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**Southwestern
Region**

Range
Specialist Report

Forest Plan Revision
FEIS

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Specialist Report

Introduction

This report evaluates and discloses the potential environmental consequences on the range resource that may result with the adoption of a revised land management plan. It examines, in detail, four different alternatives for revising the 1987 Apache-Sitgreaves National Forests (Apache-Sitgreaves NFs) land management plan (1987 forest plan).

Relevant Laws, Regulations, and Policy that Apply

Where consistent with other multiple use goals and objectives, there is Congressional intent to allow livestock grazing on suitable lands. This is shown in the Multiple Use and Sustained Yield Act of 1960, the Forest and Rangeland Renewable Resources Planning Act of 1974, the Federal Land Policy and Management Act of 1976, the National Forest Management Act of 1976, and the Rescission Act of 1995.

It is Forest Service policy to make forage available to qualified livestock operators from lands suitable for grazing consistent with land management plans. This is laid out in Forest Service Manual (FSM) 2203.1, based on 36 Code of Federal Regulations (CFR) 22.2 (c).

It is Forest Service policy to continue contributions to the economic and social well being of the American people by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood, as laid out in FSM 2202.1.

It is Forest Service policy that decisions on management of individual grazing allotments be made after project-level environmental analysis for the particular allotment as laid out in Forest Service Handbook (FSH) 2209.13 91. Management on specific livestock grazing allotments must comply with the provisions of the forest land management plan and applicable standards and guidelines must be included in the term grazing permit, as described in FSH 2209.13 91.1 and 91.2 .

Methodology and Analysis Process

This report describes the capability and suitability of National Forest System (NFS) lands for producing forage for grazing animals and for providing habitat for wildlife. It describes the condition and trend of lands suitable for grazing and browsing. It also describes the potential environmental consequences of vegetation treatments (mechanical and fire) on the rangeland resource. The report also describes the management objective for the Heber Wild Horse Territory and unauthorized livestock.

An Animal Unit Month (AUM) is the amount of dry forage consumed by one animal unit for 30 days (Newman 2010). An Animal Unit is one 1000 pound cow with or without a calf under six months, or five sheep

An estimate of range condition and the present and potential supply of forage for livestock and wild and free-roaming horses and burros, and the capability of these lands to produce suitable food and cover for wildlife species can be found in the Plan Set of Documents.

The methods for determining acres of land capable and suitable for livestock grazing are described in detail in Appendix A to this report. The boundary for the suitability analysis is the boundary of the Apache-Sitgreaves NFs on the Arizona side. This includes some allotments that are administratively managed by the Gila National Forest.

Assumptions

In the analysis for this resource, the following assumptions have been made:

- This programmatic analysis does not analyze changes that may occur to livestock management at an allotment scale. Allotment level analysis will instead be analyzed at the project level including season of use, and permitted livestock numbers.
- The proposed plan allows for site-specific determinations relating to allotment management, such as the proper grazing systems to meet desired conditions and what range improvements would be needed to implement those systems.
- The proposed plan sets objectives for vegetation treatment and manipulation practices that contribute to the amount and condition of rangelands (1982 Rule Sec. 219.20 (a)).
- Pest (e.g., invasive plants) problems are evaluated during allotment planning or as issues arise on a site-specific basis (1982 Rule Sec. 219.20 (b)).
- Conflict or beneficial interactions among livestock, wild free-roaming horses and burros, and wild animal populations are managed at the allotment/Territory level (1982 Rule Sec. 219.20 (b)).
- The proposed plan, through desired conditions and objectives for each vegetation type, provides direction to move rangelands in unsatisfactory condition toward desired conditions. Implementation occurs at the allotment level (1982 Rule Sec. 219.20 (b)).
- Livestock grazing under all alternatives would be managed with adaptive management to match livestock numbers with annual forage production.
- Climate change may affect forage conditions on the forests. Under all alternatives, adaptive management used in allotment management planning allows for adjustments in the number of livestock and season of pasture use so that livestock use matches forage production for every grazing season. The Forest Service has given regional direction for use of rangelands after a drought to ensure health of the forage resource.
- Under all alternatives, various activities such as dispersed recreation, firewood gathering, roads, OHV use, and elk grazing can also affect the forage resource. The intensity of the effects from these activities varies throughout the forest depending on the intensity of the activities. When conflicts arise from these uses that threaten the long-term range condition and trend, the forests would look for multiple-use solutions that properly balance these effects.
- Rangeland condition is a reflection of overall vegetation conditions and trends. See the Vegetation Specialist Report for detailed information.

Revision Topics Addressed in this Analysis

Revision Topic – Community-Forest Interaction

Contribution to Local Communities

- Acres of rangeland suitable for grazing
- Environmental consequences based on amount (acres) of vegetation treatments
- Qualitative discussion of management strategy for the Heber Wild Horse Territory and invasive species

Summary of Alternatives

A summary of alternatives, including the key differences among alternatives, is outlined in the Final Environmental Impact Statement.

Description of Affected Environment (Existing Condition)

Livestock grazing on lands of the Apache-Sitgreaves NFs has changed dramatically over the past century. Prior to the forests establishment, grazing was largely unregulated with cattle, sheep, and horses typically grazing the range. As the number of livestock increased, the rangeland deteriorated. In the early 1900s, the Forest Service instituted a grazing control system to maintain productivity that required users to pay a fee and divided the forest into allotments to discourage denuding the rangeland (Forest Service 1988).

Permitted animal unit months (AUMs) have declined on the forests throughout the years. In the 1980s, about 236,000 AUMS were permitted on an annual basis (Forest Service 1983) compared to 130,000 AUMS permitted in 2011. Although livestock numbers and associated grazing receipts have decreased in the past, the forests do not anticipate significant reductions in permitted numbers in the future. About 1.7 million acres of NFS lands are included in currently active livestock grazing allotments (Forest Service 2011b). Grazing on the Apache-Sitgreaves NFs helps to maintain the social customs and traditions of ranching and provides economic contributions to local ranching operations.

Range Allotments and Permitted Livestock

The forests currently have 92 active grazing allotments and two sheep driveways covering approximately 1.7 million acres of National Forest System lands. Other allotments are vacant, with varying likelihoods of being reopened for permitted livestock grazing. Livestock grazing occurs on NFS lands that are capable and suitable for livestock grazing and include every major vegetation type present on the Apache-Sitgreaves NFs.

In 2011, permitted livestock Animal Unit Months (AUMs) totaled 130,000 of which 8,912 were from sheep and the rest was mostly cattle with incidental amounts from work horses and burros. In the same year, authorized livestock AUMS totaled 81,433 before the Wallow Fire disrupted grazing on all or part of 45 grazing allotments. In most years, the numbers of livestock permitted under the term grazing permits is more than what is authorized (actually allowed to graze and billed for by the forests). This happens either because the Forest Service restricts numbers and/or season of use for resource protection such as during droughts, or because the grazing permittee decides to bring on fewer than or none of the permitted livestock.

Seventy-six [1]of the active and vacant grazing allotments have been assessed under regional protocols for resource conditions, and environmentally analyzed under the provisions of the National Environmental Policy Act of 1964 (NEPA) and the Rescission Act of 1995. This process still needs to occur for the remaining allotments. The standard provisions of the term grazing permits (FS-2200-10) themselves allow for an extensive degree of adaptive management to account for year to year resource needs. Current Forest Service direction also provides for additional adaptive management established through the NEPA decisionmaking process to maintain and improve rangeland resources.

Ecological conditions and trends have been evaluated on almost every active allotment on an annual basis by looking at ungulate percent utilization of herbaceous forage, and periodically via long-term monitoring sites (range analysis and other resource assessments) usually in conjunction with NEPA environmental analyses for term permit renewals and allotment management plans. In general, compared with the 1980s, resource conditions in riparian areas have improved while increased densities of juniper and pine trees and long years of drought have tended to keep upland areas from showing much improvement in herbaceous plant cover (see project files).

Vegetation

Rangeland management is affected by the vegetation condition and ongoing management activities including vegetation treatments such as removal of encroaching juniper, mechanical treatments, and burning. For information on vegetation condition, see the Vegetation Specialist Report.

In the absence of frequent fire or mechanical treatments, woodlands naturally become denser and trees encroach into adjacent grasslands. As junipers and piñons encroach into grasslands, they extract shallow groundwater, and deposit allopathic leaf litter, thereby reducing the density and species composition of the native herbaceous understory.

The encroachment of woody species into grasslands reduces ground cover increasing the amount of soil erosion with the potential of permanent loss of topsoil. The result is a loss of forage and habitat quality for livestock and wildlife, with the permanent loss of topsoil a potential in severe stages of erosion. Also lost in severe stages of many years' duration are the seed banks of the grasses and forbs. This occurs through occasional sprouting and subsequent loss of young plants as grazers concentrate on them and loss of seeds with eroding topsoil. Because much of the existing, encroached grasslands have been dominated by junipers and piñons for the better part of a century, a seed bank of native herbaceous species may no longer exist. This is more the case with piñon-juniper, than in areas with overstocked or encroaching ponderosa pines, since the amount of topsoil lost with encroaching ponderosa pine is generally less due to higher quantities of protective pine needle litter and duff.

The 1987 forest plan acknowledged the overstocking of juniper and the associated effects on herbaceous understory density and composition. It called for thinning juniper overstory on at least 2,400 acres and the conversion of 400 acres to grassland per year, and keeping it thinned with

[1] Communication from Mike Alpey, June 2012. Mike queried the INFRA database to determine this.

1,700 acres of re-treatment per year. Currently, around 1,200 acres per year are treated to remove encroaching woodland species.

Riparian Areas

Livestock are attracted to areas with high amounts of water. Cattle and elk, if not actively managed, tend to stay in and graze gentle-gradient riparian areas to an extent that can interfere with attaining the desired vegetation and soil resource conditions for these areas. There are approximately 48,000 acres of riparian vegetation types on the Apache-Sitgreaves NFs. Wetlands, springs and aspen stands, with their associated wildlife, can be negatively affected by the relatively higher livestock occupancy and use, if not controlled by management actions. Current allotment management focuses on strategies to move livestock enough to distribute their use and impacts throughout pastures and prevent concentration in the riparian areas.

Invasive Species

Noxious and other weeds outcompete and replace the native plant species on which grazing animals and the entire ecosystem depend. Most of what is considered weeds has no or little forage value, compared to the species they have replaced. The end-result of a heavy takeover by one or more weed species is the loss of the area as forage for ungulates, and as habitat for a huge variety of wildlife, insects and other classes of native life.

The forests are not heavily infested with weeds. Most populations are small and scattered, and do not dominate the vegetation community as yet. Therefore there is very little current effect on forage levels for livestock or wildlife.

The forests have weed inventory and treatment authorized under the 2008 Environmental Analysis for the Implementation of the Apache-Sitgreaves National Forests Integrated Forest-Wide Noxious or Invasive Weed Management Program (Forest Service 2008b). The weed treatment policy as outlined in the 2008 decision incorporates the agency direction for weed control, and includes actively searching out and treating small initial infestations. *Note: A particular and separately funded inventory and treatment effort is currently (2012) underway for the Wallow Fire.*

The forests are a partner in the cooperative weed management area (CWMA) that encompasses lands of all ownerships between the Navajo and Apache reservations, in Navajo, Apache, and Greenlee Counties. The CWMA provides education to the public to recognize and prevent weed expansions, inventories the Apache-Sitgreaves NFs and other lands for weed populations, and is developing capacity to cooperatively treat weed populations.

Heber Wild Horse Territory

The Heber Wild Horse Territory (Territory) comprises approximately 19,700 acres in the Black Canyon area southwest of Heber-Overgaard, Arizona. The Territory was established in 1973, based on the location of a known band of horses, under the Wild Free-Roaming Horse and Burro Protection Act of 1971 (the Act). The purpose of the Act was to establish territories for use by, and for, the protection and management of wild horses in a manner that is designed to achieve and maintain a thriving natural ecological balance.

The 1987 forest plan does not contain specific goals or objectives for the Territory. However, it does contain a standard and guideline that states "Maintain existing wild horse territory and herd." Direction for its management will be contained in the Heber Wild Horse Territory Management Plan, which is currently under development and environmental analysis.

Unauthorized Livestock, Stray Equine, and Feral Horses

Unauthorized livestock are livestock occupying NFS lands without Forest Service authorization. They fall into several categories: cattle, sheep, horses and other livestock actively owned by people other than grazing permittees or short-term recreationists; permittee-owned livestock allowed to run in excess numbers, at an unauthorized time of year, or in an area not authorized for them; animals of livestock species newly abandoned on the forests or remaining long enough to become feral and perhaps reproduce feral offspring. The Apache-Sitgreaves NFs has feral cattle on the Clifton Ranger District and stray equine or feral horses on all districts.

It is fairly easy to determine authorization status for cattle, because virtually all actively owned cattle are branded and have ear markings which identify the owner. Domestic sheep and goats are relatively uncommon on the forests and need human protection from predators, so they rarely show up as unauthorized livestock. Unauthorized burros and mules not clearly associated with a permittee or other person are considered unauthorized, and are almost never encountered. Unauthorized horses have been observed on all five ranger districts. Most are probably feral or stray equine from adjacent land owners, while others may have been abandoned by recreational owners.

Environmental Consequences

The land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project or activity. Because the land management plan does not authorize or mandate any site-specific projects or activities (including ground-disturbing actions) there can be no direct effects. However, there may be implications, or longer term environmental consequences, of managing the forests under this programmatic framework.

All alternatives provide similar guidance for managing livestock grazing. The management focus is to balance livestock grazing with available forage.

Lands Suitable for Livestock Grazing

The criteria for suitability for livestock grazing are the same in the **action alternatives** (see chapter 4 in the proposed plan and the table below). This is very similar to the existing direction under **Alternative A**.

Table 1. Suitability of livestock grazing on the Apache-Sitgreaves NFs

Management Area	Livestock Grazing	
	Suitable	Not Suitable
General Forest	X	

Community-Forest Intermix	X	
High Use Developed Recreation Area	X	
Energy Corridor	X	
Wild Horse Territory	X	
Wildlife Quiet Area	X	
Natural Landscape	X	
Recommended Research Natural Area		X
Research Natural Area		X
Primitive Area	X	
Recommended Wilderness	X	
Wilderness	X	
Other Areas		
Active and vacant grazing allotments	X	
Current National Forest System land not in a grazing allotment		X

The major difference in suitability criteria between **Alternative A** and the **action alternatives** is the vacant 62,715 acre Sandrock allotment that was identified as not suitable in the 1987 forest plan. The acres suitable for livestock grazing in the action alternatives are very similar. The only variation among the **action alternatives** corresponds to the amount of land allocated to the Recommended Research Natural Area MA which is considered not suitable. In **Alternatives B and C** land is allocated to five recommended RNAs (which are not suitable to livestock grazing), while there are only three recommended RNAs in **Alternative D**. Table 2 identifies the acres that are suitable for livestock grazing by alternative.

Table 2. Suitable Acres by Alternative.

ALTERNATIVE	Suitable Acres
A	1,930,286
B	1,901,512
C	1,901,512
D	1,903,116

Effects of Vegetation Treatments

Piñon-Juniper Reduction

The **action alternatives** have more average annual mechanical treatments in piñon-juniper woodlands and grasslands encroached by woody species than **Alternative A** (see table below).

Table 3. Woody Encroachment Reduction Treatments by Alternative

ALTERNATIVE	ACRES TREATED IN GRASSLANDS ENCROACHED BY WOODY SPECIES, AVERAGE PER YEAR	ACRES TREATED IN P-J WOODLAND, AVERAGE PER YEAR	AVERAGE YEARLY TOTAL BY ALTERNATIVE
A	500	500	1,000
B	8,202	1,561	9,763
C	500	2,633	3,133
D	5,121	2,358	7,479

After removal of most of the existing tree overstory, remaining herbaceous plants would benefit from reduced competition with trees and should increase in vigor, expand their basal and canopy cover, and deposit seeds that can sprout into new plants. However, the increase in herbaceous vegetation density is likely to be less than in an area with treated ponderosa pine, because the seed bank that could have responded may be lost with eroded topsoil. This could be mitigated by seeding the treated grasslands and woodlands. **Alternatives D and B** would provide the greatest benefit to rangeland condition since the most acres are treated, followed by **Alternative C and Alternative A**. Additional environmental consequences of mechanical treatments are shown in the following section.

Mechanical Vegetation Treatments

The **action alternatives** project annual average acres of mechanical vegetation treatments (i.e. tree cutting in pinon-juniper and other forested vegetation types) that are greater than the annual average acres under current management (**Alternative A**).

Table 4. Mechanical Treatments by Alternative

ALTERNATIVE	ACRES TREATED, AVERAGE PER YEAR
A	12,182
B	19,590
C	23,997
D	15,953

Under **all alternatives**, mechanical vegetation treatments would have little effect on livestock operations while they are occurring. Sale administration generally minimizes conflicts such as gates left open or damaged fences. In the near to mid-term, up to 20 years from treatment, mechanical vegetation treatments and their associated prescribed burns open up the tree canopy and allow more light and water for herbaceous plants to increase and establish. This increases the available forage for grazing animals. This increase in forage within existing treed areas would increase livestock distribution in pastures, which would reduce use on more typical grazing areas such as meadows. Improved livestock distribution would improve conditions throughout each pasture.

However, this may be temporary, unless follow-up treatments occur that would maintain the reduced tree canopy. If little or no re-treatment prescribed burns are done in most treated areas, it is likely that most treated areas would gradually revegetate with trees and lose the herbaceous component that had developed; thus reducing the amount of forage available and, in response, lowered livestock numbers to match use with capacity.

A short-term effect, with long-term potential if untreated, is that areas which have been mechanically treated often have weed populations, mostly musk thistle, establish in the following two to three years. This establishment is likely the result of vehicle-transported seeds and increased light availability following treatment. In some cases, the weed seeds may have been dormant in the soil for several decades with the disturbance and increased sunlight encouraging seed sprouting. Noxious and other weeds outcompete and replace the native plant species upon which grazing animals and the entire ecosystem depend. Most of what is considered to be a weed has less or no forage value, when compared to the species they replaced. The result of an infestation by one or more weed species is the loss of the area as forage base for ungulates and as habitat for a variety of wildlife, insects, and other native plants and animals.

Fire

Prescribed fire intensities may range from low to severe and tree-killing. Fire removes forage available to livestock in the short-term until the forage plants can regrow. Grazing management can be affected by burning and would likely need to be adjusted by changing pasture rotations, livestock number, or livestock season of use on a grazing allotment. Livestock in this situation would need another location to graze.

After any prescribed burn or wildfire, the area would be evaluated for ground cover and condition, plant composition, infrastructure (e.g., fencing), presence of noxious and invasive weeds, and forage production before re-authorizing livestock to graze the affected pastures. The deferral time for livestock grazing would vary depending on the results of the evaluation.

Note: For the 45 allotments involved in the 2011 Wallow Fire, forest personnel and the detailer team brought in to assist were in consensus that areas burned with low intensity received little or no damage to herbaceous species and recovered soil cover later the same year, so livestock grazing could be authorized the next year.

Table 5 displays the average amount of annual prescribed burning planned across all vegetation types. There is not a direct correlation between the amount of prescribed burning, burned pastures, and the need to defer livestock grazing. However, there are times following a burn and an evaluation of resource condition, a pasture may be temporarily unavailable to livestock grazing, which may in turn impact the livestock permittee.

Table 5. Annual average burning (acres) treatment objectives by alternative

A	B	C	D
6,844 acres	28,929 acres	12,855 acres	48,926 acres

Unlike **Alternative A**, the **action alternatives** call for establishment of at least one forage reserve area per ranger district during the planning period. This would most often be developed from a vacant grazing allotment, and used as a temporary location to graze displaced livestock. There are cases where such arrangements have worked satisfactorily, such as with the Malpais Borderlands

group of ranchers associated with the Coronado National Forest. In other places, ranchers have proven unwilling to make use of temporary forage reserves, citing unwillingness to move their cattle to unfamiliar areas and having to maintain fences and other improvements on the reserve. Depending on the cause of the livestock displacement, permittees can sometimes receive subsidized forage from the Department of Agriculture, which probably plays a part in the disinclination to use forage reserves. Assuming partial acceptance, some of the deferred livestock AUMs could be accommodated on the forests as the reserves are established.

In the near to mid-term, up to 20 years from treatment, prescribed burns would open up the tree canopy and allow more light and water for herbaceous plants to increase and establish. This would increase available forage for grazing animals. However, this may be temporary, unless follow-up treatments occur that would maintain the reduced tree canopy. It is likely that untreated areas would gradually revegetate with trees and lose the herbaceous component that had developed.

The increased herbaceous cover may not lead to noticeable increases in authorized or permitted livestock AUMs, because forage in upland areas is very often underused when compared to the critical areas along streams and meadows, which control how long and how many livestock can graze in a given pasture without adverse impacts to those areas.

An effect of large tree-killing fires across most of a watershed is the restoration of old dry springs, because of the removal of many live trees that otherwise extract shallow ground water before it can come out in the springs. This effect (and the springs) fades over decades with restoration of most of the tree cover. This effect is much less likely with prescribed burning than with hot wildfires, because fewer trees are killed.

Riparian Restoration

In **all alternatives**, the impact of livestock grazing on riparian habitat would be analyzed in all new range NEPA projects on the forests. If substantial negative effects could not be mitigated through grazing management practices (e.g., herding, grazing deferment when areas are wet), then livestock exclosures may be necessary around wetlands, cienegas, and riparian areas. Exclosure areas would likely not be available for forage, but would not be big enough to reduce stocking rates in a pasture. The use of water by livestock at exclosures would be mitigated with alternative water sources, providing lanes to the water, piping to livestock drinkers, or other technique.

Invasive Species Treatments

Increased abundance of invasive weeds would reduce the quality of forage by displacing native species and altering nutrient and fire cycles, degrading soil structure, and decreasing the quality and availability of forage for livestock and wildlife (Mack et al. 2000). Although the 1987 forest plan (**Alternative A**) provided no direction to manage invasive species, the forests actually began to actively manage for them in the mid-1990s. All of the **action alternatives** provide specific direction to control, treat, and eradicate invasive plant and animal species.

In **all alternatives** it is assumed that weed populations would be treated before they can dominate areas, and would not affect forage levels. Chemical treatments are available that have minimal effect on livestock management. Biological insect or pathogen treatments would not affect

livestock management. Treatment should result in control of the invasive plants and improvement of the degraded rangeland (DiTomaso 2000)

Heber Wild Horse Territory

All alternatives would manage the Horse Territory in the same manner, that is, according to the Territory Management Plan currently being developed and analyzed. The only difference between **Alternative A** and the other alternatives is that the **action alternatives** all recognize the Territory as a separate Management Area. Desired Conditions for the Territory include:

- Grazing is in balance with available forage.
- Grazing and its associated uses are not contributing to reduced water quality from sediment or other non-point source pollutants.
- Horse numbers within the territory are aligned with the appropriate management level2 as described in the Heber Wild Horse Territory Management Plan.
- The Wild Horse Territory Management Area contains landscapes that vary from moderately altered where human activities are evident (low scenic integrity) to natural-appearing where human activities do not stand out (high scenic integrity).
- Recreation opportunities range from semi-primitive non-motorized to roaded natural.

In **all alternatives**, wild horse numbers would be managed according to the Heber Wild Horse Territory Management Plan (under development) that would ensure herbivory is in balance with available forage.

Unauthorized Livestock

All alternatives would manage unauthorized livestock according to Federal and State law, regulations and agency policy. Therefore, there should be no negative effect from unauthorized livestock that could consume available forage.

Other Disclosures

There are no irreversible and irretrievable commitments of resources associated with authorizing livestock occupancy and grazing under the proposed plan.

Relationship of Short-Term Uses and Long-Term Productivity

In **all alternatives**, livestock grazing is authorized at roughly the current levels. Permitting livestock grazing at sustainable levels is mandated by law and regulation (see the Relevant Laws

[2] The Interior Board of Land Appeals (IBLA) has defined the appropriate management level as the 'optimum' number of wild horses (or burros) which results in a thriving natural ecological balance and avoids a deterioration of the range. (109 IBLA 119; also reference Dahl vs. Clark, supra at 592). (From http://www.blm.gov/nv/st/en/prog/wh_b/appropriate_management.html) It is usually expressed as a range of numbers.

section above), but livestock grazing can affect other uses of the forests by requiring fences and other structures, eating forage, attracting some predators, and trampling vegetation and soils. The fences and structures add human-caused features to the visual environment. The forage that livestock eat could be allocated to wildlife or used for watershed improvement in some but not all areas. If livestock were not on the Apache-Sitgreaves NFs, predators would increase their focus on wildlife, and on livestock on adjacent private and State lands. Trampling impacts, if no longer caused by domestic livestock, could be the result, to a lesser extent, of increased elk presence. The two species weigh about the same and both tend to concentrate in riparian areas. Elk roam more widely, but are present on many seasonal allotments at times of the year when livestock are not permitted to prevent impacts to wet soil.

In **all alternatives**, prescribed burning is done for resource improvement. These burns have short-term and site-specific impacts on livestock grazing levels because the potential need to defer livestock grazing until resources have had time to recover.

Cumulative Environmental Consequences

Out of the list of cumulative actions developed for this analysis (ASNF 2011) several that relate to the authorization of domestic livestock grazing on the forests are analyzed below.

Forest Restoration Activities / Mechanical Vegetation Treatments – For the most part mechanical vegetation treatments or other types of restoration activities on other land ownerships have mostly site-specific effects that would not affect livestock operations on the forests during their implementation. A short-term effect with long-term potential impacts is in areas which have had mechanical vegetation treatments. These areas often have weed populations, mostly musk thistle, which establish in the following two to three years. This is likely a combination of vehicle-transported seeds, and increased light availability following treatment. In some cases the weed seeds may have been dormant in the soil from several decades back, and disturbance plus increased light encouraged seed sprouting. The Apache-Sitgreaves NFs weed treatment policy as outlined in the 2008 decision (Forest Service 2008b) incorporates the agency direction for weed control, and includes actively searching out and treating small initial infestations.

Planned and Unplanned Ignitions – Fires from adjacent lands can escape and spread onto the Apache-Sitgreaves NFs. If they do, it would lead to temporary grazing exclusions in burned pastures. This can hamper management flexibility in the involved allotment, and sometimes the only remedy is use of a forage reserve, or allotment non-use. Unanticipated non-use may impact the permittee's ranching operation by requiring the permittee to find new forage or sell all or part of the livestock. At present, we have very few forage reserves. **Alternatives B, C, and D** have a guideline calling for establishment of at least one new reserve per District.

Groundwater Pumping and Climate Change – Groundwater extraction on non-NFS lands within and near the forests may result in a lowering of shared water tables. The areas most likely to show the effects of groundwater extraction are large portions of the Clifton Ranger District (mine-related) and near municipalities (Show Low, Springerville, etc.). A lowered water table may affect existing wells used for livestock water on the forests by lowering the water below the depth of the well. At a shallower level of groundwater, developed springs have been drying up, primarily because of years of drought and excess trees extracting shallow water. This concentrates livestock use around remaining waters and makes proper resource management more difficult, leading to expensive attempts to develop additional stock waters.

Urban Development – As real estate development occurs adjacent to or within the forests, it can affect non-NFS lands and water sources which had been available for livestock grazing or were not used in ways which conflicted with operation of adjacent grazing allotments. As these parcels become subdivided and residences are constructed, conflicts (i.e. gates left open, vegetation and soils affected by off-road vehicle use, etc.) with allotment management increase. Land exchanges involving the forests tend to convert NFS land near municipalities into non-NFS land and the lands acquired in exchange often are not included in adjacent allotments. If the NFS lands transferred out of the NFS have critical resources on them like water or corrals, this could affect use of the allotment.

Arizona Department of Game and Fish acquisition of ecologically important lands – The lands considered here are almost always non-NFS land in-holdings within the forests and are valuable for the water and riparian vegetation that led to their becoming non-NFS land during homesteading. Sometimes they were available for livestock grazing by the adjacent permitted livestock; with acquisition they are no longer available because their forage and water are reserved for wildlife. This can put additional grazing pressure near the waters remaining available to livestock.

Spread and Treatment of Invasive Species -- Almost all noxious weed species and all other exotic invasive plant species are not native to the Apache-Sitgreaves NFs and enter the forests from sometimes-distant non-NFS lands, carried by vectors such as vehicles (the most common method). Livestock and wildlife can bring in weed seeds, but decades of livestock grazing on the forests and non-NFS lands have shown cattle and sheep use results in fewer new weed populations than those established along roads and trails by seeds spread by vehicle tires, equipment tracks, and/or attached soil (Tyser and Worley 1992; Tyser and Key 1988; Gelbard and Harrison 2003).

Noxious and other weeds outcompete and replace the native plant species on which grazing animals and the entire ecosystem depend. Most of what we consider weeds have no or little forage value, compared to the species they have replaced. The end result of a heavy takeover by one or more weed species is the loss of the area as forage base for ungulates, and as habitat for a huge variety of wildlife, insects and other classes of native life.

The Apache-Sitgreaves NFs weed treatment policy as outlined in the 2008 decision (Forest Service 2008b) incorporates the agency direction for weed control, and includes actively searching out and treating small initial infestations. The forests are a partner in the cooperative weed management area (CWMA) that encompasses lands of all ownerships between the Navajo and Apache reservations, in Navajo, Apache and Greenlee Counties. The CWMA provides education to the public to recognize and prevent weed expansions, inventories the Apache-Sitgreaves NFs and other lands for weed populations, and is developing capacity to cooperatively treat weed populations.

Livestock grazing under the **action alternatives** would provide for continued availability of forage for domestic livestock and opportunities for ranching lifestyles consistent with the other desired conditions in the plan. Because an adaptive management strategy is used to adjust use with capacity and minimize adverse effects, the cumulative consequences associated with continued grazing use are minimal. The expected relative significance of the implementation of the **action alternatives'** objectives (to treat encroached grassland and woodlands) within the

context of the greater landscape would be a slight increase in available forage with minimal consequences to other resources and continued opportunities to graze livestock.

Adaptive Management

Forest Service policy on rangeland decision-making (FSH 2209.13 Ch. 90 and R3 Supplement FSH 2209.13 Ch. 90) specifically incorporates adaptive management into the NEPA decisionmaking process. In addition, the terms and conditions of term grazing permits give line officers latitude in altering livestock management, numbers, and seasons of use to account for weather, fire, or other year-to-year changes.

Other Planning Efforts

The only known planning effort that would apply to the range resource would be plans made by the Arizona Department of Game and Fish relating to elk population levels.

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Appendix A – Methodology and Analysis Process to Determine Rangeland Capability and Suitability

Provisions of the 1982 planning rule require that the capability and suitability for producing forage for grazing animals on NFS lands be determined. The analysis process and results are discussed in the following sections.

Capability is the potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease.

Suitability is the appropriateness of applying certain resource management practices to a particular area of land, in consideration of relevant social, economic, and ecological factors. A unit of land may be suitable for a variety of individual or combined management practices.

An identification of an area as suitable for a particular use does not mean that the use will occur over the entire area. Likewise, identifying that a particular use is not suitable in a management area does not mean that the use will not occur in specific areas. The identification of an area as suitable for various uses is guidance for project and activity decision-making and is not a resource

commitment or final decision approving project and activities. Final decisions on resource commitments are made at the project level. The final decision to authorize livestock grazing would be made at a project (allotment) level. National Forest System grazing allotments have long histories of monitoring resource conditions and monitoring actual livestock grazing use, which can be correlated on the site-specific basis. Livestock numbers are based on monitoring of resource conditions, including riparian and other critical and key areas, and then taking actions to adjust management (e.g., timing, frequency, or duration of use) to control livestock impacts affecting progress toward a wide range of resource goals and desired conditions.

Step 1: Capability

Capability to produce forage for grazing animals was originally determined in the 1980s during the development of the 1987 plan. Most landscape scale conditions that determine capability have not changed significantly since the first evaluation. The Analysis of the Management Situation (1983) and the Environmental Impact Statement (1987) document the analysis of grazing capability and suitability for the 1987 plan.

Step 2: Suitability

Suitable rangeland is that which is fully capable and where the activity of livestock grazing is consistent with other management objectives (U.S. Forest Service 1997). To identify the lands suitable for livestock grazing, additional criteria (see table 6) from Chapter 4 Suitability of the proposed plan were used.

Suitable rangeland is that which is appropriate for the activity of livestock grazing in consideration of relevant social, economic, and ecological factors. Suitable rangeland is a subset of capable rangeland and is determined based on compatibility with desired conditions and objectives in the plan area. Lands within the plan area are not identified as suitable for a certain use if that use is prohibited by law, regulation, or policy; would result in substantial and permanent impairment of the productivity of the land or renewable resources; or if the use is incompatible with the desired conditions for the relevant portion of the plan area.

Table 6. Lands suitable or not suitable for livestock grazing.

Management Area	Livestock Grazing	
	Suitable	Not Suitable
General Forest	X	
Community-Forest Intermix	X	
High Use Developed Recreation Area	X	
Energy Corridor	X	
Wild Horse Territory	X	
Wildlife Quiet Area	X	

Natural Landscape	X	
Recommended Research Natural Area		X
Research Natural Area		X
Primitive Area	X	
Recommended Wilderness	X	
Wilderness	X	
Other Areas		
Active and vacant grazing allotments	X	
Current National Forest System land not in a grazing allotment		X

To calculate the acres suitable for livestock grazing in the action alternatives, GIS was used to subtract areas not in an allotment and the designated and recommended research natural areas. The 1987 plan was used as the baseline to identify lands suitable for livestock grazing in Alternative A.

The 1987 forest plan identified the Sandrock allotment as unsuitable for livestock grazing. For Alternative A, the Sandrock allotment (about 9,083 acres) was subtracted from the capable acres.

Results

The following table displays the acres of land that are capable and suitable for livestock grazing.

Table 7. Acres capable and suitable for livestock grazing by alternative.

	Alternative A	Alternative B	Alternative C	Alternative D
Acres Suitable for Livestock Grazing	**1,930,286**	**1,901,512**	**1,901,512**	**1,903,116**