturates soils
North American wolverine *Gulo gulo luscus*	PT	No	No (no critical habitat designated for this species)	ODR, HAB, ELE	Individuals have reentered their historical range in the Sierra Nevada of California and southern Rocky Mountains of Colorado but have not established breeding populations in these areas; restricted to remote elevations greater than 6,890 feet, with artic-subarctic conditions, and require large areas of suitable habitat
Fishes					
Colorado pikeminnow (squawfish) *Ptychocheilus lucius*	E	Yes	No (location is outside designated critical habitat)	ODR	Medium to large rivers of the upper Colorado River basin, formerly in the mainstream Colorado River and major tributaries, historically in the Mancos River; young prefer small, quiet backwaters, whereas adults use various habitats, including deep, turbid, strongly flowing water, eddies, runs, flooded bottoms, or backwaters (especially during high flows); lowlands inundated during spring high flow appear to be important habitats
Greenback cutthroat trout *Oncorhynchus clarki stomias*	T	No	No (no critical habitat designated for this species)	ODR, HAB	Clear, cold, well-oxygenated water in streams and lakes; adequate stream spring season spawning habitat present in all mountain and foothill habitats of the South Platte and Arkansas River drainage systems; transplanted populations in 13 counties in western Colorado, including headwaters of the Dolores River drainage

Table 1-3
Threatened, Endangered, Candidate/Proposed Wildlife with the Potential to Occur in the Project Area and in Critical Habitat

Species' Common and Scientific Name	Status[a]	Potential to Occur	Critical Habitat	Rationale for Exclusion[b]	Habitat Description and Range in Action Area
Razorback sucker *Xyrauchen texanus*	E	Yes	No (location is outside designated critical habitat)	ODR	Backwaters, sloughs, oxbow lakes, and seasonally inundated floodplains; shallow, swift waters of mid-channel sandbars less than 12 feet deep during summer; slow runs, slack waters, and eddies 2.0 to 4.6 feet deep in winter; in the upper Colorado River basin, its range includes the lower San Juan River and historically the Mancos River
Birds					
Mexican spotted owl *Strix occidentalis lucinda*	T	Yes	No (location is outside designated critical habitat)	—	Steep-sided canyons, with old-growth mixed conifer forests; nests on cliff ledges or caves along canyon walls in shady, cool canyons of the pinyon- juniper woodland zone in southwest Colorado
Southwestern willow flycatcher *Empidonax traillii extimus*	E	No	No (location is outside designated critical habitat)	HAB	Foothill and montane riparian willow thickets, from near sea level to over 8,500 feet, in mosaics of relatively dense and expansive growths of trees and shrubs that are near or next to surface water or underlain by saturated soil; expected range includes most of Montezuma County, Colorado
Yellow-billed cuckoo *Coccyzus americanus*	T	No	No (location is outside designated critical habitat)	ODR, HAB	Occurs sporadically in a few isolated pockets of extensive riparian cottonwood forest in western Colorado

Source: NPS 2015

[a] **Status codes: E** = federally listed endangered; **T** = federally listed threatened; **PT** = proposed listed threatened; **C** = federal candidate for listing
[b] **Exclusion rationale codes: ODR** = outside known distributional range of the species; **HAB** = no habitat present in action area; **ELE** = outside of elevational range of species; and **SEA** = species not expected to occur during the season of use/impact

As indicated in **Table 1-3**, there are three federally listed threatened or endangered, candidate/proposed species—Mexican spotted owl, Colorado pikeminnow, and razorback sucker—with the potential to occur in or near the project area; that is, the species has been documented or is a rare migrant. Since the North American wolverine, Colorado pikeminnow, and razorback sucker do not occur in the project area, infrequent livestock removal is not anticipated to affect them; therefore, only Mexican spotted owl is analyzed in detail in **Section 3.3**. The remaining species shown in **Table 1-3** without a potential to occur in the project area are not analyzed further, based

on the rationale provided. Neither of the alternatives will have an impact on any of these other seven species.

In addition to the federally listed species, there are five State of Colorado wildlife species of special concern and one State of Colorado threatened species that do not have a federal designation; because of this, they are not listed in **Table 1-3**. Two of the state special concern species, the northern leopard frog (*Rana pipiens*) and the sharp-tailed grouse (*Tympanuchus phasianellus*), no longer occur in Mesa Verde National Park. The State of Colorado threatened species, the southwestern river otter (*Lontra canadensis sonora*), also no longer occurs there.

Listed as a state species of concern, Colorado roundtail chub (*Gila robusta*) is still extant on the Mancos River in the park. Townsend's big-eared bat (*Corynorhinus townsendii pallescens*) has been detected foraging in the park during summer. Neither of these species are directly impacted by trespassing livestock. The National Park Service would avoid these species and their habitats when putting baited pens in place. To that end, the National Park Service would conduct surveys before putting the pens in place. Similarly, special status wildlife and their habitats would be avoided during construction and repair of the boundary fence.

While livestock would continue to be removed under the No-Action Alternative and fencing would be installed or repaired, these activities have not been effective in preventing livestock from entering the park, as described in **Section 1.1**. As a result, livestock trespassing could continue to indirectly affect special status wildlife species through vegetation trampling, vegetation loss, and nonnative species introduction and spread; however, it is not known to what extent these impacts are occurring or affecting the special status species in **Table 1-3**.

In contrast, implementing a comprehensive, continuous program to remove livestock under the Preferred Alternative would likely be more effective, compared with the No-Action Alternative, under which livestock would be removed periodically and opportunistically. As a result, impacts from vegetation trampling, vegetation loss, and nonnative species introduction and spread would be reduced as livestock are removed. Reduced impacts from livestock could contribute to improved habitat conditions for special status wildlife in the park over time.

CHAPTER 2: ALTERNATIVES

Two alternatives, including a No-Action Alternative, are carried forward for evaluation in this EA. Several suggestions and other methods for livestock removal were considered and dismissed (see **Section 2.3**). No livestock are proposed to be removed in Mesa Verde Wilderness.

2.1 ALTERNATIVES CARRIED FORWARD FOR ANALYSIS

2.1.1 Alternative A—No-Action (Current Management)

Mesa Verde National Park would continue to maintain boundary fences, to haze trespass livestock, and to periodically capture and remove livestock, as resources are available and as necessary (e.g., when they are an immediate threat to human life, safety, and park resources). Under this alternative, Mesa Verde National Park would not be fully discharging its duties under 36 CFR, Subpart 2.60, by not consistently removing trespassing livestock. Under Alternative A, the recruitment rate of livestock is expected to be faster than the rate of removal; therefore, livestock populations would grow in the long term and the park would continue to be out of compliance with NPS policies and regulations.

Long-Term Exclusion

Fencing—The National Park Service would maintain boundary fences and continue to exclude livestock from artificial water sources, such as the ice machines at Far View Lodge, tertiary treatment discharges from park waste water systems, and water system leaks. They could be excluded from natural water sources where it is feasible and does not restrict water access to wildlife. Livestock would be excluded from natural water sources only during trapping. Under such a circumstance, water would be used as bait in a pen trap that trespass livestock have access to.

Boundary fence areas that have a history of or potential for livestock crossing into the park would continue to be replaced. Prioritization of fence replacements is depicted on **Figure 2-1**. Fence replacement is prioritized where fence sections are failing, where livestock have crossed, due to fence condition, or where the terrain is rugged and fences are more likely to fail. High priority fence replacement areas would be replaced before medium priority areas; low priority areas would be replaced last. Any fences along the Mesa Verde Wilderness are within the low priority fence replacement zone. A minimum requirements analysis would be performed on those fence replacements, based on the Minimum Requirement Decision Guide.

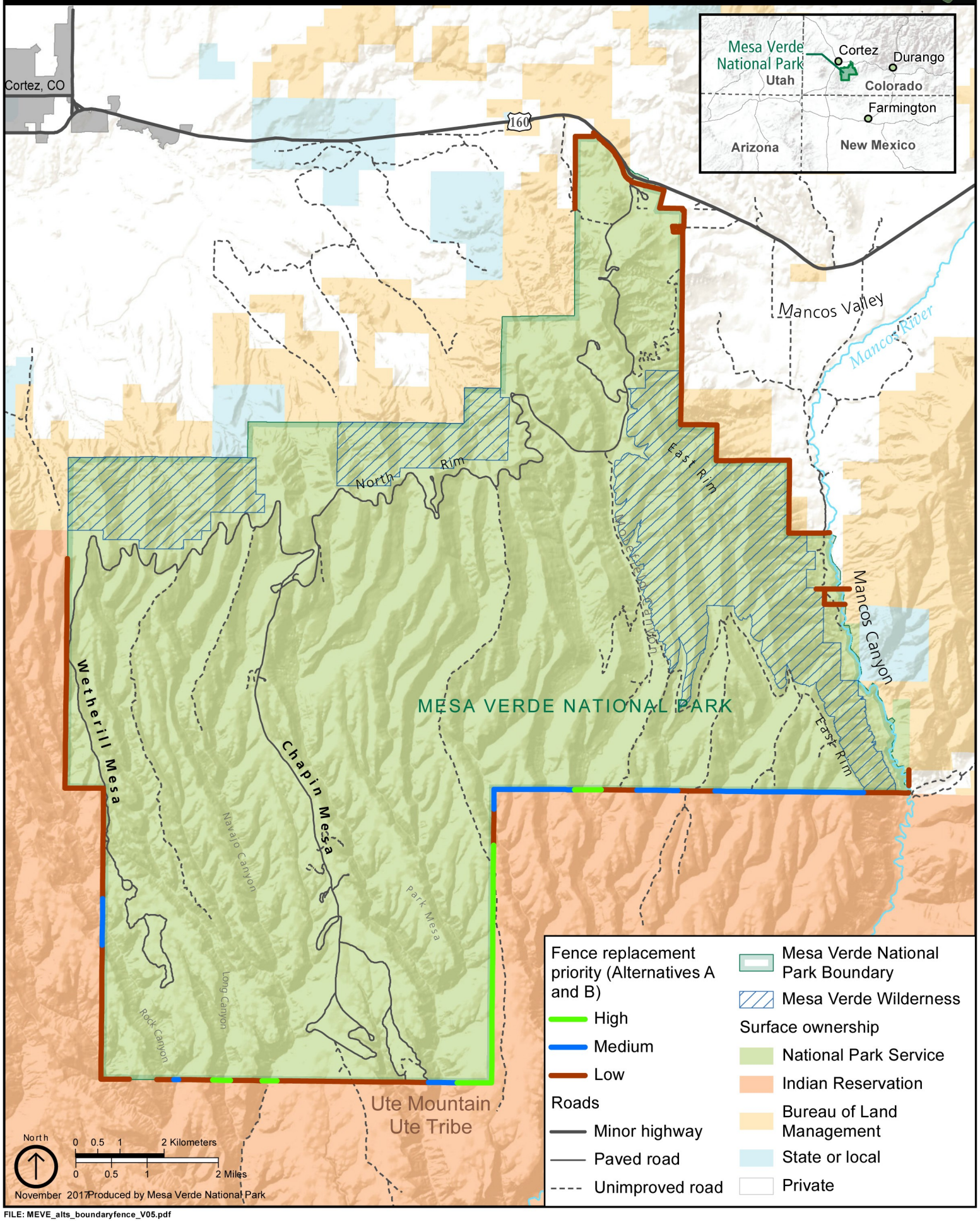
New fences have already been installed on several miles of the boundary; this has proven highly effective in allowing wildlife to safely pass and in preventing livestock from entering the park.

The National Park Service would replace additional fences using a 66-inch-tall, high-tensile, woven fence, which is less susceptible to damage by livestock than traditional five-strand barbed wire fences. It would be supported alternately by T-posts and heavy-duty U-channel sign posts. To facilitate safe movement of wildlife, the bottom of the fence would be 18 inches above the ground; H-braces would be 42 inches high and spaced every 200 feet (see **Appendix A**, photos 1 and 2). New post holes would be dug by pounding fence posts, drilling holes in rock, and using a post-hole digger.

Mesa Verde National Park

Figure 2-1, Proposed Boundary Fence Replacement

National Park Service
U.S. Department of the Interior



FILE: MEVE_alts_boundaryfence_V05.pdf

Access for replacing and maintaining fences would be along park roads, trails, and fence lines. Mesa Verde National Park would use UTVs, full-size trucks and trailers, a helicopter, and pack animals to transport fencing supplies to staging areas on the MVNP side of the boundary. Based on fence segment project size, the number of motorized vehicles or pack horses used would vary from one to three UTVs, one to three full-size trucks and trailers, two to twelve pack animals, one helicopter, or all four methods.

Fences are inspected and maintained annually from late April to late October. One to two fence replacement projects are expected each year until the fence segments that have a history or a potential for livestock crossing are replaced. Depending on available funding, Mesa Verde National Park expects that the fences in problem areas and known livestock entry routes could take up to 10 years to replace. The fence segments are expected to last at least 20 years before they need replacement.

Because many sections of the fence are overgrown with vegetation, such activities as boundary posting and fence maintenance, construction, or replacement would require some vegetation to be trimmed or cut back. The National Park Service would mostly use power hand tools (chainsaws) and hand tools (saws and loppers); however, all methods identified in the 2015 Invasive Plant Management Plan (NPS 2015b) could be used. Mesa Verde National Park proposes to trim vegetation to a maximum distance of 5 feet on each side of the boundary. This would be done to facilitate posting, fence removal, and new fence installation. Fence work on the outside of the park boundary would be coordinated and cleared with each neighbor. Mesa Verde National Park would monitor the new boundary fence's effectiveness by use of remote cameras and field inspections.

Hazing—Hazing, or aversive conditioning, is a nonlethal technique used to alter an animal's behavior by presenting noxious stimuli. An example is shouting at the animal when it is engaged in an undesirable behavior or is in an undesirable location. In Mesa Verde National Park, this technique would continue to be used to protect humans and facilities or to protect cultural and natural resources from trespassing livestock.

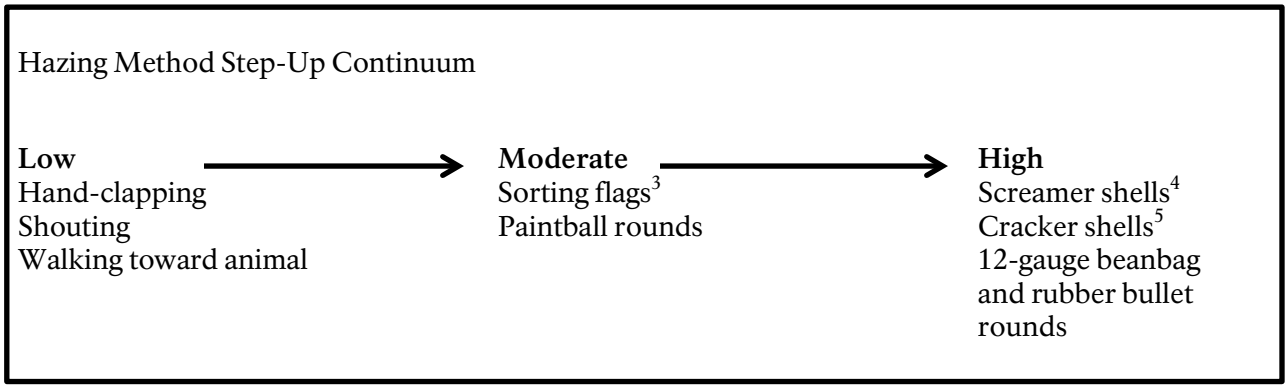
Hazing methods would range in intensity and would involve noise, human presence, or a combination thereof. In general, MVNP staff would use the lowest level method necessary, such as hand-clapping and shouting, but they would proceed to the next level, as needed, until the livestock threat has been eliminated.

To ensure human safety, proper hazing would require an awareness of the situation and knowledge of animal behavior and the appropriate technique. Only trained MVNP staff would be allowed to haze trespassing livestock. They could use the tools shown in **Graphic 2-1**.

Long-Term Removal (Minimum of 3 Years) and Post-Removal Livestock Disposal

The National Park Service initiates the livestock removal process by performing reconnaissance surveys using helicopters or horses. During these surveys, herds of trespass livestock are located and assessed for ownership identification (branding or other identifying markers). If the owners of the trespass livestock are known or suspected, they would be notified, following these surveys. At this time, the owners would be allowed to remove their livestock using preferred methods approved by the National Park Service. If they do not remove the livestock within 5 days, MVNP staff or

Graphic 2-1. Hazing Methods



[3] Brightly colored flags attached to the end of a whip that are used to scare or herd animals.
[4] Blank ammunition that is shot from a pistol that makes a siren like sound as it flies.
[5] Nonlethal shells fired from a single-barrel shotgun that create a loud noise intended to scare animals away.

contractors would capture the livestock and place them in the park's temporary baited pen trap sites until disposal, consistent with 36 CFR, Subpart 2.60.

Following the surveys and notification of local owners, the National Park Service would perform opportunistic removal in locations frequented by livestock. The National Park Service would use a variety of techniques to capture livestock, such as baited pen trapping, wrangler roundup, or restraint, such as with lariats, ropes, chutes, and corrals.

Baited Pen Trapping—**Figure 2-2** shows the location of existing baited pen trap sites, in relation to the current geographic range of trespass livestock in Mesa Verde National Park. **Figure 2-3**, Alternative A Baited Pen Trap Sites, shows a Google Earth photo of the sites. The baited pen traps could be placed in different areas within the sites, based on herd locations and site-specific conditions during removal.

Acreages of existing trap sites are provided in **Table 2-1**, below.

Table 2-1
Acreages of Existing Baited Pen Trap Sites and Vehicle Turnaround Areas

Site Name	Area (Acres)*
Morefield Spring	0.2
Chapin Mesa Quarry Road	0.3
Total area	**0.5**

Source: NPS GIS 2017

* Rounded to tenth of an acre

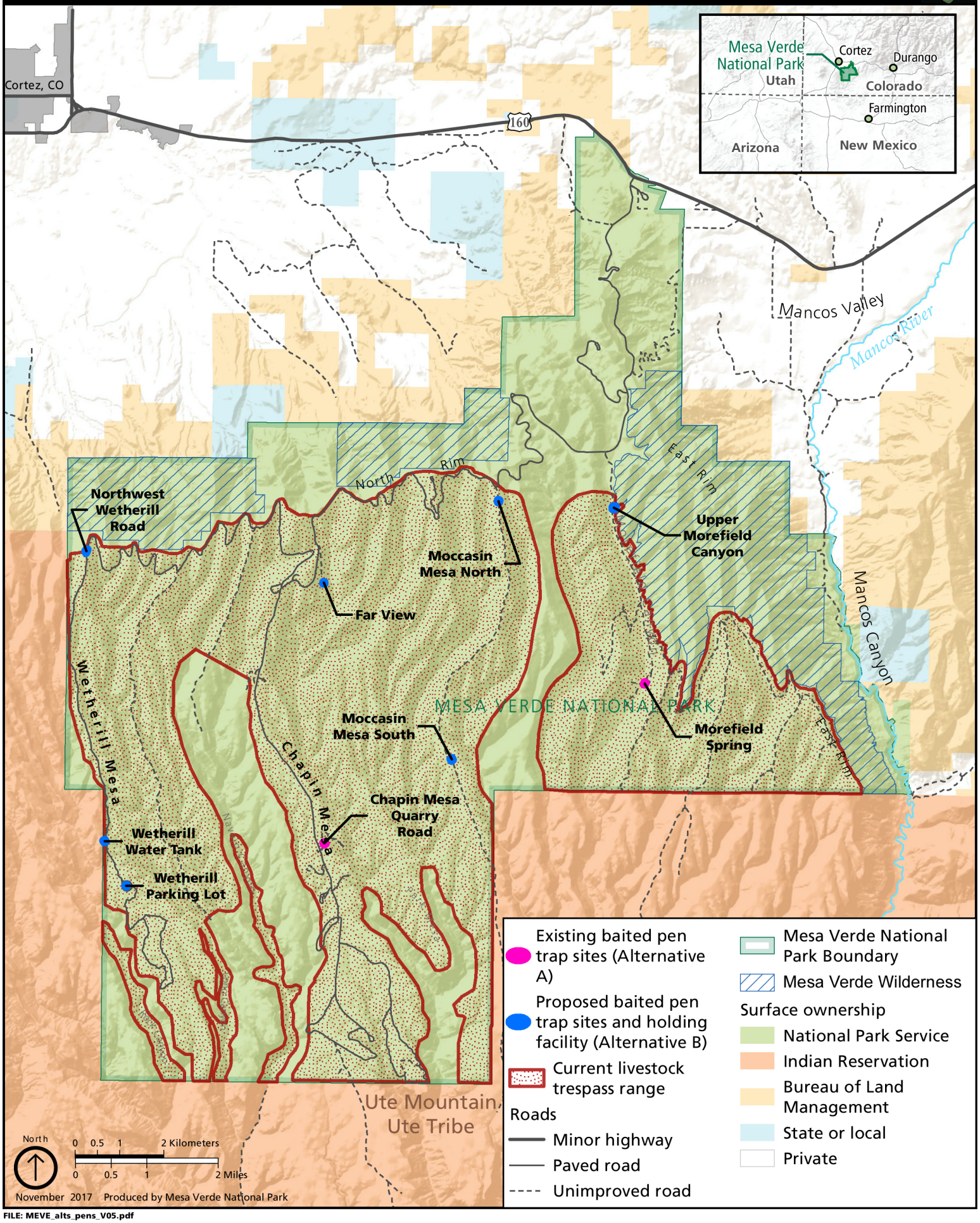
Baited pen traps would be constructed using 6-foot-high metal livestock corral panels to create a temporary circular pen of approximately 0.05 to 0.1 acres[5] (see **Appendix A**, photos 3 and 4). The pen would be capable of holding up to 15 animals at a time. The traps would also have an alley

[5] These pens would be placed somewhere on the footprint for each trap site, shown in **Table 2-1**.

Mesa Verde National Park

Figure 2-2, Existing and Proposed Capture Locations and Livestock Trespass Range

National Park Service
U.S. Department of the Interior



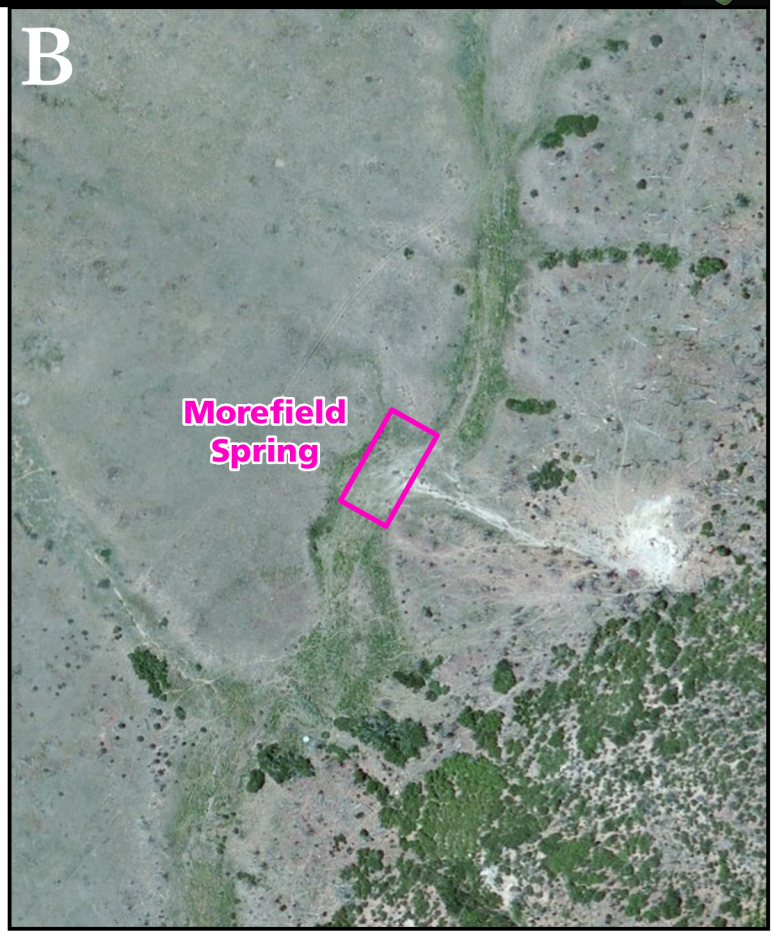
November 2017 Produced by Mesa Verde National Park

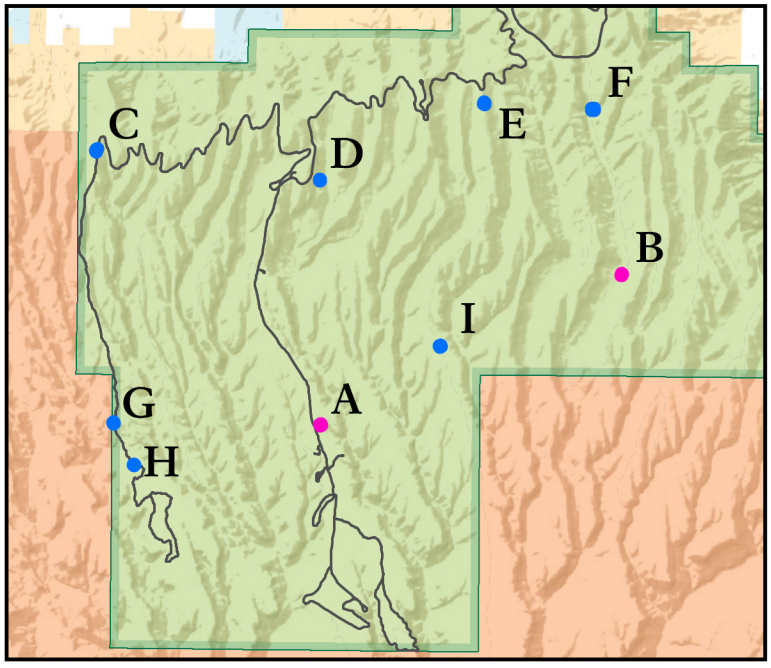
FILE: MEVE_alts_pens_V05.pdf

Mesa Verde National Park

Figure 2-3, Alternative A Baited Pen Trap Sites

National Park Service
U.S. Department of the Interior





Existing baited pen trap sites (Alternative A)

Mesa Verde National Park Boundary

North

0 50 100 200 Meters

0 150 300 600 Feet

September 2017 Produced by Mesa Verde National Park

FILE: MEVE_alts_pens_AltA_V04.pdf

attached for loading captured livestock onto trailers. All existing baited pen trap sites are near roads. During the initial setup, game cameras would be placed on each trap to help monitor trespass livestock and to determine when to begin capturing them.

A combination of habituation and bait would be used to trap livestock. Habituation is a form of learning in which an animal decreases or ceases responding to a stimulus after repeated exposure. Habituation to corral panels and eventually to a pen trap and bait could be considered a positive aspect that enables the capture of trespassing livestock.

Baited pen capture sites may be baited in advance, with water, feed, or mineral supplements, to habituate and restrict livestock to the capture area and pen. Baiting the trap would require a vehicle and staff to visit the trap once or twice per week to ensure that the trap remains pre-baited before it is set and ready to be used.

Livestock may be restricted from natural or artificial water sources next to capture sites to force them to the water at the bait station. Water restrictions would involve temporarily placing livestock panels around the water sources for up to 48 hours. These restrictions would be designed to allow wildlife access to the natural or artificial water sources, such as raised off the ground to allow small wildlife access and low enough for larger wildlife to jump over. Water would be restored if targeted livestock are not using the baited water and are in distress.

The traps would be left open to allow livestock to move freely through them until they are habituated, at which time the traps would be set. Once set, the door on the trap would be a triggered by a spring, would be equipped with a self-latching gate and trip wire, or would have a one-way gate constructed of polyvinyl chloride pipes (see **Appendix A**, photos 5 and 6). Project staff would check the trap daily. Livestock would not be held in a capture pen for more than 24 hours without water. Water would be supplied by a water truck, would be provided while they are in the pen. Trapping could occur for 1 to 6 weeks at any one time but could occur several times during the year.

The Morefield Spring baited pen trap site would be used only when the area is clear of snow, between May and November. This is because snow coverage may prevent access. The proximity of the Chapin Mesa Quarry Road trap site to the paved park entrance road may allow for year-round trapping at this location.

Roundup (Herding)—Depending on the success of pen trapping, a roundup and herding capture method could also be used. Using wranglers on horseback, these roundups would make use of park staff, contractors, park partners, and volunteers.

During a wrangler roundup, wranglers on horseback or in UTVs would herd or rope livestock in the backcountry and front country. They would bring the captured livestock directly to a baited pen trap site or to a livestock trailer next to a road or in a parking lot, which they would use to transport the livestock to the baited pen trap site. As part of the roundup, dogs trained to herd cattle may be used to push cattle out of dense vegetation or steep terrain.

Wrangler drives could occur any time of the year and once or multiple times in any given year. If a mother and her young are separated during capture and the animal not caught cannot be captured,

the animal captured would be released to be reunited with its mother or young and targeted for capture in the future.

Chemical sedation would be used to assist wranglers in gathering and capturing trespass cattle, as cattle are easier to manage while sedated. Using this method, wranglers would select cattle to be darted (intramuscular injection) with a veterinarian-recommended dose of sedative, using a rifle/dart drug delivery system to achieve light sedation and a state of calm. The purpose for this method is to lower the stress level of cattle as they are herded and handled by wranglers through narrow, rugged terrain and led to a temporary holding pen (baited pen trap site) or livestock trailer. This technique could be used anywhere in the park where wranglers could ride horses.

Mesa Verde National Park would suspend gather and capture operations if an unsafe condition exists for livestock or staff, or if weather impedes operations.

Restraint—Ropes may be used to restrain, capture, and hold livestock before moving them to a trailer or holding pen (baited pen trap site).

Mandatory Temporary Holding (Branded Livestock)—Mandatory holding would be managed consistent with 36 CFR, Subpart 2.60, at each baited trap site. If the notified owner is known, Mesa Verde National Park would provide prompt notice of impoundment; if the owner fails to remove the impounded livestock within 5 days of notice delivery, Mesa Verde National Park may dispose of the livestock by public or private sale, auction, adoption, or donation on-site, with the National Park Service issuing a bill of sale. Claimants may redeem the livestock by submitting proof of ownership and paying all expenses incurred by Mesa Verde National Park for capture, feeding, and impoundment.

A continuous supply of fresh clean water would be provided for captured livestock, at a minimum rate of 10 gallons per animal per day. Animals held for 10 hours or more in the traps or holding facilities would be provided with good quality, certified weed-free hay, at the rate of no less than 2 pounds per 100 pounds of estimated body weight per day.

Mandatory Temporary Holding (Unbranded Livestock)—Mandatory holding of unbranded livestock would also be managed consistent with 36 CFR, Subpart 2.60, at each baited trap site. If the owner is unknown, the livestock would not be disposed of until at least 15 days after the notice of impoundment is published in a newspaper of Montezuma County, Colorado, where the trespassing occurs. Livestock may be kept for up to 30 days. The unclaimed livestock would then be offered by public or private sale, auction, adoption, or donation on-site, with the National Park Service issuing a bill of sale.

A continuous supply of fresh clean water would be provided for captured livestock, at a minimum rate of 10 gallons per animal per day. Animals held for 10 hours or more in the traps or holding facilities would be provided with good quality, certified weed-free hay, at the rate of no less than 2 pounds per 100 pounds of estimated body weight per day.

Euthanasia—Euthanasia may be an effective tool in instances of injured or sick animals. Euthanasia would allow park staff or contractors to humanely address situations where unnecessary pain and suffering would otherwise result. To ensure humane, long-term care of captured livestock, Mesa

Verde National Park would periodically evaluate their condition to provide for their well-being. These evaluations may, at times, result in euthanasia.

Decisions to euthanize would require that Mesa Verde National Park evaluate individuals affected by injury, physical defect, chronic or incurable disease, poor condition, or old age. In determining whether to use euthanasia, Mesa Verde National Park would consider the animal's ability to survive the stress of removal and its probability of surviving mandatory temporary holding and placement for on-site adoption, on-site sale, or long-term holding.

Final decisions regarding euthanasia of an animal would be made by a qualified park officer designated by the MVNP Superintendent. There would be cases where this decision must be made in the field and cannot always be anticipated.

Mesa Verde National Park would administer accepted and appropriate euthanasia techniques in a manner that adheres to humane standards and is in accordance with NPS policies and American Veterinary Medical Association (AVMA) Guidelines on Euthanasia (AVMA 2013). MVNP personnel would be properly trained in euthanasia techniques. When necessary, captured livestock would be euthanized by a veterinarian or other trained individual approved by the MVNP Authorized Officer. When the selected euthanasia technique involves injecting chemical agents or substances, a licensed NPS veterinarian would approve the agent used and would supervise the action.

The MVNP Superintendent would authorize the euthanasia of an animal when any of the following conditions exist:

- animal displays a hopeless prognosis for life
- animal is affected by a chronic or incurable disease, injury, lameness, or serious physical defect that would not allow it to maintain an acceptable quality of life for the foreseeable future
- animal would require continuous treatment for the relief of pain and suffering in a domestic setting
- animal is incapable of maintaining a Henneke body condition score[6] greater than or equal to 3, in its present environment
- a federal or state animal health official orders the humane destruction of an animal that poses a threat to human safety as a disease control measure
- animal exhibits unusually dangerous characteristics beyond those inherently associated with feral livestock

Mesa Verde National Park would keep a record to document that euthanasia was performed and would provide the reasons for the euthanasia. The remains of captured livestock would be disposed of in accordance with federal, state, or local sanitation laws; remains would not be sold or transferred.

[6] The Henneke Scoring System is a scientific method for evaluating a horse's body condition, regardless of breed, body type, sex, or age. It was developed by Henneke et al. (1983) at Texas A&M University, with the goal of creating a universal scale to assess horses' body weights. Scores range from 1 to 9, with 1 being low (poor) and 9 being extremely fat (obese).

2.1.2 Alternative B—Preferred Alternative

Alternative B would use a proactive program to capture and remove trespass livestock from MVNP. It would include a two-phased approach through a short-term (1 to 2 years) and long-term removal process, followed by disposal.

Long-Term Exclusion. Fence replacement and hazing under Alternative B would be the same as under Alternative A.

Short-Term Removal (Year 0 to Year 2). The objective of this plan is to reduce livestock by at least 50% in Year 1 and at least 80% (total) in Year 2. In other words, after Year 2, there would be up to 20% of the original livestock remaining.

The National Park Service would use a variety of techniques to capture livestock. They may be removed via baited pen trapping, wrangler roundup and capture, or restraint via lariats, ropes, and chutes (similar to Alternative A). Under the Preferred Alternative, however, up to six additional baited pen trap sites could be used, along with a holding facility divided into corrals. **Figure 2-1** shows the location of existing and proposed baited pen trap sites in relation to the livestock presence in the park. It also shows the proposed holding facility at Upper Morefield Canyon. **Figure 2-4** shows detailed views of the proposed baited pen trap sites, along with the Upper Morefield Canyon Holding Facility. The National Park Service developed the list of proposed baited pen trap sites and the holding facility using a constraints analysis of possible resources impacted.

The National Park Service conducted the constraint analysis in a GIS environment, using the resource and operational issues identified during internal and public scoping. The model spatially delineated locations for baited pen traps with no or minimal resource impacts, such as previously disturbed areas that could also be accessed via motor vehicle to transport captured livestock. The National Park Service conducted site visits to the proposed baited pen trap sites to confirm site-specific conditions and validate the constraint analysis results.

Acreages of existing and proposed capture facilities under Alternative B are provided in **Table 2-2**, below.

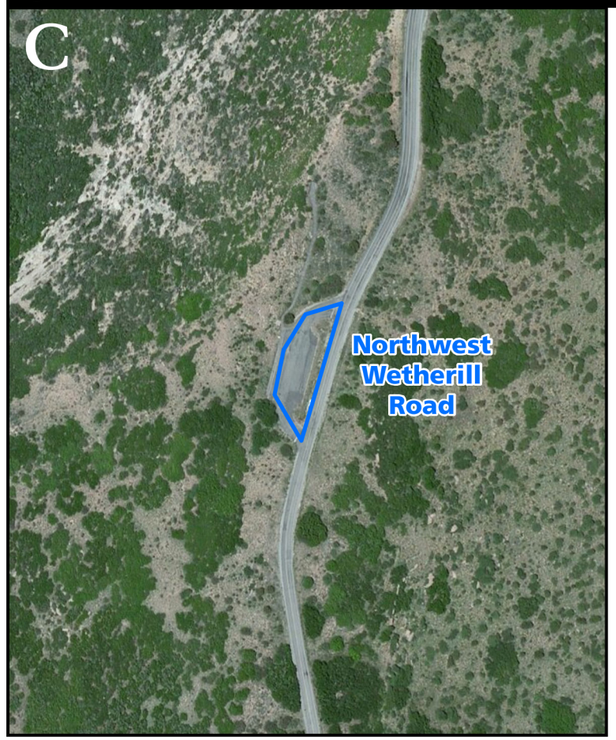
Baited Pen Trapping—Mesa Verde National Park would use baited pen trapping as the primary capture method during the first 2 years at Morefield Spring, Chapin Mesa, Wetherill Mesa, Far View wastewater lagoons, and Moccasin Mesa. The approach to capturing trespass livestock through baited pen trapping would be similar to that under Alternative A. A Judas horse, tamed and trained to lure trespassing horses into a pen or corral, could also be used.

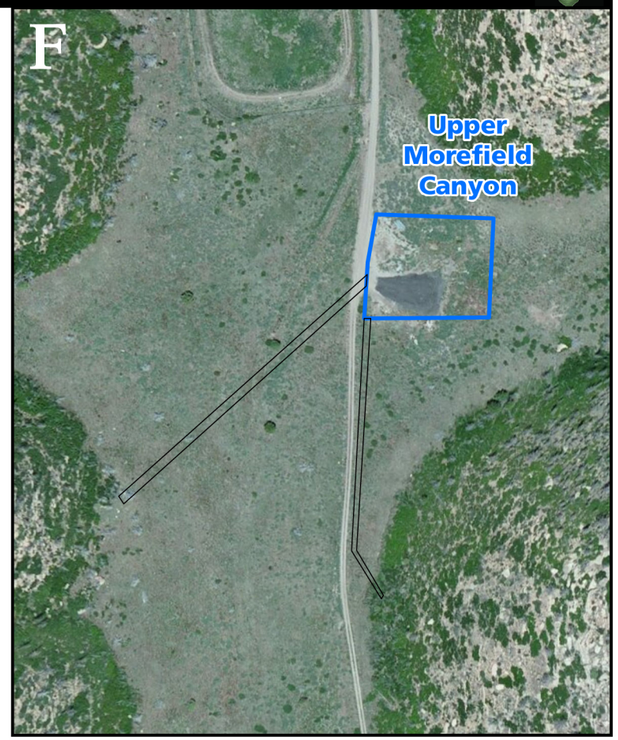
Once captured, the livestock would be loaded within 24 hours onto a stock trailer (up to 24 feet long) and transported to a central holding facility in a previously disturbed MVNP location (see **Figure 2-3**). The truck and trailer would be used to drive to the trap site up to five times during the trapping period to remove captured livestock. A chute would be used to load livestock into a stock trailer. A veterinarian would examine the animals and administer vaccinations as needed.

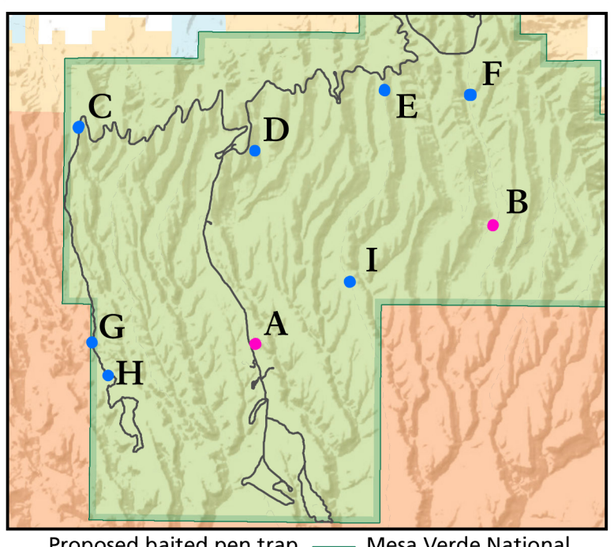
Mesa Verde National Park

Figure 2-4, Alternative B Baited Pen Trap Sites and Holding Facility

National Park Service
U.S. Department of the Interior







Proposed baited pen trap sites and holding facility (Alternative B)

Mesa Verde National Park Boundary

Proposed drift fence (Alternative B)

North

0 50 100 200 Meters

0 150 300 600 Feet

September 2017

Produced by Mesa Verde National Park

FILE: MEVE_alts_pens_AltB_V04.pdf

This page intentionally left blank.

Table 2-2
Estimated Acreages of Capture Facilities and Vehicle Turnaround Areas

Site Name	Type*	Area (Acres)**
Morefield Spring	Existing baited pen trap	0.2
Chapin Mesa Quarry Road	Existing baited pen trap	0.3
Moccasin Mesa North	Proposed baited pen trap	0.3
Moccasin Mesa South	Proposed baited pen trap	0.3
Far View	Proposed baited pen trap	0.1
Northwest Wetherill Road	Proposed baited pen trap	0.3
Wetherill Water Tank	Proposed baited pen trap	0.2
Wetherill Tank East and West Fences	Proposed drift fence	0.1
Wetherill Parking Lot	Proposed baited pen trap	0.2
Upper Morefield Canyon Fences	Proposed drift fence	0.3
Upper Morefield Canyon	Proposed holding facility	0.8
Total area		**3.1**

Source: NPS GIS 2017

*The drift fences would be installed at the Upper Morefield Canyon holding facility or the Wetherill Tank pen for the duration of the proposed roundup; they would be removed after these activities are completed.
**Rounded to a tenth of an acre

After livestock have been removed from an area, wildlife-friendly fences, with the high-tensile, woven design described in Alternative A, would be installed around water sources to prevent livestock from recolonizing the area. A remote camera would be used to determine if livestock are still in the area. Water would be restored if livestock are still in the area and are in distress.

Roundup (Herding)—Similar to Alternative A, a roundup and herding capture method could also be used during Year 2. In addition to wranglers on horseback, drift fences would be used,[7] as appropriate, to funnel livestock toward and into temporary traps. Drift fences consist of T-posts driven into the ground approximately every 15 feet to support the fence barrier. The fence barrier would be soft material, such as burlap or deer fencing. Drift fencing would extend up to 200 yards on each side of the pen to direct livestock into the holding pen. A Judas horse may be used during roundups, as described under Bait Pen Trapping, above.

Chemical sedation would be used on trespass cattle as identified under Alternative A.

Restraint— Restraint methods would be used as described under Alternative A.

Chemical Immobilization —Chemical immobilization would be used to remove livestock when it is the most effective and safest means of removal. The livestock would be darted (intramuscular injection) in the field or aerially with a veterinarian-recommended dose of anesthesia drugs, using a rifle/dart drug delivery system to achieve immobilization. All personnel conducting chemical immobilization would be trained in chemical capture procedures. In such cases, veterinary staff or biologists would oversee captured animal recovery. The livestock would then be transported to the park holding facility. Anesthetized livestock would be monitored by trained personnel and would be moved to designated holding facilities in the park using trucks, UTVs and trailer or sled, or by helicopter;

[7] A temporary, continuous section of fence used to control animal movement.

depending on terrain and location. Trespass horses that are chemically immobilized would not be moved by helicopter.

As under Alternative A, Mesa Verde National Park would suspend gather and capture operations if an unsafe condition exists for livestock or staff, or if weather impedes operations under Alternative B.

Mandatory Temporary Holding (Branded and Unbranded Livestock). Temporary holding would occur similar to Alternative A; however, trespass livestock would be moved to a larger, separate holding facility (see **Appendix A**, Photos 7 and 8), as opposed to the baited pen trap sites. Holding all of the trespass livestock in a single holding facility opens up the trap sites for repeated use.

A minimum of 100 square feet would be provided per animal in temporary holding pens. Family groups would be kept together during temporary holding unless safety is an issue. Animals would then be sorted according to age, number, size, temperament, gender, and condition when in the central holding facility. This would be done to minimize, to the extent possible, injury due to fighting and trampling. Alternate pens in the holding facility would be used to separate branded livestock from unbranded livestock. They also would be used to separate out young animals and their mothers and sick and injured animals from other animals.

Mesa Verde National Park may restrain animals to determine age or gender or for other necessary procedures. Electric prods would not be routinely used; however, they could be used as a last resort, when livestock or humans are in jeopardy or when other aids have been tried and are not working.

A continuous supply of fresh clean water would be provided for captured livestock at a minimum rate of 10 gallons per animal per day. Animals held for 10 hours or more in the traps or holding facilities would be provided with good quality, certified weed-free hay at the rate of no less than 2 pounds per 100 pounds of estimated body weight per day.

At the central holding facility, a veterinarian would examine each load of livestock and would provide recommendations to MVNP staff regarding care, treatment, and, if necessary, euthanasia of the recently captured livestock.

Only horse or stock trailers with a covered top would be allowed for transporting animals from trap sites to temporary holding facilities and from temporary holding facilities to their new destinations. The floors of horse and stock trailers and loading chutes would be covered and maintained with wood shavings or other nonslip material to protect the animals.

Euthanasia—Any decisions regarding euthanasia of an animal would be approached the same as identified under Alternative A.

Long-Term Removal (Minimum of 3 years) and Post-Removal Livestock Disposal. Under Alternative B, livestock would be removed and disposed of similar to Alternative A. After the second year of baited pen trapping, if the 80% removal objective is not met, the National Park Service would consider the use of helicopters, in addition to the baited pens, to round up the remaining trespass livestock. Helicopters are an effective method to assist in livestock removal (Hansen and Mosley 2000; Cattoor 2017). They may be used to drive livestock by hovering over them at a distance safe

enough not to endanger them and direct them to a desired area. Helicopters could be considered for use for roundups after Year 2 if capture and removal methods such as baited pen trapping and wrangler rounds ups fail to substantially meet the 80% removal objective. Even then, use of helicopters for roundups would be limited by helicopter and funding availability. The use of baited pen traps and the helicopter roundups would continue after Year 2.

To protect young animals, they would be rounded up by helicopter only when they are at least 4 months old, unless there are no young animals in the band or herd targeted for capture. If a mother and her young are separated during capture and the animal not caught cannot be captured, the animal captured would be released to be reunited with its mother or young and targeted for capture in the future.

Following livestock removal, the National Park Service would dispose of trespass livestock the same as under Alternative A with the possible consideration of lethal reduction.

Lethal Reduction—To meet the need for the action, Mesa Verde National Park's long-term objective is to remove all remaining livestock. It would use lethal reduction when there is an imminent safety hazard to humans. If there is no eminent safety hazard, a branding determination would occur on remaining livestock that persistently evades capture and removal by the other methods proposed followed by the notification process described above. If the notification process does not receive claims on the remaining livestock, only then would the National Park Service consider proceeding with lethal reduction. Mesa Verde National Park is authorized by both 54 United States Code (USC), Section 100752, and NPS policy to lethally reduce unclaimed livestock in the park to protect park values and resources. In addition, NPS management policies allow for exotic animal species to be eradicated. This would be done if control were prudent and feasible and the exotic species were interfering with natural processes, were disrupting the cultural landscape, were damaging cultural resources, or were significantly hampering management of park lands (see NPS Management Policies [2006], Section 4.4.4.2).

Lethal reduction to remove livestock would be done by qualified NPS personnel, using firearms and lead-free ammunition from a helicopter or on the ground. They would leave the carcass to naturally decompose. Livestock deemed a safety hazard to humans would be dispatched in the same manner, but the situation may require that the carcass be transported to another park location for natural decomposition.

In cases of euthanasia or lethal reduction for injured or sick livestock, NPS personnel would strictly adhere to American Veterinary Medical Association Guidelines on Euthanasia (AVMA 2013).

Alternative B Partnership Option—All Phases of Removal. An option under Alternative B is for Mesa Verde National Park to collaborate with interested livestock advocacy groups (potential partnering organizations), which would advertise the sale of livestock through their networks of stakeholders and would identify potential buyers and homes for captured livestock. In particular, this would be the case for unclaimed horses. The livestock would be held in the park for up to 30 days. If after 30 days the partnering organization has not found a home placement for an animal, Mesa Verde National Park would dispose of it in accordance with 36 CFR, Subpart 2.60.

If partnering organizations commit to collaborating on the placement of captured livestock, Mesa Verde National Park would deliver the livestock to a central holding facility in the park for a period not to exceed 1 month or other agreed on holding period. Then the partnering organizations would transfer the animals to recipients by on-site sale, auction, or donation.

Mesa Verde National Park would allow the partnering organization's personnel to access the holding facility for veterinary care, feeding and watering, handling, preparing animals for transfer to recipients, and loading animals into recipient trailers. Personnel would be authorized to provide veterinary care, feed, and water for captured livestock only after receiving training from NPS veterinarians or park biologists. This includes volunteers, contractors, or other park staff who are not part of the park biologist staff.

The National Park Service or contract veterinarians and park biologists would ensure proper care and would oversee captured livestock. Volunteers would sign an NPS volunteer agreement stating their roles and responsibilities. Any contract veterinarians or wranglers would be required to follow established operating procedures in their contract for capturing and handling livestock, as described by park biologists or NPS veterinarians.

Before placing animals, the partnering organizations would establish, through promotion and advertising, a network of qualified prospective owners. Captured livestock would be placed by the partnering organization through direct on-site sale, donation, bids, or auctions. Partnering organizations would be responsible for providing training to ensure the placement of individual animals. A memorandum of understanding would be created by the National Park Service and partnering organizations defining roles and responsibilities of both parties.

2.2 MITIGATION MEASURES

The mitigation measures below apply to both Alternatives A and B.

An MVNP archaeologist, ecologist, and biologist would advise on identifying, avoiding, or minimizing potential physical impacts on cultural resources and natural resources. This would transpire before removing livestock, siting temporary traps or central holding facilities, or installing or repairing fences with the potential to affect archaeological resources, historic resources, or natural resources. This would be done to ensure that work would not adversely affect archaeological, vegetation, and wildlife resources. If disturbance is unavoidable, mitigation measures developed with the concurrence of the SHPO would be implemented.

Siting temporary corrals and central holding facilities would avoid archaeological sites and historic resources eligible for listing on or listed on the NRHP. In the event of an inadvertent archaeological discovery, work would stop in the area of discovery, and an archaeologist would be contacted to assess the site. On completion of livestock removal, trap sites would be restored by reseeding and treatment of invasive species as appropriate to prevent invasive plant species infestation.

Livestock removal and fencing crews would receive training to protect any cultural resources and sensitive natural resources encountered. Contracted crews working alone in the backcountry would be required to attend Mesa Verde National Park's backcountry training.

Baited trap pens and the central holding facility would be located to reduce the likelihood of injury and stress to the animals and to minimize potential damage to the natural and cultural resources of the area. These sites would be on or near existing roads and away from public view, when feasible.

To minimize impacts on the Chapin Mesa milkvetch from project activities, the following mitigation measures would be implemented:

- Prior to livestock removal activities in potentially suitable habitat, the park will survey for the presence of Chapin Mesa milkvetch.
- Livestock removal activities in occupied and potentially suitable habitat will occur after August 31st and before March 15th to prevent impacts to actively growing plants.
- Flag existing plants and place baited pen trap and gate away from plants as much as possible.
- Control invasive exotic plants in the baited pen trap and within 300 feet of the surrounding area.
- Plant 50 juniper trees in burned but suitable habitat in an area equal to the size of the baited pen trap with a buffer of 100 feet within the northern range of the species to accelerate tree recovery and improve habitat conditions for the species.
- Collect Chapin Mesa milkvetch (*Astragalus schmolliae*) seeds and plant them with the revegetation seed mixes after project completion. No rhizomatous grasses would be included in seed mix for revegetation.

To minimize impacts on alkalai pepperweed, the park will collect seed from alkalai pepperweed and sow them at the holding facility once livestock activities have completely ceased at the site.

To minimize impacts on Mexican spotted owl from project activities, the following mitigation measures would be implemented:

Roundup (herding)—Wrangler and possibly aerial roundups would occur outside proposed protected activity centers during the March 15–August 31 breeding season. Roundups may occur within the proposed protected activity centers during the breeding season if surveys have shown that there are no active breeding Mexican spotted owls within the project area. If helicopter roundups occur outside the proposed protected activity centers when owls are present, helicopters would remain 300 feet agl while traveling over the proposed protected activity centers.

Fence Replacement—Fence replacement involving any mechanical activities in proposed protected activity centers—such as use of helicopters, vegetation removal using chainsaws or trimmers, pounding equipment or UTVs—would be used outside the Mexican spotted owl breeding season of March 15–August 31, or when surveys conclude there are no Mexican spotted owls within the proposed protected activity centers.

Lethal Reduction—Firearms would be used only for lethal reduction in the proposed protected activity centers outside of the March 15–August 31 breeding season or when surveys show that there are no Mexican spotted owls within the proposed protected activity centers.

Mesa Verde National Park would take precautions to ensure that archaeological resources are not inadvertently damaged during fence installation. Fence replacement would require minor surface disturbance and the placing fence posts that may adversely affect historic properties. The National Park Service would enter into a memorandum of agreement with the SHPO for phased identification and mitigation of any adverse effects that may be associated with fence repair and replacement. A MVNP cultural resource specialist would monitor fence replacement to identify, avoid, or minimize potential physical impacts on cultural resources. Appropriate discovery and mitigation measures would be implemented, as required.

The following mitigations would be implemented on this project:

- During construction, flagging would be installed around cultural and natural avoidance areas to keep UTVs off these sites.
- UTV routes that are clear of cultural or natural resources would be flagged so contractors would know the acceptable routes.
- MVNP cultural resource staff would meet with the contractor's staff before work begins to inform them of federal laws that protect archaeological resources and the consequences of damaging sites or taking artifacts.
- Mesa Verde National Park would provide an archaeological monitor when the contractor is working near 5MV2760 or other known sites.
- In the event of an inadvertent discovery, construction would cease at the site of discovery until the National Park Service has fulfilled the requirements of 36 CFR, Subpart 800.13, including consulting with the Ute Mountain Ute Tribal Historic Preservation Officer (THPO), the SHPO, and interested tribes.

A comparison table of alternative actions and mitigation measures are provided in **Table 2-3**, Livestock Removal Alternatives Comparison.

Table 2-3
Livestock Removal Alternatives Comparison

Alternative A—No-Action (Current Management)	**Alternative B—Preferred Alternative**
• Maintain and replace boundary fences	• Same as Alternative A
• Hazing	• Same as Alternative A
• Pre-removal reconnaissance surveys	• Same as Alternative A
• Owner Notification	• Same as Alternative A
Short-Term Removal	***Short-Term Removal***
• No Similar Action	• Eight Baited Pen Trap Sites, a Holding Facility and could use Judas Horses
• No Similar Action	• Roundup: o Wranglers on Horseback o UTV o Cattle Dogs o Judas Horses o Drift Fences

Table 2-3
Livestock Removal Alternatives Comparison

Alternative A—No-Action (Current Management)	Alternative B—Preferred Alternative
• No Similar Action	• Chemical Immobilization, including sedation of cattle
• No Similar Action	• Restraint
• No Similar Action	• Mandatory holding at the holding facility: o Branded Livestock o Unbranded Livestock
• No Similar Action	• Euthanasia of sick, diseased or injured livestock
Long-Term Removal	***Long-Term Removal***
• Two Baited Pen Trap Sites	• Eight Baited Pen Trap Sites, a Holding Facility and could use Judas Horses
• Roundup: o Wranglers on Horseback o UTV o Cattle Dogs	• Same as Alternative A with the addition of: o Judas Horses o Drift Fences o Helicopters
• Chemical Sedation of Cattle	• Same as Alternative A
• Restraint	• Same as Alternative A
• No Similar Action	• Chemical Immobilization
• Mandatory Holding at Baited Pen Trap sites: o Branded Livestock o Unbranded Livestock	• Same as Alternative A but at the holding facility
• Euthanasia of sick, diseased or injured livestock	• Same as Alternative A
Disposal	***Disposal***
• Post Removal Livestock Disposal in Accordance with 36 CFR, Subpart 2.60.	• Same as Alternative A with the addition of possible consideration of lethal reduction.
Partnership Option	***Partnership Option***
• No Similar Action	• Partnerships
Mitigation	***Mitigation***
• Cultural and Natural Resources Mitigation	• Same as Alternative A

2.3 ALTERNATIVES CONSIDERED AND DISMISSED

The following suggestions and alternative methods for removing livestock were considered but dismissed from further consideration, as described below. These include suggestions from the public during project scoping, as well as from the project planning team.

Do Not Use Firearms as the Primary Method to Remove Livestock. Commenters suggested prohibiting the use of firearms as the primary method to remove livestock. This alternative was dismissed because as described in Alternative B, the National Park Service would prioritize other methods of livestock removal over lethal reduction with a firearm; however, by not having the option to consider using a full range of available tools to remove livestock (including lethal reduction if necessary) the National Park Service would fail to meet the need for the action and would continue to fail to comply with 36 CFR, Subpart 2.60.

Use of Firearms as the Primary Method to Remove Livestock. Mesa Verde National Park received comments that the National Park Service should use lethal reduction with a firearm as the primary method to remove trespassing livestock, particularly horses, in the park. While it is in the National Park Service's authority to use lethal means to remove animals (54 USC, Section 100752), it is also obligated to first try to find the owners of trespassing livestock. In accordance with 36 CFR, Subpart 2.60, the National Park Service must notify the owner if known and, if not, to notify the public and hold the livestock for 5 to at least 15 days from the date of notice of impoundment. This is done to identify and return the livestock to the original owners and obtain compensation for the National Park Service's expenses for capturing, feeding, and impounding livestock and for returning the livestock to its owners.

Directly reducing trespassing livestock by lethal means has been retained as a final resort option. It would be used when there is an imminent safety hazard to humans or if all other proposed capture and removal methods had failed. The National Park Service also understands the concerns raised by other public commenters on the welfare and safety of the trespassing livestock. The National Park Service has been contacted by several groups whose members are interested in working with the park to adopt or place the trespassing horses in sanctuaries, as opposed to selling or lethally removing them. The National Park Service has brought this forward as an option under Alternative B.

Transfer Livestock to Other Federal Units. Several commenters suggested transferring livestock to other NPS units that manage livestock, such as Theodore Roosevelt National Park. The National Park Service dismissed this alternative because Mesa Verde National Park reached out to other NPS, Bureau of Land Management, and United States Forest Service units that manage livestock. None was willing to accept additional livestock; thus, the alternative could not be implemented if it were selected.

Transfer Livestock to Existing Sanctuary. Mesa Verde National Park has been in contact with a local group that may create a sanctuary near the park and has contacted five other existing horse sanctuaries in the area. Three of the five responded that they could not accept additional livestock from the park; the other two have not responded. The sanctuaries that responded are at capacity. One of these sanctuaries indicated if space were to become available, it would only accept animals from an agency that manages horses under the Wild Free-Roaming Horses and Burro Act with which they have an agreement. Other than this potential local effort, the National Park Service is unlikely to identify a willing sanctuary.

Do Not Use Helicopters for Livestock Roundups. Commenters suggested prohibiting the use of helicopters during roundups due to concerns over livestock health. This alternative was dismissed because helicopters are considered an acceptable method used by many federal, state, and tribal agencies to roundup livestock. Helicopters may be employed as a tool for identifying livestock locations and for moving equipment. In specific circumstances, because of the terrain in the park, helicopters may be the only tool available to drive livestock toward traps or holding facilities. Any time an animal is captured, either wild, feral, or domestic, there is a chance of injury when using any method of capture. Project staff would use an established aerial livestock capture protocol to ensure the lowest chance of injury to animals.

Manage Livestock. Public commenters suggested that the National Park Service manage livestock in the park. Comments that fall into this category came from those who explicitly called for managing livestock using only fertility control, those who asked the National Park Service to round up and geld male livestock, those who asked that no livestock be removed, and those who suggested that the National Park Service should maintain the herds living in the park by providing water and veterinary care.

These options were categorized as managing livestock and do not meet the need for the project; this is because Mesa Verde National Park is prohibited by 36 CFR, Subpart 2.60, from managing trespassing livestock. These suggestions were out of scope and therefore were not considered for detailed analysis.

This page intentionally left blank.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment, which includes the existing setting or baseline conditions. It is an analysis of the potential environmental consequences that would occur because of implementing the No-Action Alternative (Alternative A) and the Preferred Alternative (Alternative B). The potential impacts analyzed here are quantified where possible; they are analyzed qualitatively and with best professional judgment where quantitative analysis was not possible. The level of detail and depth of analysis is limited to the minimum needed to determine whether there would be significant environmental effects; therefore, the analysis that follows does not discuss those alternative actions that typically have little potential to cause environmental impacts, such as collaboration and education.

Direct, indirect, and cumulative effects are analyzed for each resource topic carried forward. Potential impacts are described in terms of type, context, duration, and intensity.

3.1 CUMULATIVE IMPACTS SCENARIO

The actions discussed below make up the cumulative impacts scenario.

MVNP Fire Management Plan (in process). This plan proposes to continue suppressing wildland fires and increasing fuels treatments. It would clear or thin vegetation to protect cultural resources, human safety, and park infrastructure. Also proposed is prescribed fire, limited in size and scope, to control fuels and to benefit resources.

MVNP Burned Area Emergency Rehabilitation Plans (1996, 2000, 2002, 2003, future). Management prescriptions are outlined in the plans to prevent sedimentation, rehabilitate vegetation, and prevent conversion of native vegetation to invasive plant species.

MVNP Integrated Pest and Hazardous Wildlife Management Plan (in process). This plan proposes an integrated pest management approach for managing and controlling animal pests and hazardous wildlife.

MVNP Long-Range Interpretive Plan (2014). The implementation of this plan would better inform visitors about the MVNP's resources, features, and facilities.

MVNP Visitor Distribution and Transportation Plan (in process). This plan proposes to distribute park visitors by enhancing the transportation infrastructure and providing alternate modes of transportation, such as hiking and biking. Options being considered are reestablishing the shuttle system on Wetherill Mesa and possibly instituting a transit system on Chapin Mesa. Proposed activities are to construct new hiking trails and biking trails; to develop a transit center, transit vehicle storage, bus stops along the routes, road and parking improvements; and to install additional visitor information kiosks and signs.

Invasive Plant Management Plan (in process). This plan proposes to expand the methods to control invasive plants in Mesa Verde National Park. These include mechanical, chemical, and biological methods. They would be administered by ground-based delivery, such as via backpack and boom sprayers, and some limited aerial applications using fixed-wing aircraft or rotorcraft.

Proposed Horse Sanctuary Near the MVNP (in process). Private interests are proposing to create a horse sanctuary on privately owned lands between the park and the town of Mancos, Colorado. The size and capacity of this sanctuary has not been determined. It is expected that it will accept horses from federal agencies.

3.2 SPECIAL STATUS SPECIES—PLANTS

3.2.1 Affected Environment

Plant species in Mesa Verde National Park are diverse and abundant, reflecting the wide range of Upper Sonoran Life Zone habitat types that are found there. The distribution of species in the park varies by season, elevation, and the variety of habitats.

Per **Table 1-1**, Chapin Mesa milkvetch is ranked critically imperiled in the state of Colorado, Cliff Palace milkvetch is critically imperiled/imperiled, and alkaline pepperweed is imperiled. The Chapin Mesa milkvetch also is a candidate for the federal list of threatened and endangered species. Per **Table 1-2**, Chapin Mesa milkvetch preferred habitat is aeolian mesa topsoil of pinyon-juniper woodlands on Chapin Mesa and a few on Park Mesa and adjoining canyon edges. Livestock trespass range overlaps with 1,825.7 acres of high and low density Chapin Mesa milkvetch habitat.

Cliff Palace milkvetch preferred habitat is sandstone rimrock, shallow sandy soil at mesa edges of the pinyon/juniper woodlands. Livestock trespass range overlaps with 110.1 acres of Cliff Palace milkvetch habitat.

Alkaline pepperweed grows in pinyon-juniper woodland openings and may be associated with Mancos shale. It is also found on arroyo banks and greasewood flats. Livestock trespass range overlaps with 183.7 acres of alkaline pepperweed habitat.

Observations have suggested that Chapin Mesa milkvetch plants suffer some level of herbivory[8] from horses on burned parts of Chapin Mesa during spring when the plants are blooming or developing seed pods. T. Spector of the park staff observed horse trampling of both Cliff Palace milkvetch and Chapin Mesa milkvetch and their habitat in spring 2016. Some of the park's other sensitive plants likely experience small levels of browsing or trampling, mostly from horses.

[8] The eating of plants

3.2.2 Impacts of Alternative A (No-Action Alternative)

There are potential adverse impacts on special status plant species under the No-Action Alternative. The existing Chapin Mesa Quarry Road baited pen trap site is in the Chapin Mesa milkvetch's range. The proposed baited pen location would overlap approximately 0.3 acres of a low-density population area. The site is disturbed and in poor condition. There would be no direct impacts on Cliff Palace milkvetch or alkaline pepperweed populations under Alternative A.

Locating a baited pen trap in Chapin Mesa milkvetch habitat would further degrade the already disturbed habitat and possibly destroy plants on the 0.3 acres. Concentrating livestock activity would have adverse impacts, such as trampling, grazing, and depositing invasive, nonnative plant seeds. This would affect Chapin Mesa milkvetch, both directly, by trampling plants and inhibiting the native seed bank, and indirectly, through soil trampling, reduced habitat quality, and reduced pollinator habitat, in and around the baited trap pen. Impacts would last until at least the next growing season. Impacts are likely to be limited, given that the species occupies 2,000 acres in Mesa Verde National Park and 2,000 acres on the Ute Mountain Ute Tribal Park. The impact of 0.3 acres represents less than 0.01% of the total occupied habitat for the species. The baited pen trap in Chapin Mesa milkvetch habitat would be placed to avoid plants as much as possible, to minimize impacts. If needed to reduce impacts, livestock would be herded in the fall, when the milkvetch exists only as dormant seeds or underground roots.

Wrangler roundups in the park could occur once or twice per year. During these events, livestock and wranglers on horseback could impact Chapin Mesa milkvetch, Cliff Palace milkvetch, and alkaline pepperweed by trampling, and degrading habitat potentially reducing the extent or vigor of populations. This could affect the viability of certain populations and degrade potentially suitable habitat.

While livestock would continue to be removed under Alternative A and fencing would be installed or repaired, these activities have not been effective in preventing livestock from entering the park, as described in **Section 1.1**. As a result, livestock would continue to affect Chapin Mesa milkvetch, Cliff Palace milkvetch, and alkaline pepperweed in the park by trampling and browsing. This could reduce the extent or vigor and could affect the viability of trampled or browsed populations. Impacts would occur throughout the 30,310 acres where livestock trespass. It is not known to what extent this is occurring, but impacts are likely limited due to the localized nature of Chapin Mesa milkvetch, Cliff Palace milkvetch, and alkaline pepperweed populations.

3.2.3 Impacts of Alternative B (Preferred Alternative)

Impacts on the Chapin Mesa milkvetch would be the same as those under Alternative A. The proposed holding pen and drift fences at Upper Morefield Canyon would also overlap approximately 1 acres of alkaline pepperweed habitat under the Preferred Alternative. The location of the holding facility is disturbed and in poor condition.

Locating a baited pen trap in alkaline pepperweed habitat would degrade habitat and possibly destroy plants. Concentrating livestock activity would have impacts, such as trampling, grazing, and depositing invasive, nonnative plant seeds. This would affect alkaline pepperweed both directly, by

trampling plants and inhibiting the native seed bank, and indirectly, through soil trampling, reduced habitat quality, and reduced pollinator habitat, in and around the baited trap pen.

While the total occupied acreage for the species is not known, alkaline pepperweed is known from 15 collections in six Colorado counties and the species may also be present in New Mexico and Utah. Although potentially suitable habitat for alkali pepperweed potentially exists outside of the park there are no recorded occurrences of the species within the action area other than in the park. The proposed activities may have temporary indirect effects to potentially occupied habitat by reducing the abundance and vigor of flowering plants within the park where activities will be taking place thus reducing the availability for genetic exchange for potential populations outside the park. The species has been recorded on 354 acres within the park; thus the proposed direct impacts will be very minor to the population within the action area. The holding facility and drift fence in alkaline pepperweed habitat would be placed to avoid plants as much as possible, to minimize impacts. The holding facility and drift fence in alkaline pepperweed habitat would be placed to avoid plants as much as possible, to minimize impacts. If needed to reduce impacts, livestock would be herded in the fall, when alkali pepperweed is dormant thus avoiding disturbance when plants are flowering or fruiting.

The Wetherill Water tank baited pen trap site would overlap 0.1 acres of Cliff Palace milkvetch habitat which is part of a larger occurrence within and most likely outside the park. Concentrating livestock activity would have impacts, such as trampling, grazing, and depositing invasive, nonnative plant seeds. This would affect Cliff Palace milkvetch, both directly, by trampling plants and inhibiting the native seed bank, and indirectly, through soil trampling, reduced habitat quality, and reduced pollinator habitat, in and around the baited trap pen. Impacts would last until at least the next growing season. Wrangler round-up activities would directly and indirectly impact Cliff Palace milkvetch in the action area by trampling plants, disturbing soils and biological soil crust associated with the species and degrading habitat. These proposed activities within the park may also impact the two known locations and potentially suitable habitat outside the park but within the action area. Degraded habitat and loss of plants could indirectly affect other occurrences by temporarily lessening the potential for genetic exchange through reduced fruiting and flowering.

Implementing a comprehensive, continuous program to remove livestock and prioritize construction and repair of the boundary fence would likely be more effective, compared with Alternative A, under which livestock would be removed periodically and opportunistically. As a result, trampling and browsing impacts on Chapin Mesa milkvetch, Cliff Palace milkvetch, and alkaline pepperweed populations in the park would be reduced as livestock are removed; however, impacts will continue if the target or goal is not achieved or if new trespass occurs. Reduced impacts from livestock could contribute to increased extent and vigor of these species' populations in the park over time. There is the potential that improved boundary fencing could concentrate livestock in the Ute Mountain Ute Tribal Park, thus increasing trampling to the Chapin Mesa milkvetch population in that area; however, Ute Mountain Ute Tribe has initiated a horse removal program of its own.

3.2.4 Cumulative Impacts

Past projects and actions that may have affected Chapin Mesa milkvetch, alkaline pepperweed, and Cliff Palace milkvetch in and around the park have included wildfire suppression, fuels management, and residential, agricultural, and commercial developments. These have resulted in the loss, reduction, or reduced vigor of special status plant populations. The extent of these impacts is not known, but it may be widespread.

The present and reasonably foreseeable future projects and actions that are affecting or could affect Chapin Mesa milkvetch, alkaline pepperweed, and Cliff Palace milkvetch populations in the park are preparing fire and invasive plant management plans. This would help to retain populations and reduce competition from nonnative, invasive plant species.

As described above, baited pen trapping at Chapin Mesa Quarry and wrangler roundups under Alternative A could have direct impacts on Chapin Mesa milkvetch, alkaline pepperweed, and Cliff Palace milkvetch populations. Further, livestock would continue to impact these species in the park by trampling and browsing. When combined with past, present, and reasonably foreseeable future actions, Alternative A would contribute to adverse cumulative impacts on Chapin Mesa milkvetch, alkaline pepperweed, and Cliff Palace milkvetch due to the ongoing impacts from livestock trespass; however, these impacts would be offset due to the present and reasonably foreseeable future fire and invasive plant management plans, which would contribute to an overall beneficial trend for these species.

There is the potential for temporary impacts on Chapin Mesa milkvetch, alkaline pepperweed, and Cliff Palace milkvetch from baited pen trapping, temporary holding, and wrangler roundups under Alternative B. Even so, this alternative is expected to have an overall beneficial, indirect impact on these species' populations as livestock are removed from the park.

Cumulative impacts from Alternative B, combined with past, present, and reasonably foreseeable future actions, would have beneficial impacts on Chapin Mesa milkvetch, alkaline pepperweed, and Cliff Palace milkvetch populations. This would be due to the overall reduction and removal of trespassing livestock and the recovery of native vegetation.

3.3 SPECIAL STATUS SPECIES—WILDLIFE

3.3.1 Affected Environment

Those conducting intensive surveys of the southern canyons of Mesa Verde National Park found a small but successfully breeding population of Mexican spotted owl during the 1990s (Johnson 1997). Follow-up surveys in 2004 and 2005 found several birds but no breeding activity, despite the fact that most of the prime habitat for this species was intact (Johnson 2006). Additional call surveys by park biologists in suitable habitat have continued annually for many years, but the last time a response was heard was in 2009. Spring season call surveys in Mesa Verde National Park have continued intermittently since then without any detections. A summary of Mexican spotted owl surveys within the park between 2009 and 2017 are summarized in **Table 3-1**. Surveys were conducted using FWS

Table 3-1
Summary of Mexican Spotted Owl Surveys in Mesa Verde National Park (2009-2017)

Date	# of Surveys	Survey Type	Location	Notes
2017	4	Calling Stations	Headquarters, Mesa Top, and Cliff Palace Loops	No detections
2016	4	Calling Stations	Headquarters, Mesa Top, and Cliff Palace Loops, and Bobcat Canyon	No detections
2015	4	Calling Stations	Headquarters, Mesa Top, and Cliff Palace Loops, and Bobcat Canyon	No detections
2014	No surveys	-	-	-
2013	2	Calling Stations	Headquarters, Mesa Top, and Cliff Palace Loops, and Bobcat Canyon	No detections, USFWS concurred that only 2 surveys needed for compliance due to lack of recent detections
2012	2	Calling Stations	Headquarters, Mesa Top, and Cliff Palace Loops, and Bobcat Canyon	No detections, USFWS concurred that only 2 surveys needed for compliance due to lack of recent detections
2011	4	Calling Stations	Headquarters, Mesa Top, and Cliff Palace Loops, and Navajo, Wickiup, and Bobcat Canyons	No detections
2010	Unknown	Calling Stations	Navajo and Wickiup Canyons	No detections. Survey forms could not be found to confirm number of surveys.
2009	Unknown	Calling Stations	Headquarters, Mesa Top, and Cliff Palace Loops.	Park staff Marilyn Colyer stated she heard a male and female MSO but follow up surveys could not confirm their presence. Survey forms could not be found to confirm number of surveys.

protocols specified in the Mexican spotted owl recovery plan (FWS 2012). NPS guidance considers a species extirpated from a park only after it has been demonstrated that it has been absent from the area for more than 10 years. As such, this species is analyzed in detail in this section.

In addition, during the previous decade, several hundred acres in the southern canyons of Mesa Verde National Park were being proposed for designation as two Mexican spotted owl PACs. The nomination process ended because no breeding activity was being detected and no owls were detected after 2009.

3.3.2 Impacts of Alternative A (No-Action Alternative)

Potential indirect effects from project activities include wrangler roundups, fence construction, and horse surveys that could potentially disturb nesting, roosting, or foraging activities of Mexican spotted owls. These activities would each occur one to three times a year and would be short in duration, ranging from 10 hours for surveys and roundups and up to 4 weeks for fence construction. All these indirect effects will be avoided or minimized by avoiding proposed Mexican spotted owl protected activity center (PACs) by following the mitigations listed in **Section 2.2**.

Helicopters that are involved in livestock roundups may fly over proposed PACs, but they will stay above the 300-foot aboveground level recommended buffer for occupied Mexican spotted owl nest territories. Helicopters will not be used to round up livestock in the proposed PACs; only wrangler roundups may occur in proposed PACs. As a result, potential impacts on PACs would be mitigated.

While livestock would continue to be removed under Alternative A and fencing would be installed or repaired, these activities have not been effective in preventing livestock from entering the park as described in **Section 1.1**. As a result, livestock trespassing could continue to indirectly affect Mexican spotted owls through vegetation trampling, vegetation loss, and nonnative species introduction and spread. The resulting impaired vegetation productivity may degrade Mexican spotted owl prey habitat characteristics over 5 years or longer (USFWS 2012); however, because there have been no detections since 2009, impacts would be minor.

3.3.3 Impacts of Alternative B (Preferred Alternative)

Under Alternative B, impacts on the Mexican spotted owl PACs would be the same as identified under Alternative A. Implementing a comprehensive, continuous program to remove livestock may restore the height and horizontal distribution of herbaceous plants that provide food and cover for Mexican spotted owl prey species (USFWS 2012); however, because there have been no detections since 2009, impacts would be minor.

3.3.4 Cumulative Impacts

Past projects and actions affecting special status species in and around the park are wildfire suppression and fire management planning. The MVNP Fire Management Plan (in preparation) proposes continued suppression of wildland fires and increased fuels treatments. Fire suppression can reduce Mexican spotted owl habitat by building fire lines; however, fuels treatments may reduce the risk of high-severity fires that can alter or remove habitat (USFWS 2012); therefore, the extent to which wildfires and fire management planning would cumulatively affect Mexican spotted owl habitat can be determined only site specifically.

When added to the past, present, and reasonably foreseeable future actions, Alternative A would contribute to adverse impacts on Mexican spotted owl habitat, due to continued impacts caused by livestock trespass. Because it is not known to what extent these impacts are occurring, and because there have been no detections since 2009, the contribution of Alternative A to cumulative impacts is expected to be limited.

When added to the past, present, and reasonably foreseeable future actions, Alternative B would reduce adverse impacts on Mexican spotted owl habitat, by reducing livestock trespass. Similar to Alternative A, the contribution to impacts would be limited.

3.4 VISITOR USE AND EXPERIENCE

3.4.1 Affected Environment

The National Park Service has conducted surveys and studies in the past to more accurately understand visitor characteristics and how visitors respond to management actions. The Park Studies Unit at the University of Idaho conducted a survey (NPS 2012) of visitors to Mesa Verde National Park to better understand the experiences, opinions, and needs of those who use and those who manage public lands. These studies provide a variety of visitor-related information, including demographics and use characteristics, which allow the National Park Service to understand the characteristics of today's visitor.

Every year approximately half a million people visit Mesa Verde National Park; 583,527 people visited the park in 2016 (NPS 2017). The park is open every day of the year, closing occasionally in the winter due to snowstorms. The renowned cultural resources draw visitors from all over the world to learn about the prehistoric occupation of Mesa Verde by the Ancestral Pueblo people and to see the ancient structures up close. Visitors also enjoy the historic architecture of early twentieth century buildings, the natural scenery, wildlife viewing, photography, scenic driving, walking trails, and camping at Mesa Verde National Park. The busiest months of the year in 2016 were June and July; the second week in August has traditionally been the busiest week, with as many as 3,000 people per day entering the park (NPS 2016, 2017).

Mesa Verde National Park offers a wide variety of experiences, though the highest visitor use in the park is in the most developed areas. Most visitors take a self-guided cliff dwelling tour (69%), visit the visitor center (67%), and walk or hike (55%). Almost half of the visitors surveyed in 2012 stayed one night in the park (46%); 44% of visitor groups stayed in the lodge, while 29% camped in RVs/trailers and 28% camped in tents in a developed campground. (Backcountry camping is not offered at Mesa Verde National Park.)

Areas where horses were observed in a 2014 ground survey (NPS 2014) included Wetherill Mesa, Soda Canyon, Park Mesa, School Section Canyon, Moccasin Mesa, Morefield Canyon, and Prater Canyon. These are not the areas where visitors are typically concentrated, as most stay in developed areas; however, some visitor-livestock incidents do occur. Where horses graze or rest near roads, they often attract visitor attention and create a vehicle and pedestrian safety risk. Visitors may park on the road to take pictures of horses, unaware of their safety when closely approaching seemingly tame horses. Staff and visitors have at times experienced aggressive horses (often stallions) charging, bucking and rearing, and vocalizing. For example, one ranger-led tour group on Wetherill Mesa in 2010 retreated when a colt became aggressive by bucking and running around the group (NPS 2010).

As an example, in its incident log, the National Park Service recorded 43 visitor-livestock incidents from 2005 to 2010, primarily on roads and near developed areas, such as the lodge, comfort stations, campgrounds, and visitor center. These incidents occurred over 6 years, with an average annual

visitation of .5 million visitors. Incidents have included damage to visitors' vehicles. Visitor safety has been a concern, where horses have been aggressive toward park staff and visitors, have blocked roadways, or have been fed by park visitors (NPS 2011). This is particularly dangerous when on-coming drivers cannot see the stopped traffic or during low light conditions.

3.4.2 Impacts of Alternative A (No-Action Alternative)

The presence of trespassing livestock would indirectly affect local scenic resources over the long term (greater than 5 years), at a scale appreciable to visitors; for instance, they can graze and trample or congregate near cultural resources, such as kivas;[9] however, some visitors enjoy viewing livestock, and the presence of livestock would continue under the No-Action Alternative.

The presence of trespassing livestock and their impacts would continue to create trails, erode soils, intrude into the lodge area, and create unnatural conditions that may reduce the public's desire to visit impacted locations and could detract from the visitor experience. These long-term impacts would occur throughout the 30,310 acres of current livestock trespass range; however, they would be more noticeable in areas such as the lodge area, roads, and trails, where livestock trespass and visitors are present during the peak periods of July and August.

Trespass livestock grazing or resting near roads, trails, and the lodge area would continue to attract attention and create a vehicle and pedestrian safety risk. If visitation continues at a rate of a half-million visitors per year, the number of incidents would continue over time at the current average of seven per year. Potential direct impacts on visitors are damaged vehicles, blocked roadways, and trespass livestock being aggressive toward park staff and visitors. Vehicle conflicts with trespass livestock would be greater on curves where oncoming drivers cannot see the stopped traffic or during low light conditions. These short-term impacts would occur throughout the 30,310 acres of current livestock trespass range; however, they would be more noticeable in the lodge area, roads, and trails, where livestock trespass and visitors are present during peak periods of July and August.

Under Alternative A, the National Park Service would continue to use a variety of techniques to capture livestock, including baited pen trapping, wrangler roundup and capture, and restraints, such as lariats, ropes, chutes, and corrals. During capture, the treatment methods could have short-term, minimal impacts on the visitor experience, but only in limited areas where a control activity is underway. Setting up traps to gather trespassing livestock would in some locations likely require some limitations on access or closures to ensure visitor safety and minimize adverse impacts on the visitor experience.

Visitation patterns would be a key consideration in determining the timing of such control activities. Mitigation measures, such as locating trap sites away from roads and public view when feasible, would mitigate these impacts. Baited pen traps would not be used in visitor use areas to reduce impacts, though they may be visible from the road. These control actions would be designed to preserve visitor experiences by avoiding areas of high use.

[9] An underground chamber used by male Pueblo Indians for religious purposes.

Long-term exclusion of livestock from the park would involve installing new fences and maintaining existing fences. Short-term impacts on visitors would come from activities that create visual and sound disturbances, such as digging holes and pounding in fence posts or using motorized vehicles to access fences. These impacts would be localized at fence sites or near access roads or trails.

Under Alternative A, the National Park Service would use hazing techniques to protect human safety and facilities or protect cultural and natural resources from trespassing livestock. Shouting and other methods of control, such as paintballs and screamer shells, would result in temporary direct noise impacts on visitors where these techniques are used.

3.4.3 Impacts of Alternative B (Preferred Alternative)

Similar to Alternative A, trespassing livestock would continue to change the landscape through trampling and vegetation loss. Under Alternative B, trespassing livestock control, such as baited pens and boundary fencing, would increase and the amount of trespassing livestock would be reduced. As a result, the indirect effects of trespassing livestock on native biodiversity and ecological function would decrease over time. Also, park visitors would encounter fewer landscapes and species that are substantially divergent from their expectations of protected, relatively pristine, native plant and animal life; however, some park visitors enjoy viewing livestock, and as the presence of trespass livestock would decrease, it would have a long-term impact on this visitor experience.

In the long term, removing the remaining livestock would eventually eliminate such impacts as dirt trails and large patches of bare ground and would reduce the introduction and spread of invasive weeds. Local scenic resource impacts would be reduced and eventually eliminated over the long term. Similar to Alternative A, these long-term impacts would occur throughout the 30,310 acres of current livestock trespass range; however, they would be more noticeable in areas such as the lodge area, roads, and trails, where livestock trespass and visitors are present.

Like Alternative A, livestock grazing or resting near roads, trails, and the lodge area would attract attention and create a vehicle and pedestrian safety risk; however, these impacts would be reduced and eventually eliminated under Alternative B. These short-term impacts would occur throughout the 30,310 acres of current livestock trespass range; however, they would be more noticeable in areas such as the lodge area, roads, and trails, where livestock trespass and visitors are present. If visitation continues at the current rate of a half-million visitors per year, the number of incidents would be reduced and eventually eliminated from the current average of seven incidents per year.

Similar to Alternative A, treatment methods during control activities could have short-term impacts on the visitor experience; however, this would be the case only in limited, localized areas, where control is underway. An example of this is the 0.07 acres of capture facilities in visitor use buffer areas, which provide a barrier between the proposed control activities and visitor use. These temporary impacts could alter landscapes by removing vegetation or could have visual impacts from installing capture facilities. These temporary impacts would occur over 5 years and would be more noticeable at high visitor use areas, such as park roadways and the Wetherill parking lot.

Additionally, the use of vehicles and helicopters to transport supplies to staging areas on the Mesa Verde National Park side of the boundary could have minimal, short-term impacts on visitors from

associated noise and visual disturbance along access roads and trails or underneath helicopter flight paths.

Setting up portable corrals to gather trespassing livestock and using helicopters to locate and herd livestock would in some locations likely require some access limitations or closures to ensure visitor safety and minimize adverse impacts on the visitor experience. Visitation patterns would be a key consideration in determining the timing of such control activities. Mitigation measures, such as locating trap sites and central holding sites away from roads and public view when feasible, would mitigate these impacts. Control actions would be designed to minimize the diminishment of visitor experience by avoiding areas of high visitor use.

Similar to Alternative A, the long-term exclusion of livestock from the park would include installing new fences and maintaining existing fences. Short-term impacts on visitor experience would occur from activities that create visual and sound disturbances. These would be localized at fence sites or near access roads or trails.

The occasional use of helicopters would result in short-term visual and noise impacts on visitors underneath flight paths. These short-term direct impacts are more likely to occur between April and October, with the greatest visual and noise impacts in July and August. This is the high visitation period when installation and maintenance occurs; however, once trespassing livestock are controlled, these impacts would be reduced or eliminated, depending on fence locations and conditions.

3.4.4 Cumulative Impacts

Past projects and actions affecting visitor use and experience in and around the park have included wildfires, residential, agricultural, and commercial developments and road construction and road and trail maintenance. Trail maintenance has had a direct impact on visitor experience, as trail work improves safety and access and provides additional opportunities for exploring Mesa Verde National Park. Other road and facility improvements directly impact the visitor experience by providing additional opportunities to Mesa Verde National Park visitors.

Present and reasonably foreseeable future projects and actions that are affecting or could affect visitor experience in the park are the preparation of fire and invasive plant management plans. They would help to retain existing vegetation and reduce nonnative, invasive plant species, directly improving visitor experience through ecosystem retention. A visitor distribution and transportation plan and long-range interpretive plan would also provide additional opportunities that would directly impact visitor experience by constructing trails and new facilities and providing new or different educational experiences. These trails and facilities would provide opportunities for visitors to experience additional areas of Mesa Verde National Park. These projects would directly improve the visitor experience by providing additional hiking and biking opportunities, road and parking improvements, and additional visitor information and signs; however, over the long term, additional trails and facilities may increase impacts from trespassing livestock on visitor experience by dispersing visitors to areas where they may encounter trespassing livestock.

Cumulative Impacts of Alternative A

As described above, the direct and indirect impacts of Alternative A on visitor use and experience would be mostly site specific or localized at capture locations, roadways, and trails. This is primarily because of capture facilities and boundary fence replacement and construction. Short-term (less than 5 years) and long-term (greater than 5 years) impacts would be landscape alterations and noise and visual disturbance. Mitigation measures, such as locating trap sites and the central holding sites away from existing roads and away from public view, when feasible, would mitigate these impacts. Also, control actions would be designed to minimize the diminishment of visitor experiences, and areas of high visitor use would be avoided. In the short term, there would be potential pedestrian and vehicle safety impacts near roadways, trails, and the lodge area from trespassing livestock. Over the long term, these impacts on visitor experiences would decrease but continue under Alternative A.

While livestock would continue to be removed under Alternative A, it would not be effective in preventing livestock from entering the park, as described in **Section 1.1**. As the indirect impacts of trespassing livestock on native biodiversity and ecological function continue and are likely to increase over time, park visitors would encounter landscapes and species substantially divergent from their expectations of a protected, relatively pristine native biota. Trespassing livestock create dirt trails and large patches of bare ground. Also, they are vectors for exotic species, because they bring in invasive plant species from adjoining areas and create disturbed conditions ideal for the growth of these plants.

Alternative A would contribute only minimally to overall cumulative impacts on visitor use and experience. This is because most visitors do not encounter trespassing livestock during their visits to Mesa Verde National Park.

Cumulative Impacts of Alternative B

Direct and indirect impacts of Alternative B on visitor use and experience would be mostly site specific or localized at capture locations, roadways, and trails. This is the same as under Alternative A; however, over the long term, these impacts on visitor experience would be eliminated under Alternative B.

The overall removal of trespassing livestock under Alternative B, compared with Alternative A, would increase visitor safety and eliminate encounters between trespassing livestock and visitors. Alternative B would eliminate the potential for impacts from livestock encounters.

3.5 CULTURAL RESOURCES—ARCHAEOLOGICAL RESOURCES

3.5.1 Affected Environment

Congress established Mesa Verde National Park in 1906 with the stated purpose to "provide specifically for the preservation from injury or spoliation of the ruins and other works and relics of prehistoric or primitive man within said park." These same resources were the basis for listing Mesa Verde National Park on the National Register of Historic Places in 1966. In 1978, the worldwide value of the park's archaeological resources was further recognized when the park was selected as

one of the seven original United Nations World Heritage Sites. Currently, there are 21 World Heritage Sites in the United States; the National Park Service serves as their chief steward. The term historic properties refers to cultural resources that are eligible for listing or that are listed on the NRHP, regardless of era.

Archaeological Resources

The prehistoric sites consist of mounds of fallen rubble and earth from small and large villages, soil and water control devices, work areas, rock alignments of uncertain function, scatters of pottery sherds and lithic fragments, campsites, and cliff dwellings.

It is estimated that Mesa Verde National Park has over 4,700 archaeological sites. The condition of most of the prehistoric archaeological sites is unknown (NPS 2015b). Approximately 1,000 sites are known to be in good condition; however, approximately 500 sites are vulnerable to severe erosion. These sites are largely on steep talus slopes, in areas burned by recent fires, and in areas where stabilization of and water treatments to the upper watershed and site are not performed (NPS 2015b). The cliff dwellings vary from large communities, one of which contains over 100 rooms, to small one-room storage areas.

Impacts on the prehistoric sites and structures come mostly from natural causes, wind, water, and rodents; however, abundant evidence has shown that trespassing livestock, mainly horses, have damaged these resources and indirectly exposed them to erosion (NPS 2011). This has been due to the denuding of surface vegetation, leaving the sites prone to invasive weeds and subsequent damage by wildfire. The invasive weeds may alter the fire regime, leading to the potential for increased fire frequency. The National Park Service limits the amount of damage from visitation by controlling public access (NPS 2015b).

Livestock damage to archaeological sites has been documented at Mesa Verde National Park from the animals taking dust baths, trailing through sites, and depositing dung. On Wetherill Mesa there is a spot along the tram road where interpretive rangers stop the tram to show visitors pot shards that have been exposed by horses that have been digging up the soils (NPS 2011). Livestock tend to concentrate near water and food sources, natural shelters, and depressions and fence lines. Data from the Canyon de Chelly National Monument showed that 65% of archaeological sites in one area sampled exhibited some form of adverse impact from livestock (NPS 2011). There is no comparable data on the ongoing impacts that livestock are having on archaeological sites at Mesa Verde National Park.

3.5.2 Impacts of Alternative A (No-Action Alternative)

Capturing and transporting livestock at dispersed locations around the park would temporarily disturb less than 1 acre each of land associated with holding structures, traps, fencing, and vehicle use. The disturbances would be intermittent and localized, lasting from 1 to 6 weeks during the trespass livestock capture phase, several times between May and November. The proposed locations for traps, holding areas, and other facilities were selected to avoid impacts on cultural resources. Incidental surface disturbance can be associated with roundups, immobilization, and reduction activities. Cultural resources would be avoided where possible during construction and repair of the

boundary fence. Archaeological sites are located in the area of potential effect where the boundary fence would be repaired (Dickey 2017). Where avoidance is unavoidable, the National Park Service would comply with the mitigation measures to reduce impacts, identified in **Section 2.2**.

Surface disturbance can cause direct impacts on archaeological sites by damaging, destroying, or displacing artifacts and features; by removing artifacts from their situational context; or by causing or exacerbating erosion. These activities could also temporarily cause indirect impacts that change those physical features in a property's setting that contribute to its historical significance. Examples of this are isolating the property from its setting and introducing visual, atmospheric, or audible elements that diminish the integrity of the property's significant features.

An MVNP cultural resource specialist would advise on identifying, avoiding, or minimizing potential physical impacts on cultural resources. This advisement would take place before livestock are removed, temporary traps or central holding facilities are sited, and fences are installed and maintained. The advisements would generate avoidance tactics and indicate if any of these actions would affect sites and structures. No adverse effects on historic properties are anticipated from removing trespassing livestock. Cultural resource discovery procedures would be implemented.

However, the boundary fence line crosses known archaeological sites. Fence replacement would require minor surface disturbance and the placing fence posts that may adversely affect historic properties. The National Park Service would enter into a memorandum of agreement with the SHPO, Ute Mountain Ute THPO, and interested tribes for phased identification and mitigation of any adverse effects that may be associated with fence repair and replacement. An MVNP cultural resource specialist would monitor fence replacement to identify, avoid, or minimize potential physical impacts on cultural resources. Appropriate discovery and mitigation measures would be implemented, as required.

Fewer impacts on cultural resources are anticipated when trespassing livestock are removed, or their numbers are reduced. In addition to removal, the boundary fencing would further reduce trespassing livestock. The continued presence of livestock is associated with impacts on resources eligible for listing on the NRHP, such as sites with kivas, standing prehistoric architecture, and open sites in sensitive locations. Examples of the latter are those on or near erosive soils or riparian areas containing easily damaged resources or archaeological features. Livestock tend to concentrate near water and food sources, natural shelters, and depressions and fence lines.

Impacts from trampling artifacts or features, rubbing or leaning against structures, overgrazing, and erosion would continue under Alternative A; these impacts would be decreased proportionately by reducing the number of livestock. Because the National Park Service has not historically removed livestock in large numbers, these types of impacts have not been realized over the long term (greater than 5 years) under current management. Because Mesa Verde is the first national park established for cultural resource protection, reducing the number of trespass livestock and reducing associated impacts would be important to fulfilling the park's mission.

3.5.3 Impacts of Alternative B (Preferred Alternative)

The impacts associated with trespassing livestock removal would be similar to those described for Alternative A; however, the number of affected acres disturbed for temporary facilities and fencing would slightly increase. Pen capture sites may be baited up to 6 months in advance with water, feed, or mineral supplement to habituate and restrict livestock to the capture area and pen. Livestock may be restricted from natural or artificial water sources next to capture sites, to force them to the water at the bait station.

The effects of surface disturbance and potential alterations to setting in the vicinity of the traps, as described under Alternative A, may be concentrated in these locations for a longer period; however, the proposed locations for traps, holding areas, and other facilities were selected to avoid impacts on cultural resources. Mitigation, discovery procedures, and cultural resource compliance, described under Alternative A, would minimize that potential; thus, no adverse effects on historic properties are anticipated from removing trespassing livestock.

Impacts on cultural resources would be reduced in the long term by removing all trespassing livestock within a 5-year period. Implementation within a defined timeline would result in fewer historic properties being damaged than under Alternative A and a permanent reduction in ongoing impacts. This would eliminate the impacts from trampling artifacts or features, rubbing or leaning against structures, overgrazing, and erosion from trespassing livestock.

3.5.4 Cumulative Impacts

Human use and reuse of MVNP lands has been constant over time, affecting the preservation of cultural resources. Disturbances vary considerably as to type, intensity, and duration before and after the park was established. Past impacts on cultural resources at Mesa Verde National Park resulted from visitor use, infrastructure construction and maintenance, excavation of cultural resources, fuel management, fire suppression, post-wildfire rehabilitation, and trespassing livestock.

Present and reasonably foreseeable future projects, plans, and actions that are affecting or could affect cultural resources are the following:

- preparation of fuel reduction
- burned area emergency response
- invasive plant management plans
- roads, trails, and fencing maintenance
- visitor use
- Bureau of Land Management and United States Forest Service plans
- State of Colorado lands next to the north and east boundaries
- residential, agricultural, and commercial developments on adjacent lands

Ongoing actions initiated by the National Park Service at Mesa Verde National Park and those on other federal lands that could affect cultural resources must comply with the National Historic Preservation Act and other laws, statutes, and regulations; thus, adverse impacts on historic properties are identified and resolved. Damage to cultural resources from post-wildfire erosion, where stabilization is not possible, trespassing livestock, and native wildlife is ongoing and difficult to monitor and mitigate. For actions on nonfederal lands or for projects that are not federal undertakings, there may be loss or damage to cultural resources that may not be considered.

Cumulative Impacts of Alternative A

As described above, the potential impacts of Alternative A would be localized, temporary, and minor. They would involve the surface disturbance for temporary facilities and other removal and roundup activities. The boundary fencing would further reduce trespassing livestock. Mitigation, discovery procedures, and cultural resource compliance would minimize that potential and no adverse effects on historic properties are anticipated from removing trespassing livestock. Adverse effects may be associated with boundary fence repair and replacement. The National Park Service would enter into a memorandum of agreement with the SHPO, Ute Mountain Ute THPO, and interested tribes for phased identification and mitigation of any adverse effects that may be associated with fence repair and replacement.

Alternative A would be less effective than Alternative B in reducing impacts on cultural resources from trespassing livestock in the short term and long term. When combined with past, present, and reasonably foreseeable future actions, cumulative long-term beneficial impacts on cultural resources would result from removing trespassing livestock under Alternative A.

Cumulative Impacts of Alternative B

The potential impacts of Alternative B would also be localized, temporary, and minor. They would involve surface disturbance for temporary facilities and other removal and roundup activities. The amount of land disturbed and duration of disturbance in the vicinity of capture sites would be more than under Alternative A, but they would not be expected to occur after livestock are completely removed.

Mitigation, discovery procedures, and cultural resource compliance would minimize potential impacts. No adverse effects on historic properties are anticipated from removing trespassing livestock. Alternative B would be more effective than Alternative A in reducing impacts on cultural resources from trespassing livestock in the short term and long term. When combined with past, present, and reasonably foreseeable future actions, greater cumulative long-term beneficial effects on cultural resources would result from removing trespassing livestock, especially their complete removal under Alternative B.

CHAPTER 4: CONSULTATION AND COORDINATION

4.1 AGENCY CONSULTATION

The National Park Service informed the US Fish and Wildlife Service of the Proposed Action on December 7, 2015. On January 30, 2017, the National Park Service sent a letter to the USFWS to initiate informal consultation and to seek a "no effect" concurrence in accordance with Section 7 of the Endangered Species Act. USFWS responded via email on March 17, 2017 that the actions proposed may affect listed and candidate species present in the park.

Based on this consultation and further analysis, the National Park Service determined that actions proposed under both alternatives may flush out the Mexican spotted owl, if present. While there have been no known occurrences of this species in Mesa Verde National Park since 2009, the park still contains large areas of suitable habitat and there may be effects to the species. Also, one baited pen trap site is proposed to be located in Chapin Mesa milkvetch habitat. Therefore, the National Park Service prepared a biological assessment to analyze possible impacts on the Mexican spotted owl and the Chapin Mesa milkvetch (a candidate species currently under review for listing). The NPS is seeking USFWS concurrence with a determination that the preferred alternative may affect, not likely to adversely affect Mexican spotted owl and may affect, likely to adversely affect Chapin Mesa milkvetch.

In accordance with Section 106 of the National Historic Preservation Act, the National Park Service consulted with the Colorado SHPO in a letter dated December 7, 2015. The subject of the letter was aspects of this project and EA that could impact cultural resources. In the consultation document, the National Park Service described and summarized planned actions and best management practices to be implemented to prevent and minimize impacts on cultural resources. The draft actions were provided for SHPO review and reference. On December 16, 2015, the SHPO provided a letter acknowledging that the National Park Service was working on the EA and the SHPO would complete Section 106 review after it had received the assessment of effect and other Section 106 documentation.

The National Park Service met with the Bureau of Land Management and United States Forest Service at the Bureau of Land Management Bloomfield, New Mexico, holding facility in June 2016. The three agencies discussed processes and infrastructure requirements for proposed livestock removal. The National Park Service also met with the Colorado Department of Agriculture Brand Commissioner and the regional and local brand inspector in February 2016, regarding state livestock requirements. The National Park Service also sent a letter to the Bureau of Indian Affairs notifying it of the project.

4.2 AMERICAN INDIAN CONSULTATION

The 26 American Indian tribes that Mesa Verde National Park consults with were sent an official consultation letter on December 7, 2015. This was done to comply with government-to-government consultation requirements and to determine if the proposal would affect ethnographic resources. An

invitation was also relayed to the tribes to see if they wanted to be involved in the environmental compliance process.

The tribes contacted are as follows:

- Hopi Tribe of Arizona
- Jicarilla Apache Nation, New Mexico
- Kewa Pueblo, New Mexico
- Navajo Nation, Arizona, New Mexico, and Utah
- Ohkay Owingeh, New Mexico
- Pueblo of Acoma, New Mexico
- Pueblo of Cochiti, New Mexico
- Pueblo of Isleta, New Mexico
- Pueblo of Jemez, New Mexico
- Pueblo of Laguna, New Mexico
- Pueblo of Nambé, New Mexico
- Pueblo of Picuris, New Mexico
- Pueblo of Pojoaque, New Mexico
- Pueblo of San Felipe, New Mexico
- Pueblo of San Ildefonso, New Mexico
- Pueblo of Sandia, New Mexico
- Pueblo of Santa Ana, New Mexico
- Pueblo of Santa Clara, New Mexico
- Pueblo of Taos, New Mexico
- Pueblo of Tesuque, New Mexico
- Pueblo of Zia, New Mexico
- Southern Ute Indian Tribe of the Southern Ute Reservation, Colorado
- Ute Indian Tribe of the Uintah & Ouray Reservation, Utah
- Ute Mountain Ute Tribe
- Ysleta del Sur Pueblo
- Zuni Tribe of the Zuni Reservation, New Mexico

During the public scoping period, comments were received from the following tribal governments:

- Hopi Tribe of Arizona
- Pueblo of San Felipe, New Mexico
- Pueblo of Santa Ana, New Mexico
- Pueblo of Santa Clara, New Mexico
- Ute Mountain Ute Tribe
- Ysleta del Sur Pueblo

Additional in-person consultation between the National Park Service and the Ute Mountain Ute Tribe took place at the tribal government office in Towaoc, Colorado, on February 17, 2016; a telephone consultation between the National Park Service and Pueblo of Santa Clara took place on March 15, 2016. The Preferred Alternative was also discussed at the annual tribal consultation meetings that took place on April 6, 2016 in Aztec, New Mexico, and April 5, 2017 in Albuquerque, New Mexico. Consultation is ongoing and would continue through implementation of the Preferred Alternative.

4.3 LIST OF PREPARERS

The following persons assisted with the preparation of the EA:

National Park Service—Mesa Verde National Park, Colorado

- Sheldon Baker, Archaeologist
- Elizabeth Dickey, Compliance Specialist
- Tim Hovezak, Archaeologist
- Josh Irving, Wildlife Biologist
- Gay Ives, Archaeologist
- Allan Loy, Project Manager
- Paul Morey, Wildlife Biologist
- Bill Nelligan, Deputy Park Superintendent
- George San Miguel, Natural Resources Manager
- Mark Sinclair, Outdoor Recreation Planner
- Tova Spector, Botanist
- Cliff Spencer, Park Superintendent

Environmental Management and Planning Solutions, Inc. (EMPSi)

- Blake Busse, Environmental Specialist
- Kevin Doyle, Cultural Resources Specialist
- Derek Holmgren, Soil and Water Resources Specialist
- Jenna Jonker, GIS Specialist
- Kate Krebs, NEPA Specialist and Quality Assurance
- Laura Patten, Recreation Specialist
- Holly Prohaska, Project Manager
- Kevin Rice, Biologist
- Chad Ricklefs, Recreation Specialist
- Cindy Schad, Word Processor
- Randolph Varney, Technical Editor
- Meredith Zaccherio, Senior Biologist

This page intentionally left blank.

CHAPTER 5: REFERENCES

AVMA (American Veterinary Medical Association)

2013 ISBN 978-1-882691-21-0; Version 2013.0.1. Internet website: https://www.avma.org/KB/Policies/Pages/Euthanasia-Guidelines.aspx. Last accessed on June 30, 2017.

Cattoor Livestock Roundup, Inc.

2017 Wild Horse Information. Internet website: http://www.wildhorseroundups.com/information.html. Last accessed on June 30, 2017.

Colyer, Marilyn

2004 "The Grazing History of Mesa Verde National Park." February 26, 2004. Unpublished report

Dickey, Elizabeth

2017 *National Historic Preservation Act, Section 106 Documentation: Livestock Removal in Mesa Verde National Park, Montezuma County, Colorado, Draft*. Mesa Verde National Park, Colorado.

Hansen, K.V., and J. C. Mosley

2000 "Effects of roundups on behavior and reproduction of feral horses." *Journal of Range Management* 53:479–482.

Henneke; Potter G. D., J. L. Kreider, and B. F. Yeates

1983 "Relationship between condition score, physical measurements and body fat percentage in mares." *Equine Vet*: 371–2. October 1983

Johnson, C. L.

1997 "Distribution, habitat, and ecology of the Mexican spotted owl in Colorado." Master's thesis, University of Northern Colorado, Greeley.

Johnson, M. J.

2006 Determining Protected Area Centers (PAC) for Mexican Spotted Owls at Mesa Verde National Park, 2004-05 Final Report.

NPS (US Department of the Interior, National Park Service)

1986 National Register of Historic Places Nomination Form. Mesa Verde Administrative District. Prepared by National Park Service, Regional Office, Santa Fe, New Mexico

1996 The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Treatment of Cultural Landscapes. Washington, DC: US Department of the Interior, National Park Service, Cultural Resource Stewardship and Partnerships, Heritage Preservation Services, Historic Landscape Initiative.

1998 Director's Order 28: Cultural Resource Management Guidelines. Washington, DC.

2002 "Mesa Verde National Park 2002 Annual Report." Unpublished document on file with Mesa Verde National Park Natural Resource Office.

2003 "Annual Report." Unpublished document on file with Mesa Verde National Park Natural Resource Office.

2010 "Incident Log. Public safety incidences involving horses for the last 5 years where V&RP [Visitor and Resource Protection] staff members or dispatch has been contacted regarding the feral horses." Unpublished document on file with Mesa Verde National Park.

2011 "Feral Trespass Horse Management White Paper." Unpublished document on file with Mesa Verde National Park.

2012 *Mesa Verde National Park Visitor Study*. Natural Resource Report NPS/NRSS/EQD/NRR—2013/664. Internet website: https://www.nps.gov/meve/learn/management/upload/uofi_meve_visitor_study_2012.pdf. Last accessed on June 30, 2017.

2014 *Mesa Verde National Park Feral Horse/Ungulate Ground Survey Results: April and September 2014*. Submitted by Paul Morey, Biologist.

2015a "National Environmental Policy Act Handbook." Internet website: https://www.nps.gov/subjects/nepa/policy.htm. Last accessed on June 30, 2017.

2015b *Invasive Plant Management Plan: Environmental Assessment and Assessment of Effect. Mesa Verde National Park and Yucca House National Monument, Colorado*. Internet website: https://parkplanning.nps.gov/document.cfm?parkID=79&projectID=46918&documentID=64677. Last accessed on June 30, 2017.

2016 *Visitation statistics*. Internet website: https://www.nps.gov/meve/learn/management/statistics.htm. Last accessed on June 30, 2017.

2017 "Summary of Visitor Use by Month and Year." Mesa Verde National Park.

NPS GIS

2017 GIS data provided by the National Park Service and used for calculations or figures; includes internal data and data available from the Integrated Resource Management Applications Portal. Internet website: https://irma.nps.gov/Portal/. Last accessed on June 30, 2017.

Shapins Associates

2012a National Park Service Cultural Landscapes Inventory: CCC Camps, Mesa Verde National Park. Report prepared for the National Park under contract on file with Mesa Verde National Park.

2012b National Park Service Cultural Landscapes Inventory: Entrance Road Corridor, Mesa Verde National Park. Report prepared for the National Park under contract on file with Mesa Verde National Park.

2012c National Park Service Cultural Landscapes Inventory: Headquarters Loop, Mesa Verde National Park. Report prepared for the National Park under contract on file with Mesa Verde National Park.

2012d National Park Service Cultural Landscapes Inventory: Utility Area, Mesa Verde National Park. Report prepared for the National Park under contract on file with Mesa Verde National Park.

US Environmental Protection Agency

1998 *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses*. Internet website: http://www3.epa.gov/environmentaljustice/resources/policy/ej_guidance_nepa_epa0498.pdf. Last accessed on June 30, 2017.

USFWS (United States Fish and Wildlife Service)

2012 *Mexican spotted owl recovery plan, first revision (*Strix occidentalis lucida*)*. Albuquerque, New Mexico.

This page intentionally left blank.

CHAPTER 6: GLOSSARY

Anesthesia: Drugs that are administered that cause a patient not to have any sensation or awareness.

Archaeological resources: Any material remains or physical evidence of past human life or activities that are of archaeological interest, including the record of the effects of human activities on the environment. They are capable of revealing scientific or humanistic information through archaeological research.

Candidate species: Plants and animals for which there is sufficient information on their biological status and threats to propose them as endangered or threatened under the 1973 Endangered Species Act, but for which development of a proposed listing regulation is precluded by other higher priority listing activities.

Chemical immobilization: A method used to temporarily incapacitate trespassing livestock by applying remote delivery of immobilizing drugs to tranquilize the animal safely. This is often done using dart guns.

Critical habitat: Defined in the Endangered Species Act as an area occupied by a species listed as threatened or endangered where there are physical or geographical features essential to the conservation of the species, or an area not currently occupied by the species, which is itself essential to its conservation.

Cultural landscape: A geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

Cultural resource: Aspects of a cultural system that are valued by or significantly representative of a culture or that contain significant information about a culture. A cultural resource may be a tangible entity or a cultural practice. Tangible cultural resources are categorized as districts, sites, buildings, structures, and objects eligible for listing on the National Register of Historic Places and as archaeological resources, cultural landscapes, structures, museum objects, and ethnographic resources for NPS management.

Ethnographic resource: A site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it.

Historic vernacular landscape: A landscape that evolved through use by the people whose activities or occupancy shaped it. Through social or cultural attitudes of an individual, a family, or a community, the landscape reflects the physical, biological, and cultural character of everyday lives. Function plays a significant role in vernacular landscapes. This can be a farm complex or a district of historic farmsteads along a river valley. Examples include rural historic districts and agricultural landscapes.

Lethal reduction: The act of putting an animal to death.

Prehistoric: Of, relating to, or denoting the period predating written records.

Sedation: The act of calming by administrating a medication that commonly induces the nervous system to calm (for example, when cattle are given xylazine so they are more tractable).

Sling cable: A sling cable is used as a hoist system on a heavy lift type helicopter. The sling is of fixed length, is attached to the belly of the aircraft before it takes off, and remains hanging there until the aircraft returns.

Special status species: Those species for which state or federal agencies assign an additional level of protection by law, regulation, or policy.

Threatened species: Any species likely to become endangered throughout all or a specific portion of its range within the foreseeable future, as designated by the Secretary of the Interior in accordance with the 1973 Endangered Species Act.

Trespass livestock: The unauthorized running-at-large, herding, driving across, allowing on, pasturing, or grazing of livestock of any kind in a park area.

Wildfire: An unplanned fire caused by lightning or other natural causes, by accidental (or arson-caused) human ignitions, or by an escaped prescribed fire.

Wildland fire: A general term describing any non-structure fire that occurs in vegetation and natural fuels. Wildland fire includes both planned and unplanned fires. The National Park Service applies a variety of strategies to manage wildland fire to meet park objectives.

Appendix A
Photographs

Photo 1

Photo 2

Photos 1 and 2: The bottom of the fence would be 18 inches above the ground and H-braces would be 42 inches high and spaced every 200 feet to facilitate safe movement of wildlife (**Photo 1**) and prevent the movement of livestock (**Photo 2**).

Photo 3

Photo 4

Photos 3 and 4: Baited-pen trapping consists of using 6-foot-high metal livestock panels to create a temporary circular pen approximately 0.05 to 0.1 acre in size.

Photo 5

Photo 6

Photos 5 and 6: The door on the trap would either be a spring-triggered, self-latching gate using a trip wire (**Photo 5**), or a one-way gate using PVC pipes (**Photo 6**).

Photo 7

Photo 8

Photos 7 and 8: Alternate pens within the holding facility will be used to separate branded from unbranded livestock, mares' small foals, sick and injured animals, or other animals determined to need separate pens from the other animals. A minimum of 100 square feet will be provided per animal. Family groups would be kept together unless safety is an issue.