United States Department of Agriculture

A-1 Mountain Range Management Project

Environmental Assessment

Forest Service Coconino National Forest Flagstaff Ranger District September 2016

For More Information Contact:

Mike Elson
Flagstaff Ranger District
5075 N. Highway 89
Flagstaff, AZ 86004
Phone: 928-527-8231
Email: mtelson@fs.fed.us
Fax: 928-527-8288

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Introduction

We are proposing to authorize livestock grazing using a deferred rotation or deferred, rest-rotation management system on 5,085 acres, referred to as the A-1 Mountain Range Allotment (A-1 Mountain Allotment). These actions are proposed to be implemented on National Forest System (NFS) lands managed by the Flagstaff Ranger District of the Coconino National Forest (Forest).

We prepared this environmental assessment (EA) to determine whether authorization of livestock grazing may substantially affect the quality of the human environment and thereby require the preparation of an environmental impact statement. By preparing this EA, we are fulfilling agency policy and direction to comply with the National Environmental Policy Act (NEPA). For more details of the proposed action, see the Proposed Action and Alternatives section of this document.

Acres discussed in the analysis for the A-1 Mountain Allotment may differ slightly depending on which resource is being analyzed. In general, these acreage differences are less than 0.1 percent of the project area and are a result of rounding errors and slight boundary differences that occur when combining multiple geospatial data layers.

Project Area

The A-1 Mountain Allotment is located entirely within the boundaries of the Flagstaff Ranger District on the Coconino National Forest, and is administered and managed by the Flagstaff Ranger District. The project area is located within all or portions of Township 21N, Range 6E, Sections 1-3, 10, 11, and 13-15; Township 21N, Range 7E, Section 7; and Township 22N, Range 6E, Sections 34-36 of the Gila and Salt River Meridian. The project area is flanked on the east by the City of Flagstaff and on the west by the Maxwell Springs Grazing Allotment, and is located less than a mile from the Lowell Observatory, in the Observatory Mesa area. The A-1 Mountain Allotment boundary includes Forest Service (5,085 acres), City of Flagstaff (1,313 acres) and private lands (50 acres) for a total of 6,448 acres (Appendix B, Figure 4).

Ponderosa pine, which varies from open, park like stands to dense, closed canopy stands, dominate the vegetation on the A1-Mountain Allotment, which ranges in elevation from 7,000 feet to 8,300 feet.

The A-1 Mountain Allotment is currently divided into six main grazing pastures and two smaller livestock management pastures (Appendix B, Figure 6; Table 1). Fencing separates the main grazing pastures. Permitted livestock are run in one herd.

Table 1. A-1 Mountain Allotment pastures and acres.

Pasture	Acres
Fort Valley	1,189
A-1 Mountain	1,811
Iris	250
West	356
Belle	692

Pasture	Acres
South Flag.	631
006	82
008	73

Grazing History and Management Background

Livestock grazing within the A-1 Mountain Allotment area has occurred since the time of initial historic settlement around the 1870s, and has been managed by the US Forest Service (Forest Service) since the early 1900s. The present A-1 Mountain Allotment is a combination of the antecedent A-1 Mountain Allotment, Pinewood Allotment, and portions of the Ft. Valley Allotment. The current administrative boundary of the A-1 Mountain Allotment was created sometime in 1955 or 1956 (U.S. Forest Service, 1963).

By the 1800s, domestic livestock (cattle and sheep) numbers had reached about 4.5 million in Arizona. Overgrazing combined with fire suppression and drought resulted in a reduction in herbaceous plant cover and species diversity, and an increase in woody species (Finch, 2004; Baker et al., 1988). Accounts of widespread livestock death from this time are attributed to the reduction in forage (Baker et al., 1988).

With the establishment of the Forest Reserves in 1891 (becoming the Forest Service in 1905), land managers and ranchers began addressing the concerns of overgrazing and overall ecosystem health (Baker et al., 1988). A permit system was established in 1908, requiring ranchers to pay for livestock grazed on NFS lands. With decreasing livestock numbers and changes in management, trends in herbaceous ground cover have generally improved in areas where tree and shrub density does not limit recovery (Moore et al., 2004; Arnold, 1950; Cooper, 1960; Pearson and Jameson, 1967).

Reforms in grazing management began with the passage of the Taylor Grazing Act in 1934. By the 1970s, additional federal regulations including the Multiple-Use Sustained Yield Act of 1960 were in place, and the Forest Service entered into an era of land management that dramatically changed how grazing was managed on public lands. No specific documentation is available regarding the type and number of livestock grazed in the early years on an individual allotment, but information does exist for the Coconino National Forest. From 19,000 permitted in 1970 to 16,271 permitted in 2000, the grazing history of the A-1 Mountain Allotment most likely reflects the Coconino National Forest trends, starting with high numbers and dropping to current levels (Hanneman, 2006). Table 2 and Table 3 represent livestock numbers on the Forest from 1910 to 2010.

Table 2. Cattle and horses on the Coconino National Forest, 1910-2010.

Year	Permitted Numbers	Permitted Head Months	Actual Head Months
1910	33,200	247,000	239,000
1920	49,106	427,000	400,000
1930	19,088	149,000	142,000
1940	19,500	144,992	139,835
Late 40s- 50	19,000	137,589	132,639
1960	18,000	138,906	131,018

Year	Permitted Numbers	Permitted Head Months	Actual Head Months
1970	19,000	138,688	123,611
1980	17,350	134,589	112,713
1990	17,540	136,160	96,118
2000	16,271	126,684	88,801
2010	16,318	112,947	75,715

Table 3. Sheep and goats on the Coconino National Forest, 1910-2010.

Year	Permitted Numbers	Permitted Head Months	Actual Head Months
1910	89,550	360,000	300,000
1920	95,090	420,000	350,000
1930	63,080	240,000	200,000
1940	50,000	188,237	153,966
Late 40s- 50	24,000	112,827	94,594
1960	17,000	73,554	66,512
1970	15,000	57,742	53,993
1980	10,000	41,565	13,666
1990	2,670	14,747	12,002
2000	2,670	14,747	10,227
2010	2,670	12,038	12,038

Need for the Proposal

This section describes the purpose and need for the A-1 Mountain Allotment project. For a list of proposed actions developed to address these needs, see the Proposed Actions and Alternatives section. The following project objectives respond to the goals and objectives of the Forest Plan. By comparing the project area existing conditions with the desired conditions outlined in the Forest Plan, we demonstrate the need for the A-1 Mountain Allotment project.

Why Here, Why Now?

These actions are being proposed at this time to meet direction set forth in the Rescissions Act of 1995, which directs the Forest Service to establish and adhere to a schedule to complete environmental analyses and decisions on all allotments. National Forest System lands provide an important source of livestock forage.

The Multiple-Use Sustained-Yield Act (1960) and the National Forest Management Act (1976) designate domestic livestock grazing as one of many activities that should be considered when balancing multiple uses on NFS lands. This analysis is required in order to ensure that livestock grazing is consistent with goals, objectives and the standards and guidelines of the Coconino National Forest Plan (Forest Plan), as amended (1987).

The purpose of this project is to authorize livestock grazing in a manner that maintains and/or moves the area toward Forest Plan objectives and desired conditions, including maintaining and/or improving vegetation and soil conditions and trends on the Allotment.

Enhance Flexibility in Allotment Management

There is a need to incorporate more flexibility in allotment management. Under current management, adaptive management has been used on the A-1 Mountain Allotment, however no specific strategy exists. Adaptive management involves identification of future management options that may be needed to accelerate or adjust management decisions to meet desired conditions and/or project standards and objectives, as the need is determined through monitoring. Adaptive management in the A-1 Mountain Allotment includes managing the length of the livestock-grazing period, frequency of livestock grazing, seasonal utilization, and forage utilization guidelines. Adaptive management allows land managers to address changing and /or uncertain environmental conditions within an allotment much faster than if we did not have them.

One factor contributing to changing and uncertain conditions in the southwest is climate, which is a major contributing factor affecting range condition and trend (Periman et al., 2009). This is because of its ability to effect the vitality and productivity of range plants. Climate model projections for the southwest United States predict average temperatures will continue to rise as will the potential for an increase in the frequency of extreme heat events (Crimmins et al., 2007). As temperatures increase, drought will likely increase and intensify (USDA, 2012).

Increased temperatures combined with decreased precipitation would lead to lower plant productivity and cover, which in turn, would decrease litter cover. The reduction in plant and litter cover would make the soils more susceptible to wind and water erosion.

Under existing conditions, we are limited in how we can implement adaptive management. For example, current management allows the grazing season to be shortened, but does not allow it to be extended or shifted. For example, shifting the season of use to allow livestock to come on earlier or later depending on resource conditions. Or a pasture's use period could be extended while reducing the head of adult cattle, keeping in-line with AUMS, to meet resource needs.

Desired Conditions

The A-1 Mountain Allotment is managed via an adaptive management strategy that allows greater flexibility to meet desired conditions in changing and uncertain conditions.

Reduce Unneeded Structural Range Improvements

Fencing in the Allotment is necessary to separate pastures from one another, create water lots, and provide for better management of pastures through distribution of livestock. Forest-wide standards and guidelines identified in the Forest's Forest, Land and Resource Management Plan or Forest Plan (1987, as amended) direct land managers to "[A]nalyze range structural improvements to determine whether they are needed…Reconstruct only those improvements that are needed… [R]emove improvements that are no longer needed" (p. 68)".

Under current conditions, there is pasture fencing on the north and west boundaries of what is currently the 006 Pasture. This section of fencing is no longer needed for allotment management.

As part of the connected actions with the above need for action, there will be a need to construct approximately 300 feet of pasture fencing between what is currently the 006 Pasture and the 008 Pasture. This section of fencing would close off the 006 Pasture from the Belle Pasture.

Desired Conditions

The number of structural range improvements on the Allotment are at a level commensurate with allotment management needs.

Improve Allotment Management

The Forest Plan provides forest-wide standards and guidelines to "[C]onstruct structural range improvements necessary to implement and maintain range resource management level identified for Forest Plan Management Areas (MAs).

Currently, the Allotment does not have a permeate livestock handling facility or corral.

Currently, a pasture fence splitting the Ft. valley Pasture does not exist. There may be a need to construct a fence to improve livestock management of pasture in response to changing environmental conditions.

Desired Condition

The desired condition for the A-1 Mountain Allotment is to have a permanent corral facility and the necessary pasture fencing to facilitate livestock management.

Ensure Cultural Resources are Protected

Protection and management of heritage resource on NFS land is mandated by the National Historic Preservation Act, 1966 as amended (NHPA); 36 CFR 800; Forest Service Manual 2360; the American Indian Religious Freedom Act; the Archaeological Resource Protection Act; and the National Environmental Policy Act (NEPA). The A-1 Mountain Allotment has a number of sites. One site is within 656 feet (200 meters) of a stock pond and showed signs of disturbance. This disturbance is mostly attributed to wildlife as this site is located in a pasture that has not been grazed in the last two decades.

Desired Conditions

There would be no adverse effects to cultural and historic resources from livestock grazing and associated activities.

Ensure Accuracy with Pasture Boundaries

Currently, there is a 300-foot segment of fencing along the West and Belle Pastures that is not aligned with the actual boundary.

Desired Conditions

All boundary, pasture or allotment fencing is properly aligned.

Need for Action

There is a need to ensure that livestock grazing is managed in a manner to meet or move toward the desired conditions for range vegetation under changing and uncertain environmental conditions. To meet this need, we are proposing a modified adaptive management strategy be incorporated into the management of the A-1 Mountain Allotment.

There is a need to remove or modify structural range improvements to facilitate management of livestock distribution and water access.

There is also a need to improve livestock handling for livestock transfer on and off of the A-1 Mountain Allotment.

There is a need to protect historic property located within the project area from livestock grazing and associated activities.

There is a need to ensure that pasture boundary fencing is correctly aligned properly throughout the A-1 Mountain Allotment.

What will be Decided?

The need for the proposal outlined above sets the scope of the project and analysis to be completed. Based on the analysis, the Deputy District Ranger, who is the deciding official for the A-1 Mountain Allotment will determine whether the proposed project and alternatives could result in a substantial impact. The deciding official will determine:

- Whether to reauthorize livestock grazing and to what extent, what if any structural range improvements would be constructed or taken down, whether to implement pasture modifications, and/or how adaptive management would be incorporated ;
- What specific design criteria or mitigation measures are needed;
- What specific project monitoring requirements are needed to assure design criteria and mitigation measures are implemented and effective.

The decision will be based on:

- how well the selected alternative achieves the need,
- how well the selected alternative protects the environment and addresses issues and concerns, and
- how well the selected alternative complies with relevant policies, laws and regulations.

Proposed Action and Alternatives

The EA shall briefly describe the proposed action and alterative(s) that meet the need for action. No specific number of alternatives is required or prescribed (36 CFR 220.7(b)(2)). NEPA requires that the agency study, develop, and describe appropriate alternatives to

recommend courses of action in any proposal, which involves unresolved conflicts concerning alternative uses of available resources. If no unresolved conflicts exists, the EA need only analyze the proposed action and proceed without consideration of additional topics (36 CFR 220.7(b)(2)(i)).

Analysis of alternatives requires consideration of a range of reasonable alternatives. The range of reasonable alternatives includes both alternatives that warrant detailed analysis and alternatives that are considered but eliminated from detailed study. In cases where the design and configuration of the proposed action can mitigate resource concerns to acceptable levels, the proposed action may be the only viable action alternative. When there is a substantial issue with the proposed action, an alternative to the proposed action shall be developed and analyzed in detail (FSH 1909.15, sec. 14).

We are considering the following alternatives in detail.

Alternative 1- No Action

Forest Service handbook direction for rangeland management requires consideration of a no action alternative (FSH 2209.13, Ch.90). The no action alternative is developed as a benchmark against which the agency can evaluate the proposed action. No action in livestock management planning is synonymous with no authorized livestock grazing. If Alternative 1- No Action is selected, livestock grazing would not be authorized on the A-1 Mountain Allotment. Therefore, existing structural range improvements currently maintained through the permit would not be maintained and no new range improvements would be constructed.

Selection of this alternative would not preclude livestock grazing from being authorized on this Allotment later through a separate environmental analysis. This is because the A-1 Mountain Allotment has been determined to be suitable for such activities through the Forest Plan.

Alternative 2- Proposed Action

The proposed action includes six major components: authorization, structural range improvements, project specific resource protection measures, monitoring, an adaptive management strategy, and a drought management strategy.

Authorization

The Coconino National Forest proposes to continue to authorize livestock grazing for the A-1 Mountain Allotment under the following terms:

- Permitted livestock numbers would be maintained at a maximum of 498 Animal Unit Months (AUMs)[1] which is the equivalent of 99 head of adult cattle for approximately five months.
- Annual authorized livestock numbers would be based on existing conditions, available water and forage, and predicted forage production for the year. Adjustments to the annual authorized livestock numbers and AUMs (increase

[1] An AUM is defined as the amount of forage required by an animal unit (mature cow with or without a nursing calf) for one month; approximately 800 pounds of forage per AUM (Manske, 1998).

or decrease) may occur during the grazing season, based on conditions verified by range inspections. Annual authorized livestock numbers would not exceed permitted numbers and therefore would always be between 0 and 498 AUMs.

- The permitted season of use would be June 1 through October 31. As part of the adaptive management strategy, and depending on Allotment conditions, the grazing periods may vary in length allowing livestock to enter the Allotment as early as May 15 and/or remain on the Allotment until November 15. An extended season of use would only be authorized if it has been determined through range inspections that soil, water and vegetation conditions are suitable. If an extended season of use is authorized, the maximum permitted AUMs of 498 would not be exceeded.
- Grazing Management: Grazing would occur using either a deferred rotation or a deferred-rest rotation management system, which would allow for plant growth and recovery. Having the option to use either the deferred rotation or deferred rest rotation grazing system would allow the Forest to adjust management depending on monitoring and conditions. Additional grazing management guidelines include:
    - Generally pastures would be grazed only once during the grazing season. A second grazing period of a previously grazed pasture during the grazing season will only be authorized by the Responsible Official when conditions warrant and it has been determined through range inspections that soil, water and vegetation conditions are appropriate, and that utilization guidelines for the pasture will not be exceeded as a result of a second grazing period.
    - In some cases, pasture re-entry may be needed to facilitate livestock movement on the Allotment such as trailing livestock from one pasture to another. This is not the same as a second grazing period. Pasture re-entry for livestock movement purposes will be allowed provided the livestock are actively herded through previously grazed pastures.
- Forage Utilization[2] Guidelines: The term may refer to either a single plant species, a group of species, or the vegetation community as a whole. It is a comparison of the amount of herbage left compared with the amount of herbage produced during the year. A management guideline of conservative use (30 to 40 percent forage utilization) would be employed to maintain or improve range vegetation and long-term soil productivity. Allowable use guidelines take into account the cumulative effects of wildlife and livestock.

[2] Forage utilization (also referred to as utilization) is defined as the proportion or degree of current year's forage production by weight that is consumed or destroyed by animals (including insects). The term may refer either to a single plant species, a group of species, of the vegetation community as a whole. It is a comparison of the amount of herbage left compared with the amount of herbage produced during the year. Utilization is measured at the end of the growing season when the total annual production can be accounted for and the effects of grazing in the whole management unit can be assessed.

- Seasonal Utilization[3]: Seasonal utilization would be managed to allow for the physiological needs of plants. For the A-1 Mountain Allotment, the Forest would manage for moderate seasonal utilization (up to 50%) in late spring and early summer months when sufficient opportunity exists for plant regrowth. During late summer and fall, seasonal utilization would be managed at the conservative level (30 to 40%) when the potential for plant regrowth is limited.
- Pasture Grazing Periods: Actual grazing period within each pasture would depend on current growing conditions and the need to provide for plant recovery following grazing. The length of the grazing period within each pasture would also be dictated by the seasonal utilization guidelines. When seasonal utilization guidelines are met, livestock are moved to the next pasture.

Structural Range Improvements

Construction or removal of structural range improvements are necessary to better implement adaptive management, facilitate livestock management and reduce hazards to wildlife from structural range improvements that are no longer necessary. Under this alternative the following actions, including the construction of five structural range improvements and removal of approximately 0.8 miles of fence (Appendix D of the Range Specialist report) would occur.

- Currently an approximately 300-foot portion of pasture fence between the West and Belle pastures is incorrectly located. We propose re-aligning this segment of fencing to align with the existing pasture boundary (Appendix B, Figure 10).
- Construct approximately 300 feet of fence between the southern boundaries of pastures 008 and 006 (Appendix B, Figure 11) to remove the water lane, which is no longer needed.
- Removal of approximately 0.8 miles of fence that is no longer needed for livestock and allotment management along the north and west edges of the 006 Pasture (Appendix B, Figure 8). Removing this fence will eliminate the 006 Pasture on the A-1 Mountain Allotment, and make it part of the A-1 Mountain Pasture.
- Currently, there is not a permanent livestock handling facility (corral) on the Allotment. To address this need, we propose to construct an approximately 200-foot x 200-foot (about 40,000 square feet, or less than one-tenth of one percent of the Allotment) permanent corral facility with a portable loading

[3] Seasonal utilization is defined as the amount of herbage removed through grazing or trampling during the grazing period. Seasonal utilization is different from forage utilization because it does not account for subsequent growth of either the ungrazed or grazed plants (Smith et al., 2010) Seasonal utilization is often estimated in association with the livestock grazing period and is used as a tool to help determine if changes in livestock management are necessary for the current grazing season. Seasonal utilization may also be referred to as “grazing intensity” or “relative utilization”.

chute to facilitate movement of cattle onto and off the Allotment (Appendix B, Figure 12).

- Climate change may require land managers and users to be more flexible in the future. It is possible that as climate change continues there will be a need for greater flexibility with livestock management options on the A-1 Mountain Allotment. For example, there may be a need to improve distribution of livestock throughout the Fort Valley Pasture, to encourage use in areas of the pasture that are more resilient to drought conditions. If through monitoring it is determined that there is a need for additional livestock management options in the Fort Valley Pasture, a new pasture fence, approximately 1 mile in length, will be constructed bisecting the Fort Valley Pasture and creating the West Fort Valley Pasture (Appendix B, Figure 9). This will allow the grazing permittee to be better able to implement adaptive management on the A-1 Mountain Allotment.

Drought Management Strategy

Drought is an inevitable occurrence in the southwestern United States (USDA, 2015a). Land managers and grazing permittees, must plan for drought as a normal part of management and business. The Standardized Precipitation Index (SPI) is a unit of measure that compares recent precipitation values for a period of interest with long-term historical values to assess moisture conditions in a given area. In the Southwestern Region, anytime the SPI reaches a value of minus 1.00 or less for the preceding 12-month period, grazing allotments should be evaluated for existing drought conditions.

We consider a diversity of factors when devising management actions on the National Forests in the Southwestern Region in response to drought. Such factors include species diversity, past grazing use, timing of grazing, intensity of management, and conditions of improvements to support grazing activities. These factors along with precipitation data provide flexibility to the line officer to make decisions based on recommendations from district specialists. Rangeland management specialists use direction provided in the Region 3 Supplement to FSH 2209.13, the Grazing Permit Administration Handbook, and 12-Month SPI to assess soil and vegetation conditions. Using the SPI as a baseline and combining it with site-specific information from allotment inspections and monitoring data, range specialists can make a determination for necessary management actions, and review adaptive management alternatives to determine the best course of action.

Region 3 and Coconino National Forest drought management policies identify numerous adaptive management actions for mitigating grazing effects during drought. The following are examples of management actions that could be used on the A-1 Mountain Allotment during periods of drought:

- Reduce authorized AUMs (livestock numbers). Reductions may be necessary prior to the permitted season of use and/or during the permitted season of use.
- Shorten season of use. Depending on the severity of the drought and authorized AUMs, a reduced grazing season may be necessary.
- Shorten pasture use periods.

- Lack of livestock water, or poor distribution of livestock water, may result in reduced pasture/allotment use periods.
- Pastures would only be grazed once during the same grazing season and this may ultimately result in an early exit from the A-1 Mountain Allotment.
- Pastures may need complete rest from livestock use. Pasture resting periods would depend on the severity of the drought. Livestock use of planned rested pastures due to drought would not be authorized.
- Reduce forage utilization and/or seasonal utilization levels. Depending on the severity of the drought and the authorized AUMs, reduced forage utilization and/or seasonal utilization levels would likely result in shortened pasture use periods and may ultimately result in an early exit from the Allotment.

The Responsible Official in consultation with the range specialist and the permittee would make any adaptive management actions necessary due to drought conditions.

Adaptive Management

Adaptive management would continue to be an important management tool for the Allotment. Under Alternative 2- Proposed Action, the adaptive management strategy has been modified to adjust the timing, intensity, duration and frequency of livestock grazing in response to changing ecological conditions, climatic conditions, and management activities. Specifically, the following modifications are being proposed:

- Current management allows the grazing season to be shortened, but does not allow it to be extended or shifted. Under Alternative 2, the grazing season may be shorted, extended or shifted.
- Current management does not allow for both the deferred and/or deferred-rest rotation management. Whereas Alternative 2 does.
- Current management does not include new structural range improvements as part of the adaptive management strategy, Alternative 2- Proposed Action does.

Adaptive management uses monitoring and specialist expertise to determine if management activities need to be adjusted. If monitoring indicates that changes are needed, management will be modified in cooperation with the permittee and the changes will be implemented through the Annual Operating Instructions[4] (AOIs).

Monitoring

We plan to use implementation monitoring and effectiveness monitoring for monitoring resource conditions and livestock management in the A-1 Mountain Allotment, in accordance with the Interagency Technical References, Region 3 Rangeland Analysis and Management Training Guide, and the Region 3 Allotment Analysis Handbook.

[4] Annual Operating Instructions (AOIs) are documents outlining the management of livestock, including pasture graze periods and pasture rotation schedules, for a particular grazing season. AOIs are developed in the early spring for each grazing season, but can be modified later in the season to respond to environmental changes, ranch management and/or implementation monitoring results.

Monitoring frequency varies by each activity and is a collaborative effort by Forest Service personnel, the grazing permittee, and cooperating agencies.

Implementation Monitoring

Implementation monitoring occurs on an annual basis and will include the following:

- Permit Compliance: Throughout each grazing season, Forest Service personnel will monitor activities on the A-1 Mountain Allotment to ensure compliance with permit terms and conditions, the Allotment Management Plan, and the AOIs.
- Livestock Actual Use: Permittee will keep accurate records regarding actual livestock numbers and pasture use dates on the form supplied as part of the AOIs. This form will be submitted to the Forest Service at the end of the grazing season.
- Range Readiness: Forest Service personnel assess range readiness prior to the start of the grazing season to determine if vegetative conditions are ready for livestock grazing. The range is considered ready for grazing once cool season grasses, brush and aspen have leafed out; and forbs are in bloom. These characteristics indicate the growing season has progressed far enough for plants to replenish root reserves so that grazing will not seriously affect the forage plants.
- Seasonal Utilization: Seasonal utilization monitoring will occur within each of the main grazing pastures during, or immediately after, the period when livestock are grazing the pasture. Seasonal utilization is defined as the amount of herbage removed through grazing or trampling during the grazing period. Seasonal utilization will be used by the Forest Service and the permittee to control actual pasture moves. Livestock may need to be moved out of a pasture sooner if the seasonal utilization guideline is reached before the planned move date. Likewise, livestock may stay longer in a pasture if seasonal utilization is below the established guideline when the planned move date arrives. Seasonal utilization measurements will be taken at locations within pastures using the “key area” concept. These key areas reflect the effects of livestock grazing within the entire pasture.
- Forage Utilization: Forage utilization monitoring will occur at the end of the growing season within each of the main grazing pastures. Utilization is defined as the proportion or degree of current year’s forage production that is consumed or destroyed by animals (including insects). It is a comparison of the amount of herbage left compared with the amount of herbage produced during the year. Utilization is measured at the end of the growing season when the total annual production can be accounted for and the effects of grazing in the whole management unit can be assessed. Utilization measurements will be taken at locations within pastures using the “key area” concept. These key areas reflect the effects of livestock grazing within the entire pasture. Utilization measurements can indicate the need for management changes prior to this need being identified through long term monitoring. For example, if

monitoring shows that the forage utilization guideline was exceeded in a pasture, the grazing schedule and/or cattle numbers will be adjusted for the following year. If forage utilization is exceeded after these adjustments are made, then changes will be made to the grazing management system.

- Forage Production and Ground Cover: Forage production assessments will be made to determine stocking levels for the grazing season and will also be used during the grazing season to determine if adjustments in the stocking level should be made. Qualitative assessments of ground cover will also be made and used as an indicator of condition and trend; observed changes may indicate the need to conduct effectiveness monitoring prior to the scheduled interval.
- Precipitation: Precipitation is currently recorded at four sites that approximate the precipitation for the Allotment. Additional precipitation gauges may be placed on the Allotment for more localized information.
- Allotment Inspection: Forest Service personnel will complete a written summary annually to document the overall history of that year's grazing. This document will include a monitoring summary, livestock actual use, weather history, and a discussion of the year's accomplishments and problems. Information from this report will feed into the following year's grazing plan.

Effectiveness Monitoring

Effectiveness monitoring will be used to evaluate the success of management in achieving the desired conditions. Effectiveness monitoring will occur within key areas on permanent transects at an interval of ten years or less and will be accomplished collaboratively by Forest Service personnel, grazing permittee, and cooperating agencies. Effectiveness monitoring may also be conducted if data and observations from implementation monitoring (annual monitoring) indicate a need. Effectiveness monitoring will include the following:

- Forage Production: Forage production surveys will use the best available methods at that time. Forage production data will be used as a tool to manage this Allotment, but will not be the sole measurement to establish carrying capacity.
- Vegetation and Ground Cover Monitoring: Four long-term vegetation and ground cover monitoring plots are located on the A-1 Mountain Allotment. These plots were established as Parker Three-Step monitoring clusters in the 1950s/1960s and were converted to Pace Frequency transects and 1/10 acre ocular vegetation cover plots in 2000. Data was last collected from these plots in 2014 and 2015.
- The Pace Frequency method will be used to collect vegetation frequency and ground cover data. This data will reflect changes and trends in plant species abundance, plant species distribution and ground cover.

- Ocular plant canopy cover plots (0.10 acre plots) will be used to document vegetation cover by plant species. This data will allow for a comparison between existing conditions and the desired vegetative community conditions.
- The monitoring methods identified for effectiveness monitoring may be changed or modified in the future as new methods are developed and/or the need arises for additional resource information. Any new monitoring methods adopted will be methods sanctioned and endorsed by the scientific and professional communities.

Resource Protection Measures

During project development, we identify resource protection measures to incorporate into the project. These resource protection measures are based on resource concerns and issues raised during scoping and analysis. These features would be in addition to the Forest Plan, Standards and Guidelines for water and soil resource management. Resource protection measures are further derived from the publication "National Best Management Practices for Water Quality Management on National Forest System Lands' Volume 1: National Core BMP Technical Guide" (USDA, 2012) as well as the Soil and Watershed Conservation Practices Handbook (USDA, 1990).

Rangeland management BMPs include those associated with 1) rangeland management planning, 2) rangeland permit administration, and 3) rangeland improvements and include but are not limited to the practices identified below.

The resource protection measures listed below include any direction specific to individual resources, monitoring requirements and mitigation measures for resources and actions proposed in this project. Resource protection measures are intended to enhance the effectiveness of management at site-specific locations, ensure the effectiveness of actions proposed, or reduce or eliminate potentially adverse effects of proposed management activities. The following resource protection measures would apply to the proposed action and its connected actions, including the adaptive management strategy.

Range Management

- During drought conditions and in periods of drought recovery, all or some of the following management activities may be used: adjust grazing timing, intensity, frequency, numbers, and the management system as necessary to protect the range vegetation resource; implement the Drought Management Strategy.
- Throughout each grazing season, District Range staff will monitor activities on the Allotment to ensure compliance with permit terms and conditions, the Allotment Management Plan (AMP[5]), and the AOIs.

[5] A new Allotment Management Plan (AMP) will be developed for the A-1 Mountain Allotment. Information from this EA will be used to inform the development of the new AMP. The term grazing permit (TGP), the AMP, and the Annual Operating Instructions (AOIs) are the documents used to implement the action alternative. Every year the AOI) would be developed with the permittee, outlining the specific instructions for livestock grazing and allotment operation for that particular year, based on current and expected forage and range conditions as determined through allotment inspections and monitoring.

- Salt or mineral supplement locations would be rotated annually and avoid areas where livestock concentrations could cause excessive vegetation trampling, soil loss, or disturbance to sensitive species or habitats. Salt and mineral supplements should not be placed closer than ¼ mile from a water source.
- Water will be left in troughs when cattle leave the pastures per forest-wide Forest Plan direction (p. 68).
- At least 60 days prior to the start of maintenance of earthen stock ponds, the permittee would be required to contact the District so biological and heritage surveys can be completed, if needed and resource protection measures for the protection of aquatic species could be implemented.
- Use grazing BMPs in keeping with Arizona Administrative Code R18-9-501. Grazing management and mitigation practices, which could be considered for these allotments, are described in the National Management Measures to Control Nonpoint Source Pollution from Agriculture published by the Environmental Protection Agency in 2003. You can download this publication by visiting: http://www.epa.gov/owow/nps/agmm/index.html.
- Spread of potential and existing noxious or invasive weeds by heavy equipment used in the maintenance or construction of structural range improvements will be prevented by cleaning the heavy equipment before entering the area and by avoiding weed infestations during travel. Noxious or invasive weed populations that may occur in areas of proposed structural improvements will be identified and treated.
- Incorporate BMPs for noxious or invasive weeds as listed in Appendix B of the 2005 Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds into all management actions.

Wildlife, Fisheries and Rare Plants

- Prevention measures from the State of Arizona Aquatic Invasive Species Management Plan (Arizona Department of Environmental Quality, 2011) would be required to avoid spreading aquatic invasive nuisance species and pathogens during pond/tank cleaning activities.
- Any construction of new or replacement fencing would be done in accordance with specifications developed to facilitate wildlife passage.
- Survey areas containing proposed structural improvements before construction for noxious or invasive weeds before construction of improvement. Identify populations and mitigate impacts of management actions if needed.

AOIs may be modified throughout the grazing season based on variables including precipitation, forage growth, and unexpected events such as wildfire.

- All open storage tanks/ponds and drinkers will be constructed with entry and escape ramps for wildlife. These ramps will be built to the current Bat Conservation International Specifications.

Soil and Watershed Resources

- Work on all projects (earthen stock ponds, pipelines, trick tanks, fences, power line, roads, etc.) may only be conducted when soils are dry enough to support heavy equipment without causing class two or higher soil disturbance as defined in the *Soil Disturbance Field Guide* (USDA, 2009).

Cultural and Historic Resources

- New ground disturbing activities planned for implementation within two years of the signing of this EA and which are identified on the ground have been surveyed prior to signing of this EA. These locations will be cleared prior to authorizing grazing on the A-1 Mountain Allotment as per Section 93.2 of the Region 3 Issuance Forest Service Handbook 2209.13, Grazing Permit Administration Handbook, Chapter 90, and following the First Amended USDA, Forest Service, Region 3 Programmatic Agreement Regarding Cultural Property Protection and Responsibilities, dated Approved September 27, 2007.
- Before initiating any of the ground disturbing activities that are part of this project, the District Archaeologist will be notified to ensure the proposed activities have cultural resource clearance. Any future ground disturbing activities must receive archaeological clearance prior to implementation.
- Located sites will be marked for avoidance and will be avoided during construction. If any new sites are discovered during construction activities, they are to be reported to the district or forest archeologist and ground-disturbing work halted.
- To avoid adverse effects to an existing historic site, approximately 100-feet to 150-feet of fencing will be constructed around the site.
- Management practices that tend to concentrate livestock, such as placement of salt, construction of fences, etc., will be located away from known cultural resources.

Alternatives Removed From Further Consideration

The EA shall briefly describe the proposed action and alterative(s) that meet the need for action, as well as a No Action Alternative. No specific number of alternatives is required or prescribed (36 CFR 220.7[b][2]). The following alternatives were considered, but eliminated from detailed study for reasons identified below.

Alternative 3- Current Management

Current management should also be analyzed in detail as an alternative to the proposed action if current management meets the stated purpose and need for action (FSH 2209.13,

Ch. 90). Consideration of a "Current Management" alternative has been provided through the Alternative 2-Proposed Action analysis, as the alternatives are very similar. Table 16 below highlights the minor differences between Alternative 2- Proposed Action and Alternative 3- Current Management. Current Management is not being considered in detail because it does not meet key elements of the purpose and need such as the need to avoid adverse effects to cultural resources, and the need to improve management flexibility to address changes in conditions associated with climate change.

Therefore, this alternative has been removed from detailed analysis to reduce duplication. A detailed description of Alternative 3- Current Management is located in Appendix A: Alternatives Considered, But Removed From Detailed Study.

Table 4. Comparison of Management between Alternative 3- Current Management and Alternative 2- Proposed Action.

Authorization	Alternative 3- Current Management	Alternative 2- Proposed Action
Head of Adult Cattle	99	99
AUMs	498	498
Permitted Season of Use	June 1- Oct 31	June 1- Oct 31, adaptive management strategy to allow livestock to enter the Allotment as early as May 15 and/or remain on the Allotment until November 15.
Grazing Management System	Deferred Rotation	Deferred Rotation or Deferred-Rest rotation
Seasonal Utilization Levels	21-50%	Late Spring/Early Summer: up to 50% Remainder of grazing period: up to 40%
Forage Utilization Guidelines	35%	30-40%
Structural Range Improvements	No new structural range improvements of facilities.	Realignment of 300 feet of fence. New construction of approximately 5,580 feet of fence, and construction of a permanent corral facility.
Pasture Use	No changes	Incorporation of the 006 Pasture into the A-1 Pasture.
Adaptive Management Strategy	Using similar techniques, but not an official strategy in place.	Would incorporate an adaptive management strategy.

Alternative 4- Removal of South Flag Pasture

During the public scoping period, we received comments to "investigate removing Section 7 from the A-1 Mountain Allotment Boundary" because continuing grazing within section 7 would create "numerous management issues", would not be in-line with

the “philosophical mission of providing protected open space for the Flagstaff community”, and the “potential for exacerbated resource degradation on City lands”.

The South Flag Pasture of the A-1 Mountain Allotment covers NFS lands and includes all of Section 7, Township 21N, Range 7E of the Gila and Salt River Meridian. Section 7 is surrounded by City of Flagstaff lands on all sides (see Appendix B-Figure 6).

The City of Flagstaff purchased all or portions of the adjacent lands: Sections 6, 8, 18 and 19 of Township 21N, Range 7E and Section 12 of Township 21N, Range 6E, to be included as part of the Observatory Mesa Natural Area in 2013. As part of the acquisition process, a conservation easement was granted to Arizona State Parks, which explicitly outlines acceptable uses of Observatory Mesa Natural Area as well as the City’s management responsibilities. This acquisition effectively changed the land management of these sections from lands that were grazed as part of the A-1 Mountain Allotment and managed by the State, to lands that would be managed as open space by the City of Flagstaff.

Specifically, the City identified concerns with grazing and the introduction or exacerbation of invasive biotic species, soil disruption, erosion, and effects to wildlife behavior. The City also identified a concern for damage or encroachment by livestock on City lands and the effects to native plant communities due to the “limited fencing”[6] .

Many of the City’s concerns are already addressed through project specific resource protection measures and BMPs. These have been used on previous projects and are considered effective at avoiding or reducing environmental impacts. They are consistent with applicable Forest Plan standards and guidelines, and the terms, conditions and conservation measures of existing biological opinions. Some of these resource protection measures include:

- Survey areas containing proposed structural improvements before construction for noxious or invasive weeds before construction of structural improvements. Identify populations and mitigate impacts of management actions if needed.
- Management practices that tend to concentrate livestock, such as placement of salt, will be located away from sensitive wildlife areas such as known raptor nesting sites.
- All open storage tanks/ponds and drinkers will be constructed with entry and escape ramps for wildlife. These ramps would be built to the current Bat Conservation International Specifications.

[6] The Arizona Department of Agriculture's Arizona Revised Statutes, Title 3, Chapter 11, Article 8 (No-Fence Districts), contains nine separate statutes that comprise the open range laws of the State. A private landowner who wants to know if a particular location is "open range" should contact the County Board of Supervisors. The Board of Supervisors is the entity that has the authority to designate No-Fence Districts and is responsible for maintaining the records for such designations (ARS 3-1421-1422). In northern Arizona, No-Fence Districts have not been established in Coconino, Navajo, and Yavapai counties. If an area has not been designated a No-Fence District, it is open range. Within these areas, the private landowner who is concerned with livestock damage or encroachment has an obligation to fence his/her private land with a lawful fence to keep animals out. A lawful fence is defined in ARS 3-1426.

- Work on all projects (earthen stock ponds, pipelines, trick tanks, fences, power line, roads, etc.) may only be conducted when soils are dry enough to support heavy equipment without causing class two or higher soil disturbance as (USDA, 2009).

Under Alternative 4-Removal of South Flag Pasture, livestock grazing would continue in all other pastures on the A-1 Mountain Allotment except for South Flag Pasture. This alternative would reduce total allotment acres from 5,085 to 4,454, and grazing capacity for this Allotment from 498 AUMs to 423 AUMs. These reductions would require a decrease in AUMs from 498 to 423, which would result in either a reduction in permitted numbers (from 99 head of adult cattle to 84 head of adult cattle), a reduction in the length of the grazing season (from 153 days to 130 days), or a some combination of the two.

In addition to the measures above, many of the concerns identified by the City will be addressed through the analysis process. For example, the potential impacts of the continued authorization of livestock grazing on the establishment and spread of invasive species and impacts to sensitive wildlife populations and habitat will be analyzed and disclosed for public comment in the environmental analysis.

Since the closing and subsequent removal of the South Flag Pasture from the A-1 Mountain Allotment is within the range of activities between Alternative 1- No Action and Alternative 2- the Proposed Action, it is within the range of reasonable alternatives to be analyzed, and as such will not be analyzed as a separate alternative. A discussion of Alternative 4- Removal of South Flag Pasture is located in Appendix A: Alternatives Considered, But Removed from Detailed Study.

Existing Conditions

Analysis of the existing conditions for the A-1 Mountain Allotment and the potential effects to these resources from the alternatives was accomplished through a review of peer-reviewed literature, published reports from regulatory and land management agencies, existing resource inventories, field visits, and the professional judgment of the specialist(s).

For detail information regarding the resource inventory sources, methodology, and analysis processes used to determine the existing conditions of the A-1 Mountain Allotment, please see the individual specialist reports located in the project record.

Range

Actual use over the past ten years has been variable from year-to-year, and has averaged 51 percent of permitted numbers and ranged from zero to 498 AUMs during the 2005 to 2014 grazing seasons (Figure 1 and Table 3). Annual variations in livestock numbers were the result of different factors including, but not limited to, climatic conditions and operational/economic requirements of the permittee. For example, during periods of drought when monitoring revealed decreased forage production, authorized livestock numbers were decreased either at the beginning of, or during, the grazing season so that forage utilization would be limited to conservative levels. In some years, actual livestock numbers were below permitted numbers because the permittee did not have the full number of livestock available. This commonly occurs following drought periods when the permittee has reduced livestock numbers for resource protection during the drought. When drought conditions no longer exist, it may take the permittee a number of years to build the herd back up to permitted livestock numbers.

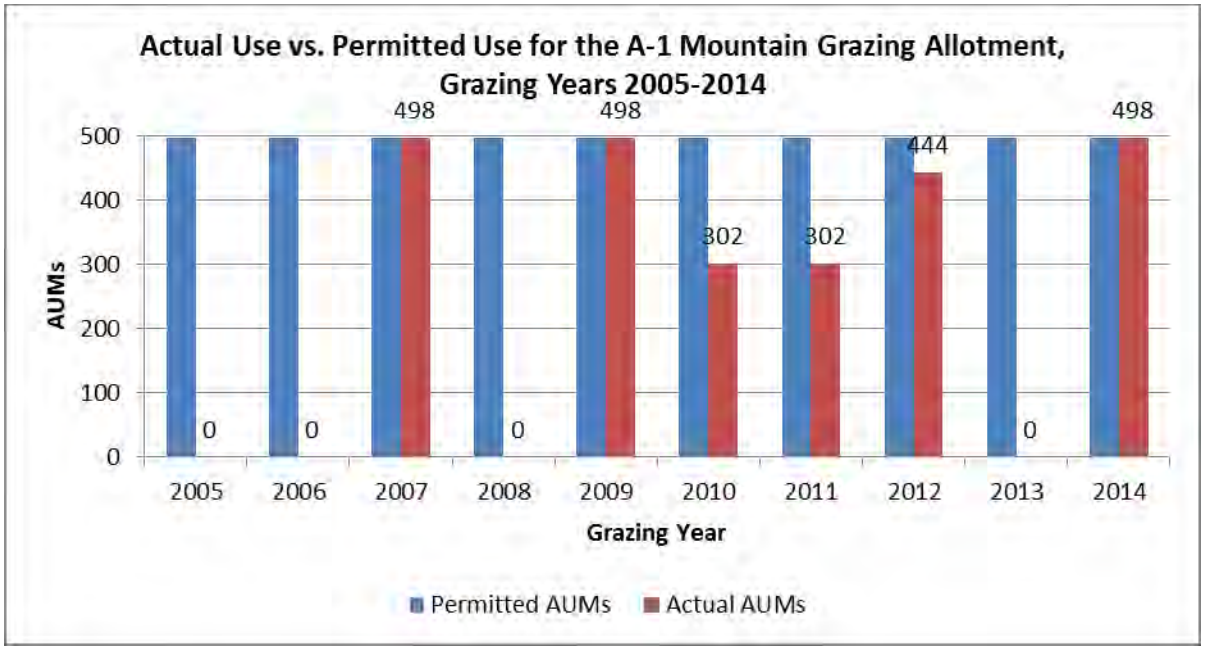

Figure 1. A-1 Mountain Allotment actual use and permitted use in AMUs for 2005 to 2014.

Available Water on the A-1 Mountain Allotment

Four weather stations measure precipitation for the A-1 Mountain Allotment. For this analysis, the weather stations were each assumed to represent 1/4 of the acreage within the A-1 Mountain Allotment, or approximately 5,085 acres. We used average annual precipitation amounts to determine the estimated average total annual precipitation amounts for the Allotment using the following calculation:

Per Baker (1987), three percent of total annual precipitation runs off as streamflow (surface water). Based on this analysis, there is an estimated average total annual surface water amount of 1.73 million gallons (5,299 acre-feet) produced on the A-1 Mountain Allotment (Table 4).

Table 5. Estimated average annual precipitation and surface water amounts for the A-1 Mountain Allotment.

Weather Station	Acres	Avg. Annual PPT (inches)	Avg. Annual PPT (feet)	Estimated Average Total Annual Precipitation Amount (Acre-Feet)	Estimated Average Total Annual Precipitation Amount (Gallons)	Estimated Average Total Annual Surface Water Amount (Gallons)	Estimated Average Total Annual Surface Water Amount (Acre-Feet)
A1-C3	1271	16	1.33	1,690	550,688,190	16,520,646	50.7
Fort Valley	1271	22	1.83	2,326	757,929,426	22,737,883	69.8
Flagstaff 4 SW	1271	23	1.92	2,440	795,076,440	23,852,293	73.2
Flagstaff WSO Pulliam	1271	21	1.75	2,224	724,692,624	21,740,779	66.7
Allotment Total	5,084	N/A	N/A	8,680	2,828,386,680	84,851,601	260.4

Livestock Water Consumption

Livestock water consumption varies by environmental temperature, class of livestock, weight of animal, and whether cows are lactating or not (Rasby and Walz, 2011). Using the approximate daily water intake amounts presented by Rasby and Walz (2011), the estimated annual water consumption of livestock on the A-1 Mountain Allotment is approximately 353,749 gallons or approximately 1.09 acre-feet (Tables 5 and 6). There are a number of factors and assumptions used when calculating the estimated annual water consumption of livestock. These include the maximum permitted number of livestock, weight of calves, number or percent of lactating cows, etc. To see a full description, refer to the Range Specialist report, in the project record.

Table 6. Daily water requirements per Rasby and Walz (2011).

Livestock Type	Use (gal./day)	Use Period on A-1 Mountain	Use Period (Days)
Lactating Cows	18.2	6/1 to 10/31	153

Livestock Type	Use (gal./day)	Use Period on A-1 Mountain	Use Period (Days)
Bulls (1,600 lbs. +)	20.6	6/1 to 10/31	153
Calves (<400 lbs.)	4.75	6/1 to 8/31	92
Calves (>400 lbs.)	6.7	9/1 to 10/31	61

Table 7. Estimated annual water consumption by maximum permitted livestock numbers.

Livestock Type	Use Period	Number	Days	AUDs	Gal./AUD	Estimated Consumption (gal.)
Bulls	Summer	5	153	765	20.6	15,759
Cows (lactating)	Summer	94	153	14,382	18.2	261,752
Calves	(<400 lbs.)	75	92	6,900	4.75	32,775
Calves	(>400 lbs.)	75	61	4,575	9.5	43,463
Total Estimated Annual Cattle Consumption (gallons)						353,749*

*Equates to a total estimated annual cattle consumption of 1.09 acre- feet.

Summary of Livestock Water Consumption

The maximum permitted livestock estimated annual water consumption of approximately 1.09 acre-feet represents less than one tenth of one percent (0.42 percent) of the estimated average total annual surface water amount on the A-1 Mountain Allotment (260.4 acre-feet).

A fraction of annual surface water is impounded in earthen stock ponds on the A-1 Mountain Allotment for livestock and wildlife consumption. There are 15 earthen stock ponds on the Allotment (Flagstaff Ranger District Records) and the average capacity of earthen stock ponds on the Coconino National Forest is 2.34 acre-feet (R. Steinke, personal communications March 2014). This equates to a water storage capacity of approximately 35.1 acre-feet of water. The water storage capacity on the A-1 Mountain Allotment represents approximately 13.5 percent of the total estimated surface runoff for the Allotment. Additionally, the estimated annual water consumption by the maximum permitted livestock number on the Allotment represents approximately three percent of the water storage capacity on the Allotment.

Range Condition and Trend

In 1963, four permanent monitoring plots were established in key areas[7] on the Allotment, the criteria for which include slopes less than 40 percent. At this time, data was collected from these plots using the Parker 3-Step method. In 2006, the first of the original four plots, A1-C3, began using the Pace-Frequency monitoring method and the 1/10 acre ocular macroplot cover monitoring method, and has been read annually using these two methods. In 2014, the next two plots, A1-C2 and A1-C4, were also converted to

[7] A Key Area is a relatively small portion of a management unit selected because of its location, use, or grazing value as a monitoring point for grazing use. It serves as a monitoring and evaluation point for range condition, trend, or degree of grazing use. Properly selected key areas reflect the overall acceptability of current grazing management over the rangeland. A key area guides the general management of the entire area of which it is a part.

the Pace-Frequency and 1/10 acre ocular macroplot cover monitoring methods. The original location for A1-C1 could not be found and was re-established in 2014 in the approximant location of the original plot. As a result, the A1-C1 plot can only be used in determining existing condition for this report and not for baseline data. All four plots were read using the Pace-Frequency method in 2014 and the 1/10 acre ocular macroplot cover method in 2015.

The A-1 Mountain Allotment permanent monitoring plots are located on one of the four terrestrial ecological unit TEU groups. This is because these monitoring plots were established prior to the publication of the Coconino National Forest's Terrestrial Ecosystem Survey (TES) and therefore not all TEUs are represented by long term monitoring. Due to similarities in parent material, slope, canopy cover, ground cover and species composition between TEUs 557, 565, 570, 582, 584 and 586, it was determined that these TEUs should be combined and analyzed as a TEU group. Based on professional judgment it was determined that since the individual TEUs are similar, conditions observed on one TEU are characteristic for the remaining TEUs in this group. This one TEU group represents approximately 4,632 acres or 91 percent of the A-1 Mountain Allotment (Table 7).

Table 8. Monitoring and inventory plots by TEU/ TEU Group.

TEU (TEU Group)	Acres <40% Slope	Acres > 40% Slope	Total Acres	% of Allotment Acres	% of Graze Acres	Number of Monitoring Plots	Acres with Existing Condition Data	Acres <40% Slope with Existing Condition Data
55	12	0	12	0.24	0.24	0	0	0
557, 565, 570, 582, 584, 586	4,549	83	4632	91.09	94.1	4	4,632	4,549
562	67	173	240	4.72	1.39	0	0	0
595	202	0	202	3.97	4.18	0	0	0
Total	4,830	256	5086	100	100	4	4,632	4,549

Summary of Range Condition

Vegetative ground cover[8], species richness and species composition for perennial grasses and forbs, and canopy cover for trees fall within the desired conditions for this TEU, which represents 94 percent of the A-1 Mountain Allotment, and 91 percent of NFS acres on the allotment overall (Range Specialist report, Appendix B, Table 22).

Current data show that canopy cover for shrubs could be increased, and species richness and composition for shrubs and trees could be increased to meet desired conditions. However canopy cover, species richness and composition for shrubs and trees is generally not affected by grazing cattle since shrubs and trees are not a primary forage

[8] Vegetative ground cover for existing conditions is the sum of vegetation basal area and litter >0.5" in depth, including wood.

source for cattle. Cool season grass species composition meets desired conditions (see Table 10 in the Range Specialist report).

Three out of the four plots currently meet the desired conditions for the ratio of cool to warm season grasses determined in the TES; A1-C4 shows warm season grasses at 75 percent and cool season grasses at 25 percent. However, the absence in the long term monitoring plots of some species listed in TES can be attributed to the natural percent canopy cover determined in TES. Plants listed as trace (T) or present (P) in Table 2 of TES (where T=<0.01% canopy cover, and P=present in the area, but not recorded in the plot) have a possibility of not being recorded in the long term monitoring plots due to limited and sporadic occurrences within the area.

Summary of Range Trend

The following discussion reflects ground cover trend using data collected from the permanent monitoring plots between the 1963 and 2014. See Figures 7-9 in Appendix B of the Range Specialist report for detailed information on ground cover trend data, and the section on Affected Environment for specific information related to methods.

Ground cover trend data were collected for plots A1-C2 and A1-C4 in 1963 and 2014, and for plot A1-C3 in 1963 and 2006-2014. Canopy cover trend data were collected for plot A1-C3 in 2006-2013 and 2015. Trend data collected show annual variations in ground cover and canopy cover as well as variations over time; these variations are further emphasized by the annual data collected between 2007 and 2014 at the A1-C3 plot. All three plots show an upward trend for vegetative ground cover between 1963 and 2014, A1-C3 shows a downward trend in vegetative ground cover between 2006 and 2014. A1-C3 and A1-C4 show an upward trend for litter (>0.5”[9] in depth) cover while A1-C2 shows litter (>0.5” in depth) to be static. A1-C3 shows and upward trend in litter (>0.5” in depth) between 2006 and 2014. Canopy cover trend for A1-C3 collected in 2006 and 2015 show a substantial increase in perennial grass cover and total canopy cover; and static conditions for tree canopy cover.

Precipitation strongly influences plant yield, and “even the slightest reductions from normal precipitation can cause severe reductions in plant yield” (Holechek et al., 1989). This, combined with changing temperatures can lead to decreased plant productivity, decreased vegetation cover and decreased litter cover. While livestock grazing can affect vegetation and litter cover, comparing vegetation trend to precipitation trend shows that variations in cover for the plots is likely driven primarily by an overall below average amount of precipitation during this time period. Figures 6-13 in Appendix B from the specialist report can be used to compare long-term trend data for canopy cover and ground cover with precipitation data.

For the TEU Group 557, 565, 570, 582, 584 and 586 the following range trend data is available:

[9] Effective litter is defined as litter greater than 0.5” in depth, which intercepts raindrops and slows surface runoff (Robbie, 2013).

- Iris (A1-C2): Ground Cover data show a statistically significant[10] increase in basal vegetation and litter cover (>0.5" in depth), and a statistically significant decrease in bare soil between 1963 and 2014.
- A1 Mountain (A1-C3): Ground cover data show a statistically significant increase in basal vegetation and litter (>0.5" in depth), and a statistically significant decrease in bare soil between 1963 and 2014. Ground cover data show a statistically significant decrease in basal vegetation, static conditions for litter (>0.5" in depth) and a statistically significant increase in bare soil between 2006 and 2014. Canopy cover data show an increase in perennial grass cover and total canopy cover, and a decrease in tree canopy cover from 2006 to 2015.
- South Flag (A1-C4): Ground cover data show a statistically significant increase in basal vegetation, litter (>0.5" in depth) and bare soil levels between 1963 and 2014.

Forage Utilization and Seasonal Utilization

Forage utilization and seasonal utilization[11] records exist for the A-1 Mountain Allotment for grazing seasons 2009, 2011, 2014 and 2015. The Allotment was not stocked during the 2006, 2007, 2008, and 2013 grazing seasons due to drought conditions and/or the operational needs of the permittee, so no forage utilization or seasonal utilization data was collected. These records represent four grazing periods with varying numbers of authorized livestock across a wide variety of annual climatic and vegetation growth conditions. Tables 18-21 in Appendix B of the Range Specialist report represent a summary of the forage utilization and seasonal utilization records for grazed pastures on the A-1 Mountain Allotment. Some records documented forage utilization and seasonal utilization by the use categories "None", "Light", "Moderate", "Heavy" or "Extreme". The following provides a description of the forage utilization ranges for these categories:

(N) – None (0-10%)

(L) – Light (11-20%)

(M) – Moderate (21-50%)

(H) – High (51-70%)

(E) – Extreme (71 %+)

Seasonal Utilization Summary

Overall, the A-1 Mountain Allotment had mostly light (L) to none (N) seasonal utilization in the 2009, 2011, 2014, and 2015 seasons, although some pastures received moderate seasonal utilization.

[10] In this section the use of the words "significant" and "significantly" refer to the statistical level of significance used when analyzing the monitoring data, and are not related to the Deciding Official's determination of significance for this project as a whole.

[11] Average forage utilization and seasonal utilization were determined using mid-points for each range of use values recorded for the separate graze periods. For example the mid-point for none (0-10%) is 5, the mid-point for light (11-20%) is 15.5 and the mid-point for moderate (21-50%) is 35.5.

Seasonal utilization data for 2009 averaged 35.5 percent, or moderate, and was the only seasonal utilization level measured for the A-1 Mountain Allotment for this grazing year. Seasonal utilization data for 2011 averaged 5 percent or none, and was the only seasonal utilization level measured for the A-1 Mountain Allotment for this grazing year. Seasonal utilization data for 2014 averaged five percent or none, and was the only seasonal utilization level measured for the A-1 Mountain Allotment for this grazing year. Seasonal utilization data for 2015 averaged 7.6 percent, or none, the highest documented seasonal utilization was light, and the lowest documented seasonal utilization was none.

For the four pasture graze periods that occurred during 2009, seasonal utilization was recorded as moderate for two pastures and not read for two pastures. For the five pasture graze periods that occurred during 2011, seasonal utilization was recorded as none for two pastures and not read for three pastures. For the five pasture graze periods that occurred during 2014, seasonal utilization was recorded as none for two pastures and not read for three pastures. For the five pastures graze periods that occurred during 2015, seasonal utilization was recorded as light for one pasture, none for two pastures and not read for two pastures.

Forage Utilization Summary

Forage utilization has typically ranged from none to light use, where data exists, across the A-1 Mountain Allotment.

Forage utilization data for 2009 averaged 7.6 or none (0-10%), the highest documented utilization was light (11-20%), and the lowest documented utilization was none (0-10%). In the 2014 grazing season, the only recorded moderate utilization was on the A-1 Mountain Pasture from the end of July to the end of August. Forage utilization averaged 15.3 percent or light (11-20%). Forage utilization data for 2015 averaged 8.5 percent or none (0-10%), the highest documented light (11-20%), and the lowest documented utilization was none (0-10%). No utilization data was recorded for the A-1 Mountain Allotment in 2011.

Grazing Capability

Grazing capability of a land area is dependent upon the interrelationship of the soils, topography, plants and animals. Grazing capability is a qualitative expression of the inherent ability of an ecosystem to support grazing use by various classes of livestock on a sustained yield basis. Grazing capability is expressed as one of four capability classes: Full Capability, Limited Capability, Potential Capability, and No Capability (Region 3 Rangeland Analysis and Management Training Guides: Revised 11/2013:2.8-2.12B). Brief explanations for each of these is below, for a full explanation see the Range Specialist report- Grazing Capability. For the A-1 Mountain Allotment no acres have been assigned Limited Capability and therefore there will be no further discussion of this capability class.

- Full Capability- areas which can be used by grazing animals under reasonable and proper management while maintaining or moving toward desired conditions. The relationship between capability and slope is often tied to erosion potential and the likelihood of access by livestock. Although exceptions may occur, slopes of zero

to 15 percent are commonly considered full capability as are most slopes of 15-40 percent.

- Potential Capability- areas are those which can be used by grazing animals under proper management, but where such factors as available water, livestock access, management infrastructure, and sufficient vegetative ground cover and/or forage production are currently lacking. These areas are different from Limited Capability because management may provide opportunities for change in the grazing capability classification. Potential Capability is often assigned to areas of impaired or unsatisfactory soil condition. In these situations, impaired and unsatisfactory soil condition can be improved with proper management.
- No Capability- areas are those, which are inherently inaccessible to livestock or cannot be used by livestock under reasonable management while maintaining or moving toward desired conditions.

The analysis of grazing capability on the A-1 Mountain Allotment indicates that the major factors in determining and classifying capability are soil condition, slope, and site productivity. Table 11 of the Range Specialist report identifies the criteria used for determining grazing capability on the A-1 Mountain Allotment. This criterion includes soil condition, slope and annual forage production. Based on the criteria identified, 94 percent or 4,689 acres of the A-1 Mountain Allotment falls under the Full Capability classification, with six percent or 323 acres being identified as No Capability, Table 9. Furthermore, the Coconino National Forest Plan (1987, as amended) limits the assignment of Full, Limited and Potential Capability to acres with slopes equal to or less than 40 percent; therefore acres with slopes greater than 40 percent have been assigned No Capability.

Table 9. Grazing capability classification for the A-1 Mountain Allotment.

Grazing Capability Classification	Pasture Acres	Percent	Description
Full Capability	4,689	93.6%	Satisfactory Soil Condition and <40% Slope
Potential Capability	0	0.0%	Impaired Soil Condition and <40% Slope
No Capability	323	6.4%	Slopes >40%; areas with <100# forage prod./acre; Sat., but Inherently Unstable soil condition <40% slope
Total	5,012	100%	

Estimated Grazing Capacity

Grazing capacity is a function of grazing capability, forage production, topography, allowable use, and the level of management that may be applied. A spreadsheet-based analysis used grazing capability, forage production, topography, and an appropriate allowable use to determine the estimated grazing capacity (see Appendix C, Table 24, Range Specialist report).

The Forest Plan (1987, as amended) identifies three Range Capacity Levels: Full Capacity, Potential Capacity, and No Allowable Capacity. The Forest Plan further

requires that "[P]ermitted use[12] and capacity are assigned based on full capacity range only" (page 67). Full Capacity is defined as "[L]ands that are presently stable because vegetative ground cover is holding soil loss to an acceptable level and are, therefore, suited for grazing and can support a livestock operation" (Forest Plan, page 260). Determining factors in the Coconino National Forest Plan definition of Full Capacity Range are "vegetative ground cover" and "holding soil loss to an acceptable level". Vegetative ground cover is the sum of the basal area of vegetation and litter greater than 0.5" in depth. An acceptable rate of soil loss is one in which soil loss can occur while sustaining inherent site productivity.

Utilizing the criteria identified above for determining vegetative ground cover and an acceptable level of soil loss, there are 5,085 acres of Full Capacity Range as defined by the Forest Plan on the A-1 Mountain Allotment. A more detailed analysis of the Allotment resulted in an estimated grazing capacity lower, approximately 396 acres less, than the Forest Plan would allow to be designated as Full Capacity acres (see Range Specialist repot, Appendix C, Table 24). Therefore, the permitted use and capacity for the A-1 Mountain Allotment are based on an acreage amount below the amount of acres identified in the Forest Plan that could have permitted use and capacity assigned.

Since permitted use is based on the assignment of capacity, the estimated grazing capacity for the A-1 Mountain Allotment is approximately 791 AUMs (see Range Specialist Report, Appendix C, Table 24).This is based on actual capacity assigned, which for the A-1 Mountain Allotment is 4,689 acres. Estimated grazing capacity represents the ability of the Full Capability lands within the A-1 Mountain Allotment to provide forage for wildlife and livestock use. When elk use is accounted for, the combined maximum permitted livestock use (498 AUMs) and estimated elk[13] use (250 AUMs) is less than the estimated grazing capacity for the A-1 Mountain Allotment by approximately five percent.

Methods for Determining Estimated Grazing Capacity

The following describes the methods used to determine the estimated grazing capacity:

Forage Production: Forage production was stratified by TEU (Range Specialist Repot, Appendix C, Table 24). Forage production estimates are based on data collected in the field. For TEUs that do not have field data forage production estimates come from the TES of the Coconino National Forest (1995). Forage production estimates (Forg) from Table 3 of TES were used for the forage production values of these TEUs. Where multiple forage production values were provided in the TES for a single TEU, or in the case of TEU groups, the smallest forage production value was used. Forage Maximum (ForgM) figures were not used because they are estimates based on the total annual yield of native forage plants after elimination of non-forage species.

[12] Permitted use is defined as the number of animals, period of use, and location of use specified in the term grazing permit (FSM 2230.5). Currently livestock grazing on the A-1 Mountain Allotment is authorized for 99 head of adult cattle from June 1- October 31, or 498 AUMs. This is less than the estimated grazing capacity of 791 AUMs for A-1 Mountain.

[13] Estimated elk use on the A-1 Mountain Allotment is approximately 250 AUMs. Estimated use based on estimated elk population numbers for 2016 provided by Arizona Department of Game and Fish.

Topography: Adjustments in the grazeable land area were made to account for slope. The following factors were used for topography adjustments on the Allotment:

- Class 1 - 0 to 10 percent Slope; No reduction in estimated grazing capacity
- Class 2 - 11 to 30 percent Slope; 30 percent reduction in estimated grazing capacity
- Class 3 - 31 to 40 percent Slope; 60 percent reduction in estimated grazing capacity
- Class 4 - >40 percent Slope; 100 percent reduction in estimated grazing capacity

Allowable Use: Allowable use was established at 35 percent. This value represents the mid-point of conservative[14] use (30-40 percent forage utilization) and represents the combined forage utilization level of both livestock and wildlife. Allowable use and therefore grazing capacity were assigned only to the following:

- Acres classified as Full Capability and less than 40 percent slope.
- Acres classified as Potential Capability and less than 40 percent slope.

Additionally, only the main grazing pastures were used to determine the estimated grazing capacity. The two management pastures (used for gathering, holding, shipping, etc.) less than 200 acres in size, and water lots were not included in the calculations. As an example, since pasture 008 is 73 acres in size it was not included in grazing capacity calculations. The proposed action would include adding pasture 006 to A-1 Mountain pasture, therefore pasture 006 (82 acres) was included in grazing capacity calculations. Estimated grazing capacity is expressed in AUMs.

Wildlife

The A-1 Mountain Allotment Wildlife Report (project record) analyzes the effects for wildlife species listed under the Endangered Species Act, sensitive species as identified by the Southwestern Region, and management indicator species (MIS) as identified by the Forest Plan. This EA discusses only those species that occur or are likely or possible to occur in the A-1 Mountain Allotment based on available suitable habitat.

Threatened or Endangered Species

Section 7, of the 1973 Endangered Species Act, directs Federal agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats (16 U.S.C. 1536 et sq.). The A-1 Mountain Allotment includes habitat for one federally listed species, the Mexican spotted

[14] Carrying capacity estimates are conservative because they are based on the average forage production of perennial grasses only. Annual plant species and browse species can make up a large part of cattle diets in a given year. Using the average forage production data based only on perennial grass species, underestimates the total forage available for livestock use. This results in a conservative estimate of the livestock carrying capacity for the Allotment.

owl (*Strix occidentalis*). Therefore, this will be the only threatened, endangered, proposed or candidate species listed under the Endangered Species Act to be discussed in this EA.

Mexican Spotted Owl

The Mexican spotted owl (MSO) was listed as a threatened species in March 1993 (United States Fish and Wildlife Service, 1993). In 2005, critical habitat was established and revised in 2012 (FWS, 2012). The Forest is encompassed by the Upper Gila Mountain Ecological Management Unit.

On the Forest, the MSO occupies mixed conifer and ponderosa pine/Gambel oak vegetation types, usually characterized by high canopy closure, high tree density, and large trees, multi-layered canopies within the stand, numerous snags and downed woody material. Frequently, suitable nesting and roosting habitat is located on steep slopes or in canyons with rocky cliffs, where dense vegetation, crevices or caves provide cool moist microsites for nests and roosts.

No MSO protected activity centers (PAC) occur in the A-1 Mountain Allotment. The area designated as Recovery habitat on the allotment is approximately 189 acres (or approximately four percent of the total area) and includes areas in forested habitats in the A-1 Mountain and Belle Pastures.

Potential MSO nesting, roosting, and foraging habitat does exist on the A-1 Mountain Allotment. This includes all or portions of 18 acres of mixed conifer forest and 171 acres of ponderosa pine forest. The quality of these habitats for owls varies. Many of these areas lack the diversity of plant species and vegetative structure preferred by owls.

There is no designated critical habitat on the Allotment. No further discussion of critical habitat will occur in this document.

Region 3 Sensitive Species

The Forest Service's Special Status/Sensitive Species Program and the Regional Forester's Sensitive Species List are proactive approaches for meeting the Agency's obligations under the Endangered Species Act, the National Forest Management Act (NFMA), and National Policy direction as stated in the 2670 section of the Forest Service Manual. The primary objectives are to ensure species viability and to preclude trends toward endangerment that would result in a need for federal listing. Species identified by the U.S. Fish and Wildlife Service (FWS) as "candidates" for listing under the Endangered Species Act, and meeting the Forest Service's criteria for protection, are included on the Regional Forester's Sensitive Species Lists.

Only those species identified as "species and/or habitat present" (Table 9) that could potentially be affected by the project will be addressed in detail.

Table 10. List of Region 3 Sensitive Species known to occur or have the potential to occur on the A-1 Mountain Allotment.

Common Name	Scientific Name	Status*
Mammals		
Navajo Mogollon vole	*Microtus mogollonensis navaho*	--/S1/Sensitive
Spotted bat	*Euderma maculatum*	--/S2/Sensitive

Common Name	Scientific Name	Status*
Red bat	*Lasiurus blossevillii*	--/S3/Sensitive
Allen's lappet-browed bat	*Idionycteris phyllotis*	--/S2/Sensitive
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	--/S3/Sensitive
Birds		
Northern goshawk	*Accipiter gentilis*	--/S3/Sensitive
Western burrowing owl	*Athene cunicularia hypugaea*	--/S3/Sensitive
Plants		
Rusby's Milk Vetch	*Astragalus Rusbyi*	--/S2/Sensitive

***S- Heritage database subnational rating; S1– sub nationally critically imperiled; S2– sub nationally imperiled; S3– sub nationally vulnerable to extirpation or extinction.**

Navajo Mogollon Vole

Navajo Mogollon voles (*Microtus mogollonensis navaho*) are associated with meadows and other wet areas above the Mogollon Rim in proximity to ponderosa pine or other coniferous forests. They also occur in forested areas where tree densities are low and herbaceous cover is high. Voles depend on grasses and herbaceous vegetation for food and cover. Vole densities are greatest in ungrazed areas or areas further from forest edges (Chambers and Lesh, 2005). A study of Mogollon voles on the Coconino and Kaibab National Forests explained that grazing by livestock or native herbivores may reduce abundance of voles when large quantities of plants or plant tissues are removed and excessive use and associated damage limits production of food plants for the vole (Yarborough and Chambers, 2007). This study only found excessive grazing in one area with potential vole habitat, which was located outside of the Allotment boundary (Yarborough and Chambers, 2007).

No specific locations of Navajo Mogollon voles are known on the A-1 Mountain Allotment. Potential habitat for voles may be found in the open areas within ponderosa pine.

Spotted and Western Red Bats

Spotted bats (*Euderma maculatum*) are a wide-ranging species that occur mostly in dry, desert scrub, but range up to pinyon juniper and high elevation conifer forests. Feeding mostly on moths. Spotted bats are known to travel long distances from roosts for water and foraging. They are thought to roost mainly in large, isolated cliffs with access to nearby water.

Western red bats (*Lasiurus blossevillii*) are typically associated with mature riparian forests (roosts), but will forage through conifer forests, including ponderosa pine and pinyon-juniper woodlands and openings. They typically feed along forest edges or in small openings.

There are no documented occurrences of either of these bats on the A-1 Mountain Allotment. No suitable roosting sites for western red bats are located in the Allotment as there is a lack of broad-leafed trees. The A-1 Mountain also lacks suitable rock outcrops with cracks or crevices for roosting habitat used by spotted bats. Suitable habitat for foraging and drinking can be found at earthen stock ponds on the Allotment as well as areas with high herbaceous ground cover.

Allen's Lappet- Browed Bat

Allen's lappet-browed bats are found in a variety of habitats in Arizona including ponderosa pine and pinion-juniper woodlands. They are associated frequently with water, likely for both feeding on aerial insects or for drinking. They are reported to use caves and mines for roost sites, but have also been found to utilize large snags as roosts as well. In Arizona, they are most often found in high elevation forests, in particular the Coconino National Forest.

While Allen's lappet-browed bats are known to exist on the Coconino National Forest, no roost sites have been documented on the A-1 Mountain Allotment. Although no caves or mines are known in the project area, roosting habitat occurs in the form of large snags in the ponderosa pine stands on the northern portion of the Allotment. Suitable habitat for foraging and drinking can be found at earthen stock ponds and troughs on the Allotment as well as areas with high herbaceous ground cover.

Pale Townsend's Big-eared Bat

This bat species is a wide-ranging species in Arizona, present in the majority of counties within Arizona. Townsend's big-eared bats roost in mines and caves in small numbers, and forage under mature forest canopies, along forested edges, wet meadows, or over water. They are sensitive to human disturbance and have been known to abandon roosts. They also occasionally use human made structures as temporary night roosts while out foraging, but will return to caves or mines before sunrise.

There are no identified mines or caves on the A-1 Mountain Allotment, so no roosting habitat for this species exists in the analysis area. Foraging habitat exists under the canopy and along the forested edges of the ponderosa pine stands in the northern section of the Allotment or near open water sources that provide plenty of aerial insect prey.

Northern Goshawk

Northern goshawks (*Accipiter gentiis*) are aerial predators that take a wide variety of prey ranging from small to medium sized birds, like Stellar's jays and robins, to squirrels and chipmunks. They are most commonly found nesting in ponderosa pine (Beier and Maschinski, 2003). Nesting stands typically have intermediate canopy cover, while the stand itself is composed of mid to larger sized trees. Open areas adjacent to ponderosa stands are commonly used for foraging.

There are portions of one northern goshawk post-fledging family area (PFA), approximately 382 acres, and a portion of one dispersal PFA, approximately 232 acres, in the A-1 Mountain Allotment. Suitable foraging habitat for goshawks can be found across the Allotment in openings under the canopy of ponderosa pine forests and areas adjacent, including grasslands, meadows, mixed conifer stands and stock ponds. This includes areas both inside and outside of the PFAs.

Western Burrowing Owl

Western burrowing owls (*Athene cunicularia hypuaea*) are medium sized, ground dwelling owls. They utilize remnant burrows excavated by mammals such as prairie dogs, ground squirrels, and badgers. Burrowing owls are opportunistic feeders, but typical prey base for this species includes invertebrates, small mammals, reptiles, and

even fish. Burrowing owls typically forage in short grass, mowed, or over grazed fields and meadows. Conserving burrowing mammal populations is of primary importance to conserving burrowing owl populations (Arizona Game and Fish Department, 2001). Beneficial effects to burrowing owls could occur as a result of grazing, as burrowing owls have been shown to positively react to grazing (Stanton and Teresa, 2007). This likely is a result of decreased vegetation height and an increase in burrowing owl visibility for detection of predators and prey.

There are no known locations on the A-1 Mountain Allotment of burrowing owls, but no formal surveys have occurred in the project area. Vacant prairie dog colonies exist on the Allotment and would provide suitable habitat for burrowing owls (~127 acres). These exist in the Fort Valley, Fort Valley West and Belle pastures. Suitable foraging habitat exists in many of the pastures on the Allotment in open areas outside the ponderosa pine stands.

Rusby's Milkvetch

Habitats where Ruby's Milkvetch (*Astragalus Rusbyi*) is likely to be found include aspen groves, mixed conifer stands, ponderosa pine/ Arizona fescue sits and ponderosa pine/Gambel oak sites in dry or temporarily moist basaltic soils. Preliminary data from the Fort Valley Restoration plots suggests that this species does better in more open areas, as opposed to areas with dense canopies or/and heavy litter on the ground. The species is found from 6,500 to 9000 feet. Legumes in general are important forage plants for many animals. Grazing may occur on this species.

This species is known to occur in northern and central Arizona on the Coconino and Kaibab National Forests. The type specimen is from Mount Humphrey. Known locations of this plant include the Fort Valley Restoration plots; Camp Navajo; near Parks and Garland Prairie near Williams on the Forest Alliance restoration plots; near Volunteer Canyon, Veit Springs and the Wild Bill Study Plots (1963). It is also known to occur from San Francisco Peaks and north of Williams, and Mount Trumbell.

Rare plant and noxious weed surveys located Rusby's milkvetch in three of the A-1 Allotment pastures: Fort Valley (46 plants), South Flag (one plant) and A-1 Mountain (one plant). Plants were also documented to the south and west of the Allotment.

Management Indicator Species (MIS)

Management Indicator Species (MIS) are used to monitor the welfare of a large number of terrestrial wildlife species and habitat types (United States Department of Agriculture, 1987). This section will focus on MIS species located or with habitat in the Allotment to determine the effects of the proposed actions and their connected actions including the adaptive management strategy.

A Forest-wide assessment entitled "Management Indicator Species Status Report for the Coconino National Forest, Version 2" (Forest MIS report) summarizes current knowledge of population and habitat trends for species identified as MIS for the Coconino National Forest (USDA, 2013). Table 10 includes all of the Forest MIS and their associated indicator habitats.

Table 11. Management indicator species found on the Coconino National Forest and associated Indicator Habitats.

Species	Indicator Habitat
Abert's Squirrel	Early seral ponderosa pine
Goshawk	Late seral ponderosa pine
Pygmy Nuthatch	Late seral ponderosa pine
Turkey	Late seral ponderosa pine
Elk	Early seral pinyon-juniper, ponderosa pine, mixed conifer, and spruce-fir
Hairy Woodpecker	Snag component of ponderosa pine, mixed conifer, and spruce-fir
Mexican Spotted Owl	Late seral mixed conifer and spruce-fir
Red Squirrel	Late seral mixed conifer and spruce-fir
Red-naped (Yellow-bellied) Sapsucker	Late seral and snag component of aspen
Mule Deer	Early seral aspen and pinyon-juniper
Juniper (Plain) Titmouse	Late seral and snag component of pinyon-juniper
Pronghorn Antelope	Early and late seral grasslands
Lincoln's Sparrow	Late seral, high elevation riparian (≥7000')
Lucy's Warbler	Late seral, low elevation riparian (<7000')
Yellow-breasted Chat	Late seral, low elevation riparian (<7000)
Macroinvertebrates	Late seral, high and low elevation riparian
Cinnamon Teal	Wetlands/aquatic

To evaluate the potential effects of a project on MIS, only those species that represent habitat identified in the project area and could be affected by the proposed action have to be addressed. Table 11 contains the Management Areas (MA) and acres occurring within the A-1 Mountain Allotment and MIS associated with each MA.

Table 12. Management indicator species and associated Management Areas located on the A-1 Mountain Allotment.

Management Areas (2007)	MIS	Acres in Project Area	Acres of Forestwide Habitat
MA-3: Ponderosa pine and mixed conifer, less than 40 percent slopes	Mexican spotted owl, red squirrel, Abert's squirrel, elk, northern goshawk, pygmy nuthatch, turkey, and hairy woodpecker	3,989	878,599
MA-6:Unproductive Timber Land (within ponderosa pine)	Abert's squirrel, elk, mule deer and hairy woodpecker	267	791,897*
MA-9: Mountian grassland	Pronghorn Antelope and elk	201	116,342
MA-10: Grassland and sparse pinyon-juniper above the rim	Pronghorn Antelope	43	261,432

*** Total acres of ponderosa pine on the Forest**.

Due to lack of habitat, such as riparian areas or spruce fir and aspen stands, MIS species associated with these habitats were not analyzed in this analysis. Livestock grazing would

have no effect on the seral stages or number of snags in mixed conifer, pinyon-juniper or ponderosa pine ecosystems so related MIS were not analyzed. Since the proposed action could potentially affect grasslands on the Allotment, one MIS was analyzed, pronghorn antelope.

Pronghorn Antelope

Pronghorn antelope (*Antilocapra Americana*) are grassland and opening dependent species. Pronghorn avoid dense understory conditions, preferring habitats that provide expansive vistas with uncluttered views. Their diet consists of forbs, grasses and shrubs; varies seasonally depending on availability, palatability and succulence; and is generally higher in forbs and shrubs compared to other ungulates. Pronghorn choose fawning areas within approximately ½ mile of water due to increased nutritional and water needs during pregnancy and lactation.

Based on MAs, there are 244 acres of grassland habitat on the A-1 Mountain Allotment for which pronghorn are an MIS: 201 acres of montane grasslands and 42 acres of grassland and sparse juniper above the rim (Table 11). This represents less than 0.01 percent of Great Basin grassland type and approximately 0.01 percent of montane subalpine grassland type on the Forest. These acres are scattered across portions of the Fort Valley Pasture, the proposed Fort Valley West Pasture, Belle Pasture and West Pasture, all of which are located in the Arizona Game and Fish Department's Game Management Unit (GMU) 7.

The pronghorn herd closest to these pastures ranges east and north of Flagstaff between Interstate 40 and Highway 89 with the most favorable habitats located in the upper elevation grassland-parks interspersed with ponderosa pine type and at lower elevations in moderately grazed grasslands (AZGFD, 2013). The quality of pronghorn habitat on the Allotment is classified as low because of the lack of tall, open grasslands on flat terrain (slopes less than 10 percent) preferred by pronghorn; fragmentation and barriers created by roads including Interstate 40 and Highways 180 and 89 North; and proximity to development. No detections of radio-collared pronghorn were made on the Allotment during previous telemetry work conducted in GMU 7 (Ockenfels et al., 1996a). Based on this information, it is assumed that use of the grassland habitats on the allotment by pronghorn is limited to foraging and travel corridors.

Habitat Trend

Forest-wide grasslands trends are based on analyses of the amount of departure of vegetation and soil condition from reference condition of the three grassland types on the Forest using potential natural vegetation types and range monitoring and assessment data. In the Forest MIS report, the forest-wide trend for grasslands is determined to be stable to declining (USDA Forest Service, 2013).

Population Trend

The main data source for the Forest's pronghorn population trend in the Forest MIS report is derived from the AZGFD's fixed winged aerial surveys and hunt data. The two best indicators for pronghorn population trend are 1) the number of pronghorn observed and 2) the number of fawns per 100 doe observed. The population trend for pronghorn

appears to be relatively stable, with fawn-to-doe ratios increasing somewhat over approximately the last ten years (USDA Forest Service, 2013). Pronghorn population indicators have fluctuated since the late 1980s, with fawn-to-doe ratios showing greater fluctuation than number of pronghorn observed per hour. Low fawn recruitment is a concern because of its influence on long-term productivity on a population and its ability to maintain itself. A number of factors have been identified that affect pronghorn populations including severe weather, amount and timing of precipitation, habitat fragmentation, diet overlap with other grazers, reductions in fawn hiding cover, woody vegetation encroachment, predation, and nutritional concerns (Neff, 1986; Ockenfels et al., 1996a).

Migratory Birds

In addition to the species already analyzed in this document, migratory birds as identified by Arizona Partners in Flight as Priority Bird Species (PIF) and U.S. Fish and Wildlife Service Birds of Conservation Concern (BCC) are analyzed that occur in the project area (Table 12). Fourteen species that occur in ponderosa pine, grasslands, and mixed conifer habitats will be analyzed for this project. Migratory birds previously discussed (northern goshawk, golden eagle, and western burrowing owl) were excluded.

Important Bird Areas (IBAs) are identified by the Audubon Society and are sites that provide important habitat for birds as well as provide opportunity to engage the public in conserving priority habitats for migratory and other species. No IBAs exist within the A-1 Mountain Allotment. The closest IBA is the Anderson Mesa IBA is located over 17 miles southeast A-1 Mountain Allotment.

Table 13. Migratory Birds occurring in the A-1 Mountain Allotment, as identified through Partners in Flight (PIF) and U.S. Fish and Wildlife Service Birds of Conservation Concern. Acres have been calculated using Management Area acres. For PIF priority species, habitat preference from Latta, Bearmore and Corman 1999; otherwise, from Corman and Wise-Gervais, 2005.

Species	USFWS Bird of Conservation Concern	Arizona Partners in Flight Priority Species	Habitat Preference1	Acres of Habitat in Project Area
Olive-sided Flycatcher		X	Mixed conifer, ponderosa pine	4,737
Virginia's Warbler	X		Mixed conifer, ponderosa pine, high-elevation riparian	4,737
Cordilleran Flycatcher		X	Ponderosa pine, mixed conifer	4,737
Olive Warbler	X		Ponderosa pine	4,497
Greater Pewee	X		Ponderosa pine	4,497
Grace's Warbler	X		Ponderosa pine	4,497
Lewis' Woodpecker	X		Ponderosa pine	4,497
Flammulated Owl	X		Ponderosa pine	4,497
Purple Martin		X	Ponderosa pine	4,497
Swainson's Hawk	X	X	High elevation grasslands	244

Species	USFWS Bird of Conservation Concern	Arizona Partners in Flight Priority Species	Habitat Preference1	Acres of Habitat in Project Area
Grasshopper Sparrow (ammolegus)	X	X	High elevation grasslands and wetlands	244
Ferruginous Hawk	X	X	High elevation grasslands	244
Loggerhead Shrike	X		Pinyon-juniper, chaparral, desert scrub, grasslands	244
Lawrence's Goldfinch	X		Riparian, desert scrub, grasslands	244

Bald and Golden Eagles

Due to the lack of habitat requirements, such as lakes, rivers, and other and large areas with open water, bald eagles will not be evaluated in this document. The A-1 Mountain Allotment lacks large snags for nesting, dense stands of trees for winter roosts, and lakes or streams for foraging.

Golden eagles are known to occur on the Coconino National Forest. No nest sites are known on the A-1 Mountain Allotment. There is no suitable nesting habitat in the form of cliffs or ledges. The grasslands on the allotment do support jackrabbits, a preferred prey species for golden eagles and provide suitable foraging habitat.

Climate

Climate on the A-1 Mountain Allotment is characterized by a bimodal precipitation pattern with about 60 percent of precipitation occurring as frontal systems in the winter from December to March and about 40 percent occurring as monsoon moisture in the summer from July to September. The summer period (July-September) is characterized by localized high intensity, short duration convective thunderstorms. Convective thunderstorms are generally highly localized, short duration events with highly variable rainfall intensity and total depth over the area influenced by the storm (Grayson and Bloschl, 2000). The winter period (December-March) is characterized by frontal activity resulting in widespread snow.

Timing of moisture can lead to shifts in dominance from warm to cool season plant species or vice-versa. Currently, there is an observable shift to warm season species dominance in many areas of northern Arizona as a result of lower winter moisture and higher summer moisture. Shifts in forage productivity and the presence of exotic plant species in grasslands will likely affect forage quality and fire frequency (USDA, 2010).

Climate changes in the future would also affect the Allotment. Large year-to-year differences in rainfall and forage production are characteristic of southwestern ranges (Martin and Cable, 1974). Wildfires are burning hotter and covering larger areas. The resulting changes in vegetation cover and soil characteristics following wildfire can dramatically increase flooding and erosion, with severe impacts to downstream infrastructure and aquatic ecosystems (Furniss et al., 2010). Consequently, these extremes may pose additional risk to vegetation and soil productivity from decreased cover that

may result in higher risk of accelerated erosion and sediment delivery to streams. Properly implemented resource protection measures including best management practices (BMPs), and allowing for flexibility through adaptive management are critical to reducing soil disturbance.

Three of the four weather stations identified below have the ability to also approximate climate on the Allotment: Fort Valley, Flagstaff 4SW and Flagstaff WSO (Pulliam). Data from these stations is derived from the Western Regional Climate Center (http://www.wrcc.dri.edu/). Precipitation data was also collected at long term monitoring plot C3-A1 from 2007-2014, except for 2010. Table 13 displays the historical precipitation data for the four sites. Graphs depicting 7 to 104 year precipitation trends for each gauge can be found in Appendix A, Figures 10-13 of the Range Specialist report.

Table 14. Precipitation data from four precipitation gauges within or adjacent to the A-1 Mountain Allotment.

Site	Location	Years Read	Mean Annual PPT. (in)	Max. PPT. (in) (Year)	Min. PPT. (in) (Year)
A1-C3	Section 1 T21N R6E, south of FR506	2007-2009; 2011-2014	15.95	18.5 in 2014	13.75 in 2013
Fort Valley*	Section 23 T22N R6E	1909-2013	22.04	37.29 in 1965	7.35 in 1994
Flagstaff 4 SW*	Section 25 T21N R6E	1984-2014	22.67	34.08 in 1992	4.06 in 2012
Flagstaff WSO (Pulliam)*	Section 9 T20N R7E, Flagstaff Pulliam Airport	1950-2014	21.04	36.59 in 1965	10.37 in 1956

***Data from the Western Regional Climate Center (http://www.wrcc.dri.edu)**

Beginning in about 1998, annual precipitation was below normal during most years throughout the southwest and, in particular, northern Arizona (Bills et al., 2007). In an eight year grazing study beginning in 1997 near Flagstaff, Arizona, the authors noted that each year's precipitation fell below the 20-year mean with one year (2002) only receiving 19 percent of the 20 year mean annual precipitation (Loeser et al., 2007). Given the timeframe of the past two decades, the current drought has been reported to be the most severe since the 1950s (Bills et al., 2007).

Regional models have shown temperatures increasing from two to 20 degrees Fahrenheit on average over the next 50 years (Smith et al., 2010). Changes in precipitation are less predictable, with some models calling for increases of 5 percent and other models calling for decreases of varying degree from three to 40 percent over the next 50 years (Smith et al., 2010). Other models suggest that an average annual precipitation in the southwest will likely decrease six to 12 percent by 2100 (USDA, 2012). Wildfire frequency and severity will likely increase as temperatures rise and precipitation decreases (Periman et al., 2009).

Watersheds

The A-1 Mountain Allotment is almost entirely within the Upper Rio de Flag sub-watershed with only 76 acres of the Allotment in the Telephone Tank sub-watershed, the

portion of which is located on steep slopes on the west side of A-1 Mountain where grazing is unlikely to occur, and therefore, will not be discussed further.

In the most recent assessment of sub-watersheds on the Coconino National Forest (2010b), the Upper Rio de Flag rated as "functioning at risk". Some of the contributing factors to this rating include urbanization of this watershed from the City of Flagstaff and overstocking of forested areas within the sub-watershed compared to pre-settlement conditions. The City of Flagstaff is located almost entirely within the Upper Rio de Flag sub-watershed with roughly 29 percent of land within this sub-watershed not managed by the Forest Service. Urbanization of this watershed has altered the precipitation/runoff response with most of the discharge in the Rio De Flag attributed to runoff from urbanized areas (Hill et al., 1988). This increase in runoff has led to incision and widening of stream channels within the sub-watershed down stream of urbanized areas. Overstocking can increase the threat of an uncharacteristic wildfire and a reduction in herbaceous ground cover (Bakker and Moore, 2007).

Wetlands, Springs, and Riparian Areas

There are no mapped wetlands or riparian areas on NFS lands within the A-1 Mountain Allotment. Two springs (Tunnel Spring and Belle Spring) occur within the Allotment boundary, but are not located on NFS lands, and therefore are not managed by the Coconino National Forest.

Stream Courses and Water Quality

The Arizona Department of Environmental Quality (ADEQ) is responsible for establishing State water quality standards and monitoring the quality of the State's surface water. Surface waters are classified into one of five categories:

- Category 1- Surface waters assessed as "attaining all uses." All designated uses are assessed as "attaining".
- Category 2 - Surface waters assessed as "attaining some uses." Each designated use is assessed as either: "attaining", "inconclusive", or "threatened".
- Category 3 - Surface waters assessed as "inconclusive". All designated uses are assessed as "inconclusive" due to insufficient data to assess any designated use (e.g., insufficient samples or core parameters). By default, this category would include waters that were "not assessed" for similar reasons.
- Category 4- Surface waters assessed as "not attaining." At least one designated use was assessed as "not attaining" and no uses were assessed as "impaired." A Total Maximum Daily Load (TMDL)[15] analysis will not be required at this time for one of the following reasons:

[15] A TMDL is a written analysis that determines the maximum amount of a pollutant that a surface water can assimilate (the "load"), and still attain water quality standards during all conditions. A TMDL is a written analysis that determines the maximum amount of a pollutant that a surface water can assimilate (the "load"), and still attain water quality standards during all conditions, and seasonal variation, with an allocation set aside as a margin of safety.

  - A TMDL has already been completed and approved by the Environmental Protection Agency, but the water quality standards are not yet attained;
  - Other pollution control requirements are reasonably expected to result in the attainment of water quality standards by the next regularly scheduled listing cycle; or
  - The impairment is not related to a "pollutant" loading but rather due to "pollution" (e.g., hydrologic modification).
- Category 5- Surface waters assessed as "impaired." At least one designated use was assessed as "impaired" by a pollutant. These waters must be prioritized for TMDL development.

The most recent assessment report is for the period 2012/2014 (ADEQ, 2015). Because ADEQ's surface water monitoring program is focused on perennial waters, there are no stream courses within the Allotment for which water quality was assessed as all stream courses within the Allotment are ephemeral.

All the stream courses within the Allotment are tributaries of the Rio de Flag for which water quality was assessed. No exceedances of State water quality standards were detected for the reach of the Rio de Flag extending from its headwaters, located north of the Allotment, 34.5 miles downstream to its confluence with the outfall of the City of Flagstaff's wastewater treatment facility.

Soils

Based on field surveys conducted in October 2015, and supplemented with information published in the Coconino National Forest's TES, soils associated with all TEUs in the analysis area have been rated as "satisfactory" (Table 15). See the Range section for more detailed information about soils in the Allotment.

Table 15. Summary of soil condition by TES map unit within the Allotment.

TEU	Landform	Average Slope (%)	Soil Great Group	Soil Texture	Vegetation Type	Soil Condition	Tolerable Soil Loss Rate (tons/ha/yr)	Area (acres)	Basis for Soil Condition Rating
557	Elevated plains/ alluvial fans	4	Eutroboralfs	Loam	Ponderosa pine	Satisfactory	9	235	TES USLE Soil Stability
570	Elevated plains	3	Eutroboralfs	Loam	Ponderosa pine	Satisfactory	6.7	3041	TES USLE Soil Stability
582	Elevated plains	3	Argiborolls	Loam	Ponderosa pine	Satisfactory	9	388	TES USLE Soil Stability
586	Elevated plains	6	Eutroboralfs	Loam	Ponderosa pine	Satisfactory	6.7	15	TES USLE Soil Stability
562	Cinder cones	45	eutrochrepts	Sandy loam	Mixed Conifer w/Aspen	Satisfactory	9	240	TES USLE Soil Stability
565	Cinder cones	30	Eutroboralfs	Loam	Ponderosa pine	Satisfactory	9	176	TES USLE Soil Stability
584	Hills/ Scarp slopes of plains	30	Eutroboralfs	Loam	Ponderosa pine	Satisfactory	6.7	775	TES USLE Soil Stability
55	Valley plains/ Swales	2	Argiborolls	Loam	Montane/Subalpine Grassland	Satisfactory	9	12	Field Assessment
595	Elevated plains/Alluvial fans	2	Argiborolls	Loam	Montane/Subalpine Grassland	Satisfactory	9	203	TES USLE Soil Stability

Noxious or Invasive Plant Species

The following noxious or invasive plant species (weeds) have been documented on the A-1 Mountain Allotment: Scotch thistle (*Onopordum acanthium*), Dalmatian toadflax (*Linaria dalmatica*), bull thistle (*Cirsium vulgare*), diffuse knapweed (*Centaurea diffusa*), spotted knapweed (*Centaurea stoebe*), cheatgrass (*Bromus tectorum*), common mullein (*Verbascum Thapsus*), field bindweed (*Convolvulus arvensis*), field brome (*Bromus arvensis*) and nodding plumeless thistle (*Carduus nutans*). Five of these (Scotch thistle, Dalmatian toadflax, bull thistle, spotted knapweed and diffuse knapweed) were addressed in the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mojave, and Yavapai Counties, Arizona (USDA, 2005). Cheatgrass has been recently added to the Coconino National Forest's list of invasive plants species of concern. On the A-1 Mountain Allotment, known populations of most of these species are found adjacent to Forest Service roads in all pastures except 006 and 008; and in areas with past thinning activity, the South Flag and Belle Pastures.

Cultural Resources

The A-1 Mountain Allotment is in an area of low prehistoric and historic settlement. Despite the fact that nearly 50 percent of the Allotment has been previously surveyed for cultural resource sites, only 15 sites have been recorded (Table 16), which is well below the average site density on the Forest. The total amount of previous survey well exceeds 10 percent inventory, considered a baseline for project inventory as per the Forest Plan (1986).

Human occupation on the Colorado plateau goes back at least 12,000 years. The cultural-historical framework used in following discussions consists of a five period general chronology applicable to the project area: Paleoindian (ca. 10,000 to 7,000 B.C.), Archaic (7,000 B.C. to A.D. 500), Formative (500 B.C.to A.D. 750), Protohistoric (A.D. 1300 to 1540) Historic (A.D. 1540 to 1950).

Euro-American entry into the area followed the Beale Wagon Road, which clips the northern margin of the Allotment. Incipient settlers in the Fort Valley area were Mormon ranchers who ultimately procured railroad ties for the oncoming railroad (Cline, 1976). Early settlers also attempted to grow crops in this agriculturally marginal area (Olberding, 2007). Euro-American settlement of the Fort Valley area was well under way by the late nineteenth century (Cline, 1976; Olberding, 2007). The economy of early settlers revolved around logging, cattle ranching, and sheep herding.

Previous Surveys

Over the course of the last 30 years, approximately 2,360 acres or 46 percent of NFS lands within the A-1 Mountain Allotment project area have been surveyed. For a full list of surveys by year and project type, see the Heritage Specialist Report in the project record.

Table 16. Heritage sites recorded within the A-1 Mountain Allotment.

Site Number (03-04-)	Nation Register Status	Site Type
02-1672*	Eligible	Beale Wagon Rd
03-0040*	Unevaluated	Homestead, foundation/masonry structural remains
03-0060*	Unevaluated	Historic Structure
03-0285	Unevaluated	Lithic Scatter
03-0294	Unevaluated	Lithic Scatter
03-0549**	Eligible/Mitigated	Field House
03-0580*	Eligible	Structural foundation, trash scatter
03-0736	Not Eligible	Trash Dump
03-0741	Eligible	Trash Dump
03-0912	Unevaluated	Lithic Scatter
03-0915*	Unevaluated	Lithic Scatter
03-0916	Not Eligible	Agricultural Field
03-1037	Unevaluated	Lithic Scatter
03-1038	Unevaluated	Lithic Scatter
03-900	Eligible/Ineligible segments	Logging Railroad segments

***Indicates sites that were field assessed per this project. ** Indicates that the site was not located.**

Simplified, the sites consist of eight historic-era sites, and seven prehistoric sites. Historic sites consist of the remains of historic structures, trash scatters, segments of the Bellemont logging railroad (1903-1930s), and the Beale Wagon Road (1857-1880s).

Prehistoric sites consist of low-density lithic scatters, dominated by Government Mountain obsidian, and one fieldhouse site, excavated in the early 1950's. The lithic scatter sites lack diagnostic artifacts and are not currently dated. The single room fieldhouse is ascribed to either the Cohonina or Sinagua (Bliss et al., 1956).

Although none of the sites listed above are listed on the National Register of Historic Places, all eligible or unevaluated sites are managed as if they are listed and afforded equal consideration of effects from project undertakings.

Desired Conditions

Desired conditions are the on-the-ground resource conditions management is working towards achieving. The Forest Plan sets forth, in detail, the direction for managing the land and resources of the Forest. The desired conditions for the project are based on Forest Plan, as amended, objectives, goals, standards and guidelines. Desired conditions are also derived from agency range management policy, shared inter and intra-agency resource goals, and direction relevant to wildlife, water quality, and cultural resource laws and regulations.

Desired conditions for the A-1 Mountain Allotment include maintaining or increasing the abundance of desired perennial native range species; and maintaining and/or improving species richness, and overall ground cover. This would help support a stable and desired plant community, which in turn would support grazing ungulates, wild and domesticated. Watersheds and soils would also be maintained at or improved towards satisfactory condition, which leads to:

- Increases in the perennial herbaceous basal vegetation
- Reductions of annuals and non-natives, improving nutrient cycling, forage production, and wildlife habitat.
- Improved watershed condition
- Maintaining a viable livestock operation.

Desired conditions are provided in Table 17 and are primarily based on Forest Plan direction, which incorporates law and regulation and often provides more specific direction for livestock grazing and resource protection.

Table 17. General desired conditions for the A-1 Mountain Allotment.

Resource	Relevant source	Specific Management Direction or resource goal/objective	Desired Conditions
Non-forested vegetation and rangeland	Forest Plan, p. 67	"Permitted use and capacities are maintained in balance for the allotments by increasing or decreasing numbers of livestock, by changing the management intensity levels, and by initiating changes in livestock class, season of use, and rotation patterns."	There is a desired condition to maintain or improve vegetative and forage condition over the long-term through monitoring and adaptive management techniques.
	Forest Plan, p. 67	"Do production and utilization surveys at least every 9 to 13 years for capacity determinations."	
	Forest Plan, p. 68	"Manage grazing use to maintain or enhance condition classes of full capacity rangelands."	
Soil Conditions	Forest Plan, p. 23,	"Maintain or, where needed, enhance soil productivity and watershed condition."	There is a desired condition to maintain satisfactory soil conditions and improve impaired soil conditions so that they meet or move towards satisfactory conditions using appropriate range management techniques.
	Forest Plan, p. 68	"Full capacity rangeland in unsatisfactory condition that has potential for improvement is treated through appropriate structural and nonstructural range improvements and pasture stocking rate adjustments as described in the AMP'S"	The desired condition for soils is for physical, chemical, and biological properties to support the productive capacity of the land, its ecological processes (hydrological function of watersheds) and the ecosystem services identified in land management plans (USDA, 2010). Soils are in satisfactory condition; do not display evidence of compaction and active sheet and rill erosion, and vegetative ground cover supports nutrient cycling. Soil structure promotes water infiltration.
	Forest Plan, p. 74	"Implement resource improvement projects that are cost-effective and/or are beneficial for maintaining and improving water quality, quantity, and soil productivity."	There is a desired condition to improve resource conditions by implementing activities that improve water quality, quantity, and soil productivity.
	Forest Plan, p. 23	"Maintain or, where needed, enhance soil productivity and watershed condition."	
Watershed Condition and Water Quality	Forest Plan, p. 71	"Ensure compliance with PL 92-500 'Federal Water Pollution Control Act' and Arizona Water Quality Standards through the implementation of Best Management Practices (BMP) to prevent water quality degradation."	

Resource	Relevant source	Specific Management Direction or resource goal/objective	Desired Conditions
	Forest Plan, p. 74	"Implement resource improvement projects that are cost-effective and/or are beneficial for maintaining and improving water quality, quantity, and soil productivity."	Water quality would either meet or exceed Arizona water quality standards, and support identified designated beneficial uses and native aquatic species. Watersheds would be resilient and recover rapidly from natural and human caused disturbance. Watersheds would produce high quality water, support aquifer recharge and stream baseflow, and support maintenance of riparian communities, where applicable, while providing habitat for adaptive animal and plant communities.
Wildlife	Forest Plan, p. 66-1	"Forage use by grazing ungulates will be maintained at or above a condition which assures recovery and continued existence of threatened and endangered species."	There is a desired condition to support the recovery and/or maintenance of sensitive, endangered, threatened, and management indicator species by maintaining or improving vegetative conditions in riparian and upland areas.
	Forest Plan, p. 65-5	" Implement forest plan forage utilization standards and guidelines to maintain owl prey availability, maintain potential for beneficial fire while inhibiting potential destructive fire, maintain and restore riparian ecosystems, and promote development of owl habitat. Strive to attain good to excellent range conditions."	
	Forest Plan, p. 66	"Manage forage to increase threatened and endangered species and management indicator species (MIS) where it is determined appropriate through the IRM and NEPA process."	
	Forest Plan, p. 64-1	"Evaluate potential resource impacts on T&E and sensitive species habitat by projects and activities through a biological assessment (FSM 2670) and conduct appropriate consultation (FSM 2670) when necessary. Provide appropriate protection or enhancement."	
Economic and Social Values	Forest Service Manual 2203.1; 36 CFR 222.2(c)	"Where consistent with other multiple use goals and objectives, there is congressional intent to allow grazing on suitable lands"	There is a desired condition to continue to facilitate livestock grazing on National Forest System lands where livestock grazing is managed to maintain or improve range conditions over the long-term.

Resource	Relevant source	Specific Management Direction or resource goal/objective	Desired Conditions
	Forest Service Manual 2202.1	"It is Forest Service policy to make forage available to qualified livestock operators from lands suitable for grazing, consistent with land management plans. It is also Forest Service policy to continue contributions to the economic and social well-being of people by providing opportunities for economic diversity and promoting stability for communities that depend on range resources for their livelihood."	There is a desired condition to contribute to the economic and social well-being of communities that depend on range resources.
Cultural and Historic Values	Forest Plan, p. 49	"Ground disturbing projects receive cultural resources clearance. This includes projects proposed in areas that have been previously cleared for other projects. Projects, not areas, receive clearance. Projects receive clearance without additional archaeological field work whenever sufficient prior field work has been done to clear the project."	There is a desired condition to avoid all adverse effects to cultural and historic resources. It is desirable that management practices that tend to concentrate livestock (and most likely wild ungulates) such as placement of salt, haying, placement of water troughs, etc., will be located away from cultural resources. Cattle should be kept away from any discovered rock shelters, sensitive historic structures, and prehistoric sites with standing architecture.
	Forest Plan, p. 50	"Cultural resource sites are located and protected from project activities according to direction in FSM 2360..."	
Invasive Species	Forest Plan, p. 23	"Prevent any new noxious or invasive weed species from becoming established, contain or control the spread of known weed species, and eradicate species that are the most invasive and pose the greatest threat to the biological diversity and watershed condition."	There is a desired condition to prevent new invasive species from becoming established and remove invasive species that cause the greatest effect to Forest resources.

Desired conditions specific to range resources include values for percent ground cover, species richness, and species composition for the A-1 Mountain Allotment. A table identifying these desired conditions are shown in Appendix B, Table 22 of the Range Specialist Report. These desired conditions were developed by an interdisciplinary team of resource specialists using information from the TES and long term monitoring data.

Desired conditions are, in part, evaluated by comparing current conditions to potential or natural conditions in the TES and considering what conditions could be achievable in a ten year timeframe. The terrestrial ecosystem units (TEUs) in Table 8 account for approximately 43,811 acres (or 85 percent of the proposed allotment size) within the allotment and are those TEUs associated with long-term vegetation monitoring locations.

Desired conditions were developed for TEUs or TEU groups that have long term monitoring plots. For the A-1 Mountain Allotment desired conditions were developed for 91 percent of the allotment, TEU group 557, 565, 570, 582, 584 and 586.

For TEUs or TEU groups that are currently meeting desired conditions, the long-term goal is to maintain or improve this condition. For TEUs or TEU groups that are not currently meeting desired conditions, the long-term goal is to move towards desired conditions.

For more detailed description of existing, desired and potential conditions by TEU, see Appendix E.

Environmental Impacts of the Proposed Action and Alternatives

This section summarizes the potential impacts of the proposed action and alternatives for each impacted resource. The information summarizes and cites the specialists' reports. Full versions of these reports are included in the project record.

Past, Present and Reasonably Foreseeable Future Actions

We identified past, present and reasonably foreseeable future actions that could overlap with the direct and indirect effects of the proposed action (see Appendix C for a list of projects and activities considered). Each resource area considered different mixes of those actions, depending on the cumulative effects boundary for the resource area and the resource affected. Only those past, present and reasonably foreseeable actions that overlap the geographic analysis area boundary for each particular resource are considered, and only if those other actions have or are expected to have overlapping effects with the A-1 Mountain Allotment. Past projects could have ongoing effects on one resource, but not another.

Past Actions

The cumulative effects analyses do not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century and beyond, and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one cannot reasonably identify each and every action over the last century that has contributed to current conditions.

Additionally, focusing only on the impacts of past human actions one risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects as much as human actions. By looking at current conditions, residual effects of past human actions and natural events are captured, regardless of which particular action or event contributed those effects. Thirdly, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the

Council on Environmental Quality (CEQ) issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, " agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions."

The cumulative effects analysis in this EA is also consistent with Forest Service National Environmental Policy Act Regulations (36 CFS 220.4(f)) July 24, 2008, which state in part: "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions."

Range Vegetation

This section focuses on rangeland management, range plant communities and herbaceous forage production. More detailed information on existing conditions and monitoring used to determine consistency with Forest Plan and other regulatory framework can be found in the Range Specialist report and project record.

Alternative 1- No Action

Selection of Alternative 1- No Action would mean that no action would be taken to authorize livestock grazing on the A-1 Mountain Allotment. In other words, livestock would be removed and a term grazing permit (TGP) would not be issued. Existing structural range improvements would not be maintained nor would new ones be constructed. Any existing structural range improvements are not proposed for removal through this analysis.

Vegetation Height and Canopy Cover

Livestock grazing reduces plant height and canopy cover as a result of livestock consumption or trampling; however this is only a temporary reduction. Under favorable conditions, plants will recover. If the no action alternative were selected, seasonal reductions in vegetation height and canopy cover resulting from livestock grazing would not occur. Because there would be no action, there can be no direct or indirect effects from livestock grazing on range vegetation.

Vegetation Diversity and Density

Changes in range condition and trend, as measured by changes in vegetation density (number of plants per unit area) and vegetation diversity (number of different plant species present in a given area) may be observed under this alternative. The degree to which those changes in vegetation would occur in the absence of livestock grazing has not been well researched, and existing studies report a range of outcomes resulting from the absence of livestock grazing (Courtois et al., 2004; Loeser et al., 2006). Courtois et al. (2004) found few differences in species composition, cover, density, and production in comparing 16 long-term livestock enclosures (65 years) with adjacent areas that had been moderately grazed. Loeser et al. (2006) found that cattle removal resulted in little increase in native plant cover and reduced plant species richness relative to the moderate grazing control in an eight year study in north-central Arizona.

Under this alternative, range condition and trend (as measured by changes in vegetation density and vegetation diversity) within most of the analysis area is expected to remain

static or move upward during periods of favorable climatic conditions. The exception to this would occur in areas where overstory species limit the improvement potential of understory species or in areas that are continuously grazed by wildlife. Range condition and trend in these areas would likely remain static or would improve during periods of favorable climatic conditions. During periods of unfavorable climatic conditions, range condition and trend is expected to decline at all locations within the analysis area commensurate with the severity and duration of the unfavorable climatic conditions. Under this alternative, the ability for improvement in range condition and trend would be most affected by climatic conditions (Sprinkle et al., 2007).

Vegetation Production and Quality

Changes in vegetation production (amount of plant biomass above ground produced in a given year) and vegetation quality (the nutritional value and palatability of plant biomass) of forage species within the analysis area are expected if no action is taken. As has been seen in past research (Holecheck, 1981; Patton et al., 2007), livestock grazing can benefit vegetation production and quality. Holechek (1981) reported that vegetation production and quality is maintained and enhanced by light to moderate grazing. Patton et al. (2007) found that low to moderate levels of grazing can increase vegetative production over no grazing, but that the level of grazing that maximizes vegetation production depends upon the growing conditions of the current year.

Under this alternative livestock grazing would not occur, and as a result vegetation production and quality would not receive the potential benefits of grazing as identified by Holecheck (1981) and Patton et al. (2007). However, these same benefits could occur if wildlife herbivory increases over the next decade in the absence of livestock.

Wildlife herbivory and browsing would continue within the analysis area. Most wildlife use would be seasonal and transitory and the density, diversity, production, and canopy cover of range vegetation would be maintained. However, it is possible that wildlife use could become concentrated in portions of the analysis area potentially creating areas of excessive forage utilization due to behavior and movement of wild ungulates. In these areas, the density and diversity range vegetation production would likely decrease.

Existing Structural Range Improvements

Operation and maintenance of existing structural range improvements is the responsibility of the grazing permittee. Under the no action alternative, a TGP would not be issued and therefore there would be no grazing permittee. As a result, operation and maintenance of existing structural range improvements would not occur. As fences degrade due to lack of maintenance, they would likely become an entanglement/impalement hazard for wildlife (AZGFD, 2011).

If the no action alternative is selected, water available to wildlife from stock ponds would decrease as they fill with sediment and debris.

New Structural Range Improvements

Under this alternative, new structural range improvements would not be constructed and as a result, there would be no direct or indirect effects related to that activity.

Cumulative Effects

Livestock grazing, in combination with recreation, fuel reduction projects associated with 4FRI, prescribed burns, fuelwood cutting, weed treatments, hunting, roads and OHV use can cumulatively effect the density, diversity, production, and canopy cover of understory plants. Under this alternative cattle grazing would not be authorized and there would be no direct or indirect effects from cattle grazing on vegetation density, vegetation diversity, production, or canopy cover. As a result, there would be no cumulative effects related to cattle grazing.

Alternative 2- Proposed Action

Under this alternative, managed livestock grazing would occur, and as a result, there would be direct and indirect effects from cattle grazing on range vegetation. Adaptive management and annual implementation monitoring will be used to mitigate the direct and indirect effects of livestock grazing, as well as the effects of climate variability.

Direct and Indirect Effects Analysis

The focus of this analysis is on range vegetation, which receives very little influence from off-site activities due to topography. As a result, the spatial extent of direct and indirect effects is confined to the A-1 Mountain Allotment boundary. The temporal extent for this analysis is 20 years, ten years in the past and ten years in the future. This timeframe was selected because ground-disturbing activities that have occurred within the analysis area are expected to exhibit recovery within ten years.

Vegetation Height and Canopy Cover

Effects to range vegetation include a reduction in plant height and vegetative canopy cover as a result of livestock consumption or trampling. These effects are only temporary since plant height and canopy cover will recover under favorable climatic conditions. Under Alternative 2-Proposed Action, reductions in plant height and canopy cover would be managed using a number of management guidelines including managing the length of the livestock-grazing period, frequency of livestock grazing, seasonal utilization, and forage utilization guidelines, that are included as part of the adaptive management strategy.

In Galt et al. (2000), a 25 percent forage utilization guideline is recommended for livestock, with 25 percent allocated for wildlife and natural disturbance, and the remaining 50 percent left for site protection. Under this alternative, wildlife use is within the proposed forage utilization guideline at 30 to 40 percent. As a result, this alternative leaves 60 to 70 percent of the forage production for site protection, which exceeds Galt et al. recommendation. During the growing season, the proposed seasonal utilization guidelines maintain forage on site to reproduce, grow to maturity, build necessary root masses, produce seed heads, produce litter important for nutrient cycling, and propagate and move into new areas.

Under favorable climatic conditions, the management guidelines for livestock grazing periods, frequency of livestock grazing, seasonal utilization, and forage utilization are expected to 1) maintain or improve vegetation canopy cover and vegetation ground cover,

and 2) maintain soil condition within areas currently identified as having satisfactory soil condition.

Adaptive management and annual implementation monitoring would provide the ability to modify the management guidelines, as needed, to maintain vegetation height and canopy cover during periods of unfavorable climatic conditions. During periods of unfavorable climatic conditions the management guidelines for livestock grazing periods, frequency of livestock grazing, seasonal utilization, and forage utilization would be modified to maintain or minimize the reduction of vegetation canopy cover and vegetation ground cover, and to maintain or minimize the reduction of vegetation necessary for soil stability.

Vegetation Density and Diversity

Depending on the timing of grazing, livestock grazing can have an effect on increasing or decreasing plant species composition. Spring and early summer grazing occurs mainly on cool season species, which are more palatable to livestock at this time. In late summer, grazing occurs mainly on warm season species as these species become more palatable. In the fall, grazing mainly occurs on cool season species as cooler weather increases the palatability of these forage plants.

In general, under this alternative, the livestock grazing use period within a pasture is seasonally rotated so that forage is grazed and rested at different times each year (see Appendix B; Tables 18-21, Range Specialist report). Alternating livestock use and rest periods on cool and warm season species helps to reduce grazing pressure on forage plants and to maintain or improve plant species composition. Annual implementation monitoring and subsequent adaptive management would provide the necessary resource information and management options to adjust the timing, intensity, frequency and duration of livestock grazing to ensure that vegetation condition is maintained or improved.

Vegetation Production and Quality

Vegetation production and vegetation quality of forage species within the analysis area are expected to be maintained under this alternative. The implementation of conservative to moderate seasonal utilization, conservative forage utilization, and an adaptive management strategy is expected to limit the effects of grazing during periods of drought. As a result, vegetation can be resilient and return to increased production and quality when climatic conditions improve (Vogel, 2012). Research (Vogel, 2012; Holechek, 1981; Loeser et al., 2004; and Patton et al., 2007) and site-specific observations suggests that, given average climate conditions, forage production and quality will be maintained or slightly improved as long as a conservative grazing capacity is assigned, seasonal and forage utilization levels are implemented, and followed, and flexible livestock management is allowed.

Vegetation production and quality of non-forage vegetation species is expected to remain unchanged under this alternative over the long-term. Vegetation production is expected to be average to above average during periods of favorable climatic conditions. During periods of unfavorable climatic conditions, vegetation production is expected to decline, but would maintain resiliency for when climatic conditions improve (Loeser et al., 2007).

Structural Range Improvements

Under the proposed action alternative, existing structural range improvements would continue to be maintained and would stay operational. Maintenance activities related to existing structural range improvements would have short-term (generally one growing season) effects to range vegetation. Specifically, plant height and vegetative canopy cover would be reduced in the immediate area due to maintenance activities. Plant height and canopy cover would be expected to recover with favorable climate conditions, and proper forage utilization.

Fencing

Maintaining existing fences reduces the chance of entanglement/impalement of wildlife with fences (AZGFD, 2011). Furthermore, as existing fences reach the end of their functional lifespan they will be reconstructed to current wildlife specifications further reducing potential for entanglement. As new fences are constructed, they will also follow wildlife specifications to facilitate safe passage.

Construction of new improvements would have similar effects as maintenance of exiting improvements. Plant height and canopy cover in the immediate vicinity of the improvements would be reduced during construction activities. These effects would only occur on a very small portion of the allotment (approximately 1 percent), and are expected to be minimal and of short duration, under normal or favorable climatic conditions. Under poor climatic conditions, there would likely be an increased amount of bare ground in this small proportion of the allotment until conditions improve.

The proposed action also proposes to remove approximately 0.8 miles of fence no longer needed for livestock and Allotment management (Appendix B, Figure 8). Removing this fence will help reduce the potential entanglement hazards to wildlife as this fencing would no longer be maintained as part of the Allotment. This proposed activity would have short-term effects to range vegetation by reducing plant height and canopy cover in the immediate area of activities. These effects are expected to be short in duration and would recover with favorable climate conditions.

Corral

The proposed action also includes construction of a permanent livestock holding facility or corral. Construction and continued use of an approximately 200 foot x 200 foot permanent corral facility would have the greatest effect to plant production, plant height, and canopy cover of all proposed new construction. These effects would be limited to construction activities and during times when livestock are utilizing the corral, which is generally twice a grazing season, once when animals are being received and once when they are being shipped. This high use area affects less than one acre, which equates to approximately 40,000 feet squared or less than one-tenth of one percent of the Allotment. Effects of constructing and using a permanent corral facility are expected to be negligible at the project level.

Stock Ponds

Existing earthen stock ponds will also continue to receive maintenance necessary to keep them operational. While functional livestock water developments are necessary for

managed livestock grazing, they also provide an important water sources for wildlife. This function would continue under the proposed action alternative. Maintenance of stock ponds typically takes place when the pond has accumulated an excessive amount of silt, and involves the use of heavy machinery. Effects are expected to be limited to the area within the footprint of the stock pond. Due to the high use of these areas from livestock and wildlife, effects to plant height and vegetative canopy cover is not expected to increase from maintenance activities.

Cumulative Effects

The cumulative effects boundaries are the same as identified above for direct and indirect effects. Cumulative Effects to range vegetation is confined to the A-1 Mountain Allotment boundary because the effects are not expected to occur outside the project area boundary. The temporal extent for this analysis is 20 years, ten years in the past and ten years in the future. This timeframe was selected because ground-disturbing activities that have occurred within the analysis area are expected to exhibit recovery within ten years. The past, present, and reasonably foreseeable future activities considered in the cumulative effects analysis for range vegetation include: fuels reduction projects including the Flagstaff Watershed Protection Project (FWPP) and the Four Forest Restoration Initiative (4FRI), prescribed burning, weed treatments, recreation, hunting, firewood gathering, and off highway vehicle (OHV) use.

Cumulative impacts result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions. Selection of the proposed alternative when combined with past, present, and reasonable foreseeable future actions are expected to have cumulative effects to range vegetation.

Fuels Reduction

Fuel reductions in the form of prescribed burns are expected to occur on approximately 500 acres per year over the next ten years within the A-1 Mountain Allotment. Prescribed burns will occur in accordance with Arizona Department of Environmental Quality (ADEQ) requirements (4FRI, FEIS Appendix C). As needed, the burning of hand piles or machine piles would occur when conditions are favorable and risk of fire spread is low, and is expected to result in low to moderate burn severity. Prescribed burns will result in localized, short term reductions in plant height, canopy cover and vegetation production. However, these effects would be temporary and recovery would typically occur in one growing season under favorable climatic conditions. In the long term, prescribed burn activities would help to reduce potential overstory canopy cover and stimulate vegetation production in understory species resulting in an increase in understory plant height, vegetative canopy cover and vegetation production.

Both prescribed burns and livestock grazing affect plant height, vegetative canopy cover, and vegetation production. Therefore, if Alternative 2-Proposed Action is selected, it is anticipated that during times when prescribed burns overlap the Allotment there could be short-term (1 to 3 growing seasons) cumulative effects to range vegetation. These effects are expected to be minimal and would not affect our ability to meet desired conditions of the long-term.

Under 4FRI, project specific mitigation measures have been designed to reduce impacts from prescribed burns, and when coupled with the resource protection measures and adaptive management strategy proposed under Alternative 2- Proposed Action it is expected that these effects would be minimal. These mitigation measures include:

- Fire personnel would coordinate with district range staff to schedule main pasture burning to limit impacts to Allotment grazing management. The general goal would be to limit burns to no more than one main grazing pasture/year/Allotment in Allotments with a less than, or equal to, six pasture grazing system.
- Burns would be restricted to no more than two main grazing pastures/year/Allotment in allotments with a greater than six pasture grazing system. Main pastures are pastures that are large enough to hold the Allotment's livestock for more than an average of 20 days per year. This is a general rule of thumb; however, each allotment has specific situations that would need to be addressed.
- Restrictions in grazing of livestock will occur after substantial burns in pastures. Livestock pasture rest after ground disturbing treatments (i.e. thinning, seeding, and aspen treatments) may occur. Line officers will evaluate annual range readiness monitoring (at a minimum) to determine when grazing may resume within a pasture. Grazing regimes may need to be altered based on ground conditions after treatments. Livestock use after treatments will be carefully and actively managed. The range management definition for range readiness is: Plants are ready for grazing when at least one of the following characteristics is present: 1) seed heads or flowers, 2) multiple leaves or branches, and/or 3) a root system that does not allow plants to be easily pulled from the ground. These characteristics provide evidence of plant recovery, high vigor and reproductive ability. Other factors evaluated may include forage production, precipitation and fuel loading. An estimate of this restriction is not available because of each pasture's response to ground disturbing treatments (including vegetation and prescribed burns) is unique. Climatic conditions, soils, vegetation, the severity of fire effects, burn amount, intensity of vegetation treatments and pasture management may vary greatly from year to year or from pasture to pasture.
- The removal or exclusion of livestock water would be mitigated with alternative water sources, providing lanes to the water, or piping water to a livestock drinker.

While prescribed burns and livestock grazing will occur within the A-1 Mountain Allotment in the same space and time over the next ten years, mitigation measures, resource protection measure, and national BMPs in place ensure that combined effects will be minimized through proper planning and coordination. It is not anticipated that these effects will be substantial, i.e. they will be of short duration, in localized areas.

Thinning Treatments

Thinning of ponderosa pine overstory will occur on approximately 4,868 acres within the A-1 Mountain Allotment through 2017, as a result of the 4FRI Final Environmental Impact Statement and Record of Decision signed April 17, 2015. Thinning activities will require the use of heavy machinery and other disturbance from skid trails and landings, which will result in localized, short-term reductions or removal of range vegetation density, plant height, canopy cover and production due to the crushing of vegetation related to the mechanical/vehicular use in the area. These effects would be temporary and recovery would typically occur within a few (1 to 3) growing seasons under average or favorable climatic conditions. In the long-term, thinning activities would open the overstory allowing an increase in light and precipitation to reach the understory vegetation resulting in an increase in range vegetation density, diversity, plant height and canopy cover, and production within the thinning area.

When combined with thinning operations, livestock grazing has the potential to cumulatively effect range vegetation. These effects are expected to be in localized areas where impacts from machinery remove or damage vegetation, and are expected to be minimal and of short duration under average or favorable climatic conditions. Thinning operations and grazing occur in a rotational pattern and are not expected to occur over the entire allotment in any given grazing season. Furthermore, project mitigation measure for 4FRI include working to identify pasture use during harvest activities to reduce the potential for effects. Based on the limited expected overlap, we do not anticipate substantial cumulative effects that would reduce our ability to maintain or meet desired conditions within the A-1 Mountain Allotment.

Recreation

Recreation (camping, hiking, biking, etc.), hunting and firewood gathering all result in reductions in plant height, canopy cover, and vegetation production due to the physical defoliation and crushing of understory vegetation primarily related to the vehicular use associated with these activities. Except in areas that receive continuous recreational and vehicular use, the effects to plant height, canopy cover, and vegetation production would be temporary and recovery would typically occur in one growing season under favorable climatic conditions.

Fuel Reduction Treatments

Fuel reduction activities will also occur over the next ten years, and recreation activities are expected to increase over the next ten years, on lands managed by the City of Flagstaff that fall within the A-1 Mountain Allotment boundary. Cumulative effects will be the same as those discussed above for fuel reduction and recreation activities, however encroachment of authorized livestock from the A-1 Mountain Allotment is expected to continue on these lands. If the City of Flagstaff constructs fences to exclude livestock grazing from their lands there would be no cumulative effects to livestock grazing on land managed by the City of Flagstaff.

Noxious Weed Treatments

Treatment of noxious weeds may occur on approximately 11 acres within the A-1 Mountain Allotment, and would result in localized, short term reductions in plant height,

canopy cover, and vegetation production due to the physical defoliation and crushing of understory vegetation related to mechanical/vehicular weed treatment activities. However, these effects would be temporary and recovery would typically occur in one growing season under favorable climatic conditions. In the long term, weed treatment projects would remove, or control the spread of, noxious weed species, which would result in maintaining vegetation density, vegetation diversity, plant height and canopy cover, and vegetation production within the analysis area. Additional acres may need to be treated if new weed populations are discovered.

Cross-country Travel

Motor vehicle use off designated roads results in reductions in plant height, canopy cover, and vegetation production due to the physical defoliation and crushing of understory vegetation. Effects to plant height, canopy cover, and vegetation production would be temporary and recovery would typically occur in one growing season under favorable climatic conditions. Changes in road and OHV management through the Travel Management Plan (2011) would lessen the impact to the range vegetation within the analysis area through a reduction in the number and mileage of roads open for vehicular use and the elimination of unauthorized off-road vehicle use.

Wildlife Use

Wildlife would continue to graze within the analysis area and provided the wildlife use is seasonal and transitory, vegetation production and quality of forage species would be maintained or enhanced in combination with managed livestock grazing. If heavy wildlife use occurs continuously throughout the year in combination with managed livestock grazing, vegetation production and quality will not be maintained in areas with focused, heavy wildlife use as a decrease in vegetation diversity and density would likely occur in these areas. Vegetation production is expected to be average to above average during periods of average to favorable climatic conditions. During periods of unfavorable climatic conditions, vegetation production is expected to decline but maintain resiliency for improvement when conditions change (Loeser et al., 2007).

Wildlife

The following section will focuses on discussing rangeland management and wildlife. More detailed information on existing conditions and monitoring used to determine consistency with Forest Plan and other regulatory framework can be found in the Wildlife specialist report and project record.

Threatened, Endangered, and Candidate Species listed under the Endangered Species Act and the 2013 Region 3 (R3) Regional Forester's Sensitive Species list were used in determining species to consider in this analysis. For species not known or suspected to occur in the A-1 Mountain Allotment, it has been determined that this project would have No Effect or No Impact.

Cumulative Effects in the Analysis Area

The timeframe for the cumulative effects considered for the species in the A-1 Mountain Allotment is 20 years. This includes ten years into the past and ten years in the future.

The timeframe was selected because effects to the wildlife resource are expected to persist. For most species in this document, the geographical extent of the cumulative effects analysis is confined to the A-1 Mountain Allotment. Any variations will be described in the cumulative effects portion for the respective species.

General Effects of Grazing on Wildlife

The following is a review of general effects that may occur to wildlife as a result of grazing by livestock. For this analysis, the focus is on effects to range vegetation.

Human activities have drastically modified southwestern arid grasslands, including grazing. Plant species composition has been altered, perennial grass cover has been reduced, and in some cases, areas that were formerly grasslands have been converted to desert scrub (Buffington and Herbel, 1965; Chew 1982; Brady et al., 1989). A review by Jones (2000) found 11 of 16 response variables showed negative effects from grazing with soil-related variables most negatively impacted, followed by vegetative cover variables, biomass and rodent diversity and richness. Potential effects to soil by grazing (described in detail in the Soil and Watershed Report) can include trampling, compaction, reduced infiltration and aeration, damage to biological soils crusts, woody or “brush” encroachment into grasslands, breaking up of surface crusts, enhancement of seed bed, reduced soil productivity and increased erosion. These effects to soil can result in changes to herbaceous cover and forage for wildlife and their prey, and changes in abundance and diversity of wildlife.

Human Disturbance

Activities associated with the management of the A-1 Mountain Allotment include permitted livestock grazing, actions related to the movement of livestock, and construction and maintenance of infrastructure such as stock ponds, pasture and boundary fences, and cattle guards. These activities can directly affect wildlife species when ranch employees, vehicles, livestock and dogs disturb individuals that are present in the allotment. Most bird, mammal, reptile and aerial invertebrate species are mobile and are capable of dispersing from disturbance. However, disturbance that is frequent or of long duration can result in the abandonment of an area by some wildlife species, which is equivalent to the loss of habitat. Individuals incapable of dispersal (nestlings or other young, terrestrial invertebrates) or individuals unwilling to disperse (adults with immobile young) can experience negative effects including trampling and crushing, collection and handling, increased physiological stress, flushing of birds from incubating eggs thus increasing potential for eggs to become unviable, premature fledging of young from nests and increased potential for predation. Long duration noise disturbance can cause temporary or permanent abandonment of nests, roosts and dens.

For bats, high intensity noise disturbance (e.g. chainsaws used for logging/fuelwood cutting) can result in premature exiting of roosts or unnecessary arousal from hibernation. Since hibernating bats often have only enough fat reserve to bring themselves out of hibernation once, disturbance during the winter can leave bats with insufficient fat reserves to come out of hibernation a second time in the spring.

Fencing

Fencing is generally intended to restrict movement of livestock, but incidentally may impede wildlife access to critical resources (e.g. water, forage, fawning grounds, cover) or restrict escape or migratory routes essential to the wellbeing of individuals and populations. Impacts can vary based on the animal's age, season, and resource availability. The impact of a fence design on a species is largely determined by the animal's agility and behavior (AZGFD, 2011). Fencing can also be of concern for wildlife as they can become entangled or impaled on fencing materials. Fencing would follow the wildlife guidelines in the Forest Plan to avoid and minimize these impacts to wildlife (replacement page 69).

Birds

Birds are affected by the impacts grazing has on vegetation (Saab et al., 1995). Domestic and wild ungulates reduce forage production, which in turn may reduce litter production, increase soil compaction, and reduce infiltration. These changes to the soil and consequently the vegetation can lead to negative effects for some breeding birds such as those that require dense herbaceous ground cover for nesting and/or foraging. During the breeding season, grazing can reduce herbaceous vegetation necessary for concealing nests of ground nesters, resulting in an increased risk of nest predation, nest parasitism, exposure to elements, and ultimately nest failure. To increase nesting success of ground nesting birds, Saab et al. (1995) recommends managing livestock grazing in shrub steppe habitats (which includes pinyon-juniper) to maintain current season growth through July and retain greater than 50 percent of perennial bunchgrass annual growth through the next nesting season.

Small Mammals

Grazing can affect wildlife by affecting their prey. Small mammal prey is important for many species of higher trophic levels, including raptors, carnivorous mammals, snakes, and avian predators (Hayward et al., 1997; Saab et al., 1995). When rodent prey decrease in response to reduced vegetative cover, so do avian predators. Grazing can directly affect rodents by trampling and collapsing burrows, compacting soils, which hinders burrow construction, and removing rodent food sources such as seed heads (Hayward et al., 1997; Adler and Lauenroth, 2000). In a study by Adler and Lauenroth (2000), rodent burrow densities were higher in ungrazed plots when compared to grazed plots.

Numerous other studies have found the abundance of rodents is higher in ungrazed and lightly grazed areas than in moderately to heavily grazed areas (Jones and Longland, 1999; Bock and Bock 1984; Reynolds and Trost, 1980). Indirect effects of grazing on rodents can occur when grazing changes the composition (Heske and Campbell, 1991; Hayward et al., 1997) and structure of vegetative species (Jones and Longland, 1999; Hayward et al., 1997; Adler and Lauenroth, 2000). In the canyonlands of southern Utah, woodrat abundance and overall small mammal species diversity were greater in ungrazed than in grazed transects (Willey and Willey, 2010). Hayward et al. (1997) found that in southwestern riparian areas where livestock grazing was excluded there were 50 percent more small mammals when compared to areas with livestock grazing. In a riparian area in Utah where grazing was excluded for eight years, researchers observed a 350 percent increase in use and diversity of small mammals at the site (Fleischner, 1994).

Variations in intensity of grazing can also affect the distribution of small mammals. Ward and Block (1995) found that heavier livestock grazing could favor conditions for deer mice as they are associated with areas of little herbaceous cover and extensive exposed soil. Whereas Mogollon voles use sites with greater herbaceous cover and less exposed ground, so are more likely to be associated with areas where no grazing or only light levels occur (Ward, 2001).

Insects

Arthropods are also an important food for various species of mammals, birds, reptiles, amphibians, and other invertebrates. Species that forage in grasslands including birds and bats primarily prey on arthropods (Milchunas et al., 1998). Aboveground macroarthropods (insects and arachnids) experienced large decreases with moderate or heavy grazing, but showed slight increase conversely with light grazing. Decreases in vegetative cover and diversity can result in changes in the diversity and abundance of insects in grasslands (Chung, 1996). These changes could potentially affect the availability of prey for grassland birds and bats. The main impacts from livestock grazing to aquatic systems, riparian habitats, and their associated biota are in the form of indirect effects. These include increased sedimentation into stream channels; altered macroinvertebrate assemblages; lowering of groundwater tables and decreased perennial flows; increased stream temperature; larger peak flows; stock pond impacts; and changes in channel form (Belsky et al., 1999; Fleischner, 1994). Indirect effects to macroinvertebrates may affect those species that forage on these organisms including frogs, toads, gartersnakes, insectivorous birds (flycatchers, warblers, and others), some predatory birds (black-hawks, herons, kingfishers, and others) and mammals (bats, raccoons, river otters, and others).

Climate Change

Climate change is thought to be an increasingly strong driver in wildlife habitat change in the coming century. Components of wildlife habitat such as available water, vegetation density, diversity, and hiding cover all fluctuate in response to inter annual, annual, and long term climactic variation. During favorable climactic conditions, increased forage, vegetative seed production, and standing water resources all increase. In periods of unfavorable conditions, the opposite of these trends can occur.

While climate change is currently a hotly debated topic, many experts agree that climate change trends will result in periods of extreme climactic conditions in both temperature and precipitation. In the southwest experts forecast a decrease in winter precipitation (Seager and Vecchi, 2010), and a delay in the onset of the North American Monsoon (NAM).

Region 3 Sensitive Species

Navajo Mogollon Vole

Alternative 1- No Action

Under this alternative, there would be no livestock grazing operations within vole habitat, and no structural improvements constructed or maintained. There would therefore be no direct or indirect effects to voles or their habitat on the A-1 Mountain Allotment.

Components of vole habitats such as vegetation density, diversity, and cover and available water fluctuate naturally in response to inter-annual and longer periods of climate variability. Periods of favorable climatic conditions can result in increased quality and quantity of wildlife habitats including herbaceous cover, plant growth, fruit and seed production, and water in stock ponds, while in periods of unfavorable climatic conditions the reverse can occur. Climate change is predicted to result in periods of extreme climatic conditions in both temperature and precipitation. As described in the Climate Change section, climate change in the Southwest is predicted to lead to decreased winter precipitation and delays in the onset of the monsoon. These changes could trend toward drier conditions and an extension of the fire season resulting in increased areas of Navajo Mogollon vole habitat being impacted by wildfire on the allotment as well as reductions in the quantity of water available for prey.

Alternative 2- Proposed Action

In addition to the general effects described above, grazing by livestock can also result in increased competition for forage, as well as a loss of hiding cover for voles, which could increase predation. These potential direct and indirect effects would be reduced and minimized by the livestock management strategies identified, including: limiting the length of grazing in a pasture in a given year, using a rotational grazing management system, and managing seasonal and annual forage utilization levels for herbaceous vegetation. This level of management would maintain sufficient herbaceous forage and hiding cover for voles. Based on this information, potential impacts from livestock grazing on Navajo Mogollon voles would be expected to be discountable.

Installation of a permanent corral facility would result in long-term disturbance to the area (~five acres). Maintenance of existing structural improvements such as fences, water lots, and corrals could result in short-term (one to three years) disturbances to voles. The presence of humans and the noise associated with maintenance activities could lead to avoidance of the area by voles where these actions occur. While vegetative cover in the immediate area of improvements is likely to be reduced, these areas would be expected to recover within a year or two with favorable climatic conditions. These disturbances would be of a short duration and would be expected to have minimal impacts to voles or their habitat.

These developments would improve livestock distribution across pastures and result in long-term beneficial impact to vole habitat through improvement of forage resources and cover in grazed areas. The potential beneficial effects of such long-term habitat improvement would be expected to be greater than the potential negative effects from noise disturbance and temporary loss of vegetative cover.

Cumulative Effects

Cumulative effects to Navajo Mogollon voles would result from increased human disturbance and changes in vegetative cover and soil conditions that affect habitat through changes in food resources and hiding cover. In general, most of the past, present, and reasonably foreseeable future activities would be expected to result in localized decreases in the quality and quantity of vole food resources and hiding cover on the allotment or short-term (only during project activities) noise disturbance.

Past, present, and reasonably foreseeable future projects that could affect habitat include increased recreation such as campers, hikers, bikers, horseback riders, and hunters that would be expected with the City's management of the Observatory Mesa Natural Area as open space. Other activities include maintenance of utility corridors and roads, fuelwood harvest, vegetation treatments including timber offerings, prescribed burns, and motorized use also have the potential to add to cumulative effects.

Conversely, improvement in foraging habitat is expected to improve in the long-term in areas where prescribed burns and tree thinning increase understory vegetation and those areas where off-road travel is limited, road densities are reduced through closures.

Recreational activities such as motorized and non-motorized travel, camping, hunting, and fuelwood harvest have the potential to affect vegetative cover and soil condition. Combined with livestock grazing this would result in localized, temporary reductions in vegetation density that provides food and hiding cover for voles. System and user created roads remove vegetation and litter and compact soils (see Soil and Watershed Report for more detail). As TMR is implemented, effects to vole habitat from motorized travel would be reduced in various locations throughout the allotment during the next decade.

On-going operation and maintenance of Arizona Public Service (APS) powerline corridors, Snowbowl reclaimed waterline, El Paso and Transwestern gas pipelines and Quest telephone lines (approximately 14 miles) on the allotment has the potential to affect vegetative cover and soil conditions due to equipment access. The use of heavy equipment and vehicles off-road could result in the compaction of soil, potential loss of productivity, and collapsing of runways in localized areas on the allotment decreasing the amount of vole habitat. These utility corridors would result in a loss of approximately 20 acres of habitat that would be cumulative in nature. However, herbaceous vegetation would be expected to improve with the removal of woody vegetation as is planned with 4FRI. This is due to an increase in availability of space, sunlight, nutrients, and water for understory species.

Forest restoration associated with 4FRI will occur on approximately 4,868 acres within the A-1 Mountain Allotment. Thinning would result in localized, short-term reductions in understory density, plant height, and vegetation production of understory vegetation due to the crushing of vegetation related to the mechanical/vehicular use in the area. However, these effects would be temporary and recovery would typically occur within a one to three growing seasons under favorable climatic conditions. In the long-term, thinning activities would open the canopy and create openings allowing an increase in light and precipitation to reach the understory vegetation resulting in an increase in understory vegetation density, vegetation diversity, plant height and canopy cover, and

vegetation production within the thinning area. This would result in an increase in vole habitat.

Prescribed fire treatments are expected to occur on approximately 500 acres per year over the next ten years within the A-1 Mountain Allotment. Prescribed burns are expected to result in low to moderate burn severity and will result in localized, short term reductions in plant height, canopy cover and vegetation production. However, these effects would be temporary and recovery would typically occur in one growing season under favorable climatic conditions. In the long term, prescribed burn activities could help to stimulate vegetation production in understory species resulting in an increase in understory plant height and canopy cover and an increase in food resources and hiding cover for voles.

Habitat conditions for voles would be expected to remain stable. Therefore, the potential impacts of livestock grazing and associated activities under Alternative 2 combined with past, present and reasonably foreseeable future projects on the allotment would result in limited effects that would occur in localized areas that could result in short-term disturbance and/or habitat degradation, but long-term improvements in vole habitat.

Determinations

- Alternative 1- No Action would result in no impact to Navajo Mogollon voles.
- Alternative 2-Proposed Action may impact individual Navajo Mogollon voles, but are not likely to result in a trend toward federal listing or a loss of viability of the species.

Bats (Spotted, Western Red, Allen's Lappet-browed, and Pale Townsend's Big-Eared)

The species of bats within the A-1 Mountain Allotment share similar habitat requirements and will be discussed in this section together. For a more detail discussion, please see the Wildlife Specialist Report in the project record.

Alternative 1- No Action

Under this alternative, there would be no livestock grazing operations in suitable bat habitat, nor would there be any construction or maintenance to structural improvements. As a result, there would be no direct or indirect effects to spotted or Western red bats or their habitats on the A-1 Mountain Allotment.

Alternative 2- Proposed Action

Concentrations of livestock in suitable foraging habitat, such as areas of high herbaceous ground cover, could potentially result in a reduction in the quality of foraging habitat for prey through trampling of vegetation and compaction of soil. Water quality of stock ponds could potentially be impacted by grazing and result in effects to invertebrate prey. These potential effects to vegetation and water quality would be managed by limiting the length of grazing of a pasture in a given year, using a rotational grazing management system, and managing seasonal and annual forage utilization levels as identified for the proposed action for herbaceous vegetation. Based on this information, potential direct and indirect impacts from livestock grazing on bats are expected to be discountable.

Additionally, the construction of new structural range improvements under Alternative 2 could result in impacts to bat foraging habitat. None of the new fencing will cross water sources and therefore will not be an added obstacle to bats foraging within the allotment. Some of the new improvements would increase the number of disturbed areas on the allotment. Loss of vegetative cover is expected to have minimal impact on prey populations or habitats. These improvements would improve livestock distribution across pastures and resulting in long-term beneficial impact to bat foraging habitat through improvement of herbaceous cover.

All four bat species occurring in the project area utilize similar roost sites, caves and mines, in the cracks and cervices of large isolated cliffs. Impacts to roost sites are expected to be minimal as roost sites are either inaccessible to livestock or none existent on the allotment.

Beneficial impacts would be expected from maintenance of existing structural improvements. Maintenance would improve or maintain available waters on the allotment, which provide drinking water and foraging areas for bats. Risk of drowning in drinkers would be reduced as escape ramps would be installed and maintained.

Based on this information, potential direct and indirect impacts from livestock grazing on the various bat species with habitat occurring within the A-1 Mountain Allotment would be expected to be discountable.

Cumulative Effects

Cumulative effects on Forest Service sensitive bats is expected from changes in vegetative cover and soil conditions that alter water availability for drinking and foraging and effect prey habitat and prey availability in areas of high herbaceous cover on the allotment. Activities that could cumulatively affect bat habitats include wild ungulate grazing, recreation including dispersed camping and illegal road and trail creation, motorized use, wildfire, fuelwood harvest, spread of invasive plant species, road closures, maintenance of APS 69 kV lines and climate change.

As described in detail for Navajo Mogollon voles and their habitats, most of the past, present, and reasonably foreseeable future activities would be expected to result in localized decreases in the quality and quantity of bat foraging habitat on the allotment. For example, climate change could result in a decrease in the availability of water as a result of changes in precipitation and native herbaceous cover can be impacted by wild ungulate grazing, recreation and wildfire. Conversely, improvement in foraging habitat would be expected in those areas where off-road travel is limited, road densities are reduced through closures, and control of invasive plant species occurs resulting in improvement in native herbaceous cover and water quality.

Determination

- Alternative 1-No Action would have no impact on bats.
- Alternative 2-Proposed Action may affect individual bats, but would not result in a trend toward Federal listing or a loss of viability of any of the species.

Birds (Northern Goshawk and Western Burrowing Owl)

Unlike the bats in the A-1 Mountain Allotment, the two avian species in the project area do not share similar habitat requirements and therefore will be discussed separately.

Goshawks

Alternative 1: No Action

Under this alternative, there would be no direct or indirect effects to goshawks or their habitats on the A-1 Mountain Allotment. Livestock grazing would not be authorized therefore no livestock grazing operations would occur in suitable goshawk habitat. Without authorized grazing, there would be no need to construct or maintain structural improvements. Therefore, there would be no effect to wildlife from decreased vegetation due to construction or maintenance activities.

Conversely, as stated earlier, water from sources like stock ponds, will become less available overtime as the stock ponds fill with sediment. Current Forest Plan standards require grazing permittees to maintain water in stock ponds year round, when livestock is on or off the allotment. This allows water to be available for wildlife use regardless of livestock presence on the allotment. Suitable foraging habitat for goshawks includes stock ponds because of the increased use by goshawk prey. As these areas become dry, prey may become harder to find.

Alternative 2: Proposed Action

Livestock grazing would occur on the allotment during the goshawk breeding season (March 1 – August 31). The presence of humans and noise associated with livestock management activities could potentially result in temporary or permanent nest abandonment. Currently there are no known nesting goshawks on the allotment, so no effects to breeding birds would be expected from livestock grazing and related activities. Concentration of livestock in suitable goshawk foraging areas such as areas with high herbaceous ground cover could result in trampling of vegetation and compaction of soil, reducing foraging and hiding cover for goshawk prey species and potentially reducing water quality in earthen stock ponds for prey species. These potential effects to vegetation and water quality would be managed by limiting the length of grazing of a pasture in a given year, using a rotational grazing management system, managing seasonal utilization and annual utilization levels as proposed in Alternative 2 for herbaceous vegetation. Based on this information, potential direct and indirect impacts from livestock grazing on northern goshawks and suitable foraging habitats are expected to be minimal.

Maintenance of range improvements could have both negative and positive effects for northern goshawks. Negative effects may occur as a result of noise and habitat disturbance for prey through maintenance of fences, earthen stock ponds and corrals. Construction of the fences at the Fort Valley Pasture, 008 and 006 Pastures and the realignment of 300 feet of pasture fence between West and Belle Pastures and the construction of a permanent corral facility could result in increased potential for bird injuries or mortalities. However, fences will not be built in PFAs reducing the potential for encounters. These new fences would minimize potential effects of livestock grazing on potential foraging habitats at these locations. This could cause prey to temporarily

avoid these areas and reduce foraging habitat quality through reduced herbaceous cover. Such disturbances would be expected to be localized across the allotment at any given time and of short duration. The herbaceous community is expected to recover under favorable climactic conditions in one or two years. Positive effects would be expected to occur from maintenance of earthen stock ponds, which provide water resources for prey species.

Cumulative Effects

The geographical extent of the cumulative effects analysis is the A-1 Mountain Allotment and a one-half mile buffer due to their larger home ranges. The timeframe selected is the same as for the other species in the document.

Cumulative effects to northern goshawk habitat and their prey would result from disturbance of prey and changes in vegetative cover and soil conditions that affect foraging habitat through changes in food resources and hiding cover for prey. Past, present, and reasonably foreseeable future projects that could be sources of noise disturbance of prey include recreationists such as campers, hikers, bikers, horseback riders, hunters, and motorized users, maintenance of power lines, gas lines and roads, and fuelwood harvests.

Activities that could cumulatively affect goshawk foraging habitats include wild ungulate grazing, recreation including dispersed camping and illegal road and trail creation, motorized use, wildfire, fuelwood harvest, spread of invasive plant species, road closures, maintenance of power lines, gas lines and climate change.

As described in detail for Navajo Mogollon voles and their habitats, most of the past, present, and reasonably foreseeable future activities would be expected to result in localized decreases in the quality of goshawk foraging habitat on the allotment. For example, climate change could result in a decrease in the availability of water as a result of changes in precipitation and native herbaceous cover can be impacted by wild ungulate grazing, recreation and wildfire. Conversely, improvement in foraging habitat is expected in those areas where off-road travel is limited, road densities are reduced through closures, and control of invasive plant species occurs resulting in improvement in native herbaceous cover and water quality.

Under Alternative 2- Propose Action, there would be some cumulative effects. These effects are not expected to result in long-term losses in vegetative cover or decreases in diversity, density, production, or quality of herbaceous vegetation. As such, habitat conditions for goshawks would be expected to remain stable. Therefore, the potential impacts of livestock grazing and associated activities under Alternative 2 combined with past, present and reasonably foreseeable future projects on the allotment would not result in any additional effects to goshawks and their habitats.

Determination

- Alternative 1-No Action would have no impact on northern goshawks.
- Alternative 2- Proposed Action may impact individual northern goshawks but are not likely to result in a trend toward Federal listing or a loss of species viability.

Western Burrowing Owl

Alternative 1: No Action

Under this alternative, there would be no livestock grazing or construction or maintenance of existing structural improvements in western burrowing owl habitat. No direct or indirect effects from livestock grazing would occur to burrowing owls or their habitats under Alternative 1.

Alternative 2: Proposed Action

Alternative 2 would have potential effects on owls from concentrations of livestock in areas with high herbaceous ground cover such as grasslands and those areas adjacent to ponderosa pine forest. These potential impacts include trampling of vegetation, ground compaction, and collapsing of burrows. These impacts would be through the grazing management system identified above for the proposed action. This level of management is expected to maintain sufficient herbaceous forage and hiding cover for owl prey.

Maintenance of existing structural improvements such as fences, earthen stock ponds, and corrals could result in short-term disturbances to owls and their prey. The presence of humans and the noise associated with maintenance activities could lead to avoidance of the area by owls and prey species where these actions occur. Vegetative cover in the immediate area of improvements could be reduced, but these areas would be expected to recover within a year or two with favorable climatic conditions. These disturbances would be of a short duration and would be expected to have minimal impacts to owls, their habitats or their prey.

Based on this information, potential direct and indirect impacts from livestock grazing and related activities on burrowing owls and their habitats under Alternative 2 would be discountable.

Additionally, the construction of new structural range improvements could result in similar short-term effects to burrowing owls, their prey and habitat as described for maintenance of improvements. These new improvements would increase the number of disturbed areas on the allotment. The potential beneficial effects of such long-term habitat improvement is expected to be greater than the potential negative effects from noise disturbance and temporary loss of vegetative cover.

Cumulative Effects

Cumulative effects to western burrowing owls, their prey, and habitats would result from disturbance of owls and prey and changes in vegetative cover and soil conditions that affect foraging habitat through changes in food resources and hiding cover for prey. Past, present, and reasonably foreseeable future projects that could be sources of noise disturbance of prey include recreationists such as hikers, bikers, horseback riders, hunters, and motorized users, maintenance of utility corridors and roads and fuelwood harvesting.

Activities that could cumulatively affect owl foraging habitats include, recreation including dispersed camping and illegal road and trail creation, motorized use, wildfire suppression tactics, fuelwood harvest, spread of invasive plant species, road closures, maintenance of utility corridors, and roads and fuelwood harvesting.

As described in detail for Navajo Mogollon voles and their habitats, most of the past, present, and reasonably foreseeable future activities are expected to result in localized decreases in the quality of owl foraging habitat on the allotment or short-term noise disturbance impacts. Operation of motorized vehicles for recreation or chainsaws for fuelwood harvest could result in owls and their prey temporarily avoiding an area. Conversely, improvement in foraging habitat is be expected in those areas where off-road travel is limited, road densities are reduced through closures, and control of invasive plant species occurs resulting in improvement in native herbaceous cover and water quality.

Cumulative effects for Alternative 2 would not result in long-term losses in vegetative cover, decreases in diversity, density, production, or quality of herbaceous vegetation, or long-term noise effects. Habitat conditions for owls are expected to remain stable. Therefore, the potential impacts of livestock grazing and associated activities under Alternative 2 combined with past, present and reasonably foreseeable future projects on the allotment would not result in any additional effects to burrowing owls and their habitats.

Determination

- Alternative 1-No Action would have no impact on western burrowing owls.
- Alternative 2-Proposed Action may impact individual western burrowing owls, but would not result in a trend toward Federal listing, or a loss of viability of the species.

Rusby's Milkvetch

Rusby's milkvetch is the only Region 3 Sensitive Species that is in the flora category.

Alternative 1- No Action

Under this alternative, there would be no livestock grazing or construction or maintenance of existing structural improvements in occupied or suitable habitat for the species. No direct or indirect effects from livestock grazing would occur to Rusby's milkvetch or its habitats under Alternative 1.

Vegetation density, diversity, cover, and available water fluctuate naturally in response to inter-annual and longer periods of climate variability. Periods of favorable climatic conditions can result in increased quality and quantity of suitable habitat conditions for this species, while in periods of unfavorable climatic conditions the reverse can occur. Climate change is predicted to result in periods of extreme climatic conditions in both temperature and precipitation. Predicted changes in weather are expected to result in drier conditions, which in turn could extend the fire season, resulting in increased areas of milkvetch habitat being impacted by wildfire on the allotment as well as reductions in the quantity of water available for the plant.

Wild ungulate grazing on the A-1 Mountain Allotment is expected to have similar effects to occupied and suitable habitat for this species as described for livestock. The main difference is livestock grazing is intensively managed, while wild ungulates are not. This could result in trampling or potential browse of the milkvetch. These impacts would primarily be from deer and pronghorn as their diet is mainly comprised of forbs.

Alternative 2: Proposed Action

Under Alternative 2, grazing operations would be authorized on the A-1 Mountain Allotment. Impacts to this species could potentially occur from trampling and grazing. Direct impacts from grazing or trampling would be expected to be minimal as cattle would preferentially graze on grasses. Livestock would only be expected to move to these forbs under extreme drought conditions. This is unlikely to occur since adaptive management measures would be taken under these conditions to limit the length of grazing in a given season. The grazing management techniques identified above, would ensure that grasses would still be available to livestock and result in minimal effects to the populations of Rusby's milkvetch on the allotment.

Construction of new fences will not impact plants. Plant surveys have been completed in areas of new fence construction and no rare plants, including Rusby's milkvetch, were found in these areas.

Maintenance of existing structural improvements such as fences, earthen stock ponds, and corrals could result in short term impacts to plants. Plant cover in the immediate area of improvements could be reduced, but these areas would be expected to recover within a year or two with favorable climatic conditions. These disturbances would be of a short duration and is expected to have minimal impacts to Rusby's milkvetch.

Cumulative Effects

Cumulative effects to Rusby's milkvetch and its habitats would result from trampling or browse of plants and habitat fragmentation. Past, present, and reasonably foreseeable future projects that could be sources of trampling and habitat fragmentation include, recreation including dispersed camping, horseback riding, and illegal road and trail creation, wildfire suppression tactics, fuelwood harvest, spread of invasive plant species, road closures, maintenance of power lines, gas lines and roads on the Forest.

Recreational activities such as motorized and non-motorized travel, camping, hunting, and fuelwood harvest have the potential to result in trampling of plants and habitat fragmentation. System and user created roads can lead to the crushing of plants and can result in barriers for the plants to germinate and spread.

Routine removal of woody vegetation underneath power lines, on gas lines and maintenance of any type of road on the allotment has the potential to affect individuals of Rusby's milkvetch. The use of heavy equipment and vehicles along roads and off-road could result in the compaction of soil and crushing of plants in localized areas on the allotment, resulting in the loss of individual plants and decreasing the amount and quality of habitat for the species. Reduction of tree canopy as is expected with thinning and prescribed burning through 4FRI would be expected to improve conditions for this species due to the increase in availability of space, sunlight, nutrients, and water.

In general, most of the past, present, and reasonably foreseeable future activities would be expected to result in localized decreases in the number of individuals of Rusby's milkvetch and the quality of its habitat on the allotment. Conversely, improvement in habitat would be expected in those areas where thinning and prescribed burning associated with restoration projects occur, off-road travel is limited, road densities are reduced through closures, and control of invasive plant species occurs.

Cumulative effects on Rusby's milkvetch, when combined with the potential effects of Alternative 2, could result in impacts to individual plants, but would not affect large groups of plants or the overall population since this species is widely dispersed across suitable habitat on the allotment. Therefore, the potential impacts of livestock grazing and associated activities under Alternative 2 combined with past, present and reasonably foreseeable future projects on the allotment would not result in any additional effects to this species or its habitat.

Determination

- No effects on Rusby's milkvetch would be expected to occur under Alternative 1.
- Alternative 2 may impact individuals, but would not result in a trend toward federal listing or a loss of viability for Rusby's milkvetch.

Management Indicator Species

Due to the potential for effects to grasslands from livestock grazing, pronghorn will also be evaluated for effects.

Pronghorn Antelope

Alternative 1: No Action

Under Alternative 1, there would be no livestock grazing or construction/ maintenance of structural range improvements in grassland habitat. Completion between livestock and pronghorn for spring forage would be eliminated. However, other wild ungulants would continue to compete for brows. Trampling of herbaceous cover from grazing would also be reduced. As a result, the quality of forage for pronghorn is expected to remain stable or potentially improve during periods of favorable climatic conditions.

As stated above, fences and stock ponds would degrade due to lack of maintenance. Fences may become an entanglement/impalement hazard for pronghorn as they degrade.

Alternative 2: Proposed Action

Under Alternative 2, there would be no effects to the quantity of grasslands on the allotment since grazing and related activities would not result in the conversion of one habitat type to another. The quality of these grasslands may be impacted through potential competition for forage. Diet overlap between cattle and antelope is usually minimal, but competition for early spring forage may occur (Lee et al., 1998). Under Alternative 2, livestock grazing on the allotment can begin as early as May 15th so, depending on the timing of the emergence of herbaceous vegetation, some competition for spring forage could occur. Potential effects of competition would be managed by limiting the length of grazing of a pasture in a given year, using a rotational grazing management system, managing seasonal utilization levels at moderate to conservative levels, and managing annual utilization levels at the conservative level for herbaceous vegetation. This level of management would maintain sufficient herbaceous forage for pronghorn and meets the management guidelines for livestock grazing in the Arizona Statewide Pronghorn Management Plan (AZGFD, 2013). As a result, grazing would have a minimal impact to

the quality of grassland habitats and would contribute to maintaining the viability of pronghorn populations on the Forest.

Maintenance and construction of structural improvements such as fences would have short duration effects on this species and its foraging habitats. These disturbances are in the form of noise and reductions in vegetative cover. The effects of said disturbances are the same as described in general effects, temporary avoidance of areas where activities occur and lose of forage. These potential effects would occur at localized areas across grasslands in any given year and would be of short duration.

Fence construction would limit the use of right angles where possible and be built to wildlife friendly standards. Water would be available for pronghorn as sediments would be removed from earthen stock ponds as needed. Fences would be maintained reducing the risk of pronghorn becoming entangled or impaled on fences. Where necessary, fences would be reconstructed over time to meet wildlife specifications, reducing the number of barriers that exist to pronghorn movements on the landscape. The proposed action also includes the removal of 0.82 miles of fence no longer needed for livestock management. By removing this fence, we meet Forest Plan guidance to reduce unnecessary improvements and reduce effects to wildlife from fences. Based on this information, potential impacts from existing structural improvements on pronghorn and quality of grassland habitats on the allotment are expected to be minimal.

Cumulative Effects

The geographical extent of the cumulative effects analysis is Great Basin and subalpine grassland habitats on the Coconino National Forest. Most of these acres are located on Anderson Mesa and the northern boundary of the Forest adjacent to Wupatki National Monument.

Cumulative effects to pronghorn and its habitats would result from disturbance of pronghorn and changes in vegetative cover and soil conditions that affect habitat through changes in food resources and hiding cover for fawns. Past, present, and reasonably foreseeable future projects that could be sources of noise disturbance include recreationists such as hikers, bikers, horseback riders, hunters, and motorized users, fuelwood harvests and maintenance projects such as along roads and utility corridors

Activities that could cumulatively affect grassland habitats include, recreation including dispersed camping and illegal road and trail creation, motorized use, wildfire suppression tactics , fuelwood harvest, spread of invasive plant species, road closures, maintenance activities such as along roads and utility corridors, grassland restoration projects on Anderson Mesa, and fence modifications projects.

Most of the past, present, and reasonably foreseeable future activities are expected to result in localized decreases in the quality of pronghorn habitat on the allotment or short-term one to three years noise disturbance impacts. For example, native herbaceous cover can be impacted by recreation. Operation of motorized vehicles, chainsaws, and other equipment for recreation, fuelwood harvest, restoration projects (including 4FRI) and maintenance activities could result in pronghorn temporarily avoiding an area. Conversely, improvement in habitat quality is expected in those areas where restoration activities such as thinning and prescribed burning occur; where off-road travel is limited

and road densities are reduced through closures via TMR; and control of invasive plant species occurs resulting in improvement in native herbaceous cover.

Grassland restoration efforts on Anderson Mesa, including on the Bar T Bar and Anderson Springs Allotments, around Slate Mountain and within the Marshall Fuel Reduction and Forest Restoration project area have improved the quality of grassland habitats for pronghorn through removal of woody vegetation and prescribed fire. Activities that have occurred in recent years have led to increases in the amount of open grassland habitat, reductions in competition for herbaceous vegetation with juniper and pine, and improvement of native herbaceous cover. Such efforts are expected to continue in the future in these areas as well as in those areas within the boundary of Phase One of the 4FRI.

Fence modifications to reduce or eliminate barriers to pronghorn movement have improved access to grassland habitats across the Forest. Over the past several years, Arizona Game and Fish Department (AZGFD) in conjunction with the Forest, Arizona Department of Transportation, and other partners have relocated fences and implemented modifications such as installing goat-bars, installing smooth wire, and raising the height of bottom wires along segments of Highways 180 and 89 North. Goat-bars are modifications to the lower wire of a fence, using PFC pipe that makes it easier for pronghorn to go underneath. Such modifications have eliminated major barriers to movement of pronghorn across grassland habitats on the northern portion of the Forest and more projects along these two highways are expected to occurring in the next couple of years. Additionally, regular fence modification and maintenance of allotment and pasture fences is conducted by grazing permittees, the Forest, AZGFD, and volunteer groups. During these efforts, fences are modified to meet Forest Plan wildlife-friendly guidelines through replacement of barbed wire with smooth on the bottom wire, raising of this wire to 18 inches, and installation of goat bars in areas where travel corridors for pronghorn and other wildlife. For example, in a 2013-2015 cooperative effort with AZGFD in GMUs 7, approximately 68 miles of fences were inventoried and about 30 miles of fence were improved through bringing fences up to wildlife standards and the installation of goat bars, with an additional 20 miles proposed to be modified the summer of 2016 (USDA, 2013).

Cumulative effects for Alternative 2 would not result in long-term losses in forage quality or vegetative cover or noise effects. Therefore, the potential impacts of livestock grazing and associated activities under Alternative 2 combined with past, present and reasonably foreseeable future projects on the allotment would not result in any additional effects to the quality or quantity of pronghorn habitat.

Determinations

- Alternative 1 would result in no change in habitat quantity or quality for pronghorn antelope. This would not alter forest-wide habitat and population trends.
- Alternative 2 would result in no change in habitat quantity or quality for pronghorn antelope. This would not alter forest-wide habitat and population trends.

Migratory Birds

See Table 12 for a list of Migratory Birds occurring in the A-1 Mountain Allotment.

Alternative 1: No Action

Under Alternative 1, there would be no livestock grazing or construction/maintenance of structural range improvements in grassland and ponderosa pine habitats. Since there would be no competition with livestock for spring forage or reductions in the herbaceous cover from grazing or trampling, the quality of forage for birds would be expected to remain stable or potentially improve during periods of favorable climatic conditions. Conversely, operation and maintenance of existing structural range improvements would not occur under Alternative 1. This would result in a long-term loss of water as stock ponds fill with sediment. Additionally, as fences degrade due to lack of maintenance, they may become an entanglement/impalement hazard for migratory birds.

Alternative 2: Proposed Action

Livestock grazing and maintenance of existing range improvements would be authorized under Alternative 2. The biggest concern for migrating birds from the proposed action come from noise disturbance, reduced available forage and herbaceous ground cover, and trampling of vegetation, nests, and even individuals.

Impacts to nesting birds from grazing may occur to those species that are ground nesters such as Virginia's warbler. Trampling of nests or vegetation for nesting cover could result in unintentional take of individual migratory birds. These impacts are expected to be minimized by management actions such as limiting the length of grazing of a pasture in a given year, using rotational grazing management system, managing grazing intensity at conservative to moderate levels, and forage utilization at conservative levels.

Maintenance of range improvements could have both negative and positive effects for migratory birds. Negative effects may occur as a result of noise and habitat disturbance for prey through maintenance of fences, earthen stock ponds and corrals. Construction of the fences at the Fort Valley Pasture, 008 and 006 Pastures and the realignment of 300 feet of pasture fence between West and Belle Pastures and the construction of a permanent corral facility could result in increased potential for bird injuries or mortalities. However, fences will not be built in key areas such as waterbodies reducing the potential for encounters. These new fences would minimize potential effects of livestock grazing on potential foraging habitats at these locations. This could cause prey to temporarily avoid these areas and reduce foraging habitat quality through reduced herbaceous cover. Such disturbances are expected to be localized across the allotment at any given time and of short duration. The herbaceous community is expected to recover under favorable climactic conditions in one or two years. Positive effects are expected to occur from maintenance of earthen stock ponds, which provide water resources for migratory birds.

Cumulative Effects

Cumulative effects to migratory birds and their habitats would result from disturbance of migratory birds and their prey and changes in vegetative cover and soil conditions that affect foraging and ground nesting habitat through changes in food resources and hiding

cover in herbaceous cover. Past, present, and reasonably foreseeable future projects that could be sources of noise disturbance include recreationists such as hikers, bikers, horseback riders, hunters, and motorized users, maintenance of roads and utility corridors and fuelwood harvests.

Activities that could cumulatively affect migratory birds foraging and ground nesting habitats include, recreation including dispersed camping and illegal road and trail creation, motorized use, wildfire, fuelwood harvest, spread of invasive plant species, road closures.

As described in detail for Navajo Mogollon voles and their habitats, most of the past, present, and reasonably foreseeable future activities would be expected to result in localized decreases in the quality of migratory foraging and ground nesting habitat in grasslands and other areas with herbaceous ground cover or short-term noise disturbance impacts. For example, native herbaceous cover can be impacted by wild ungulate grazing, recreation, wildfire, and climate change. Operation of motorized vehicles for recreation or chainsaws for fuel wood harvest could result in migratory birds and their prey temporarily avoiding an area. Conversely, improvement in foraging habitat would be expected in those areas where off-road travel is limited, road densities are reduced through closures, and control of invasive plant species occurs resulting in improvement in native herbaceous cover.

Cumulative effects for Alternative 2 would not result in long-term losses in vegetative cover, decreases in diversity, density, production, or quality of herbaceous vegetation, or long-term noise effects. Habitat conditions for migratory birds are expected to remain stable. Therefore, the potential impacts of livestock grazing and associated activities under Alternative 2 combined with past, present and reasonably foreseeable future projects on the allotment would not result in any additional effects to migratory birds and their habitats.

Determinations

- Alternative 1 would not result in unintentional take of individuals and would not lead to a decline in migratory bird populations.
- Alternative 2 would potentially result in unintentional take of individuals but would not lead to a decline in migratory bird populations.

Golden Eagles

Alternative 1: No Action

Under this alternative, there would be no livestock grazing or construction/ maintenance of existing structural range improvements in suitable golden eagle nesting habitat. No direct or indirect effects from livestock grazing would occur to nesting golden eagles under Alternative 1.

Alternative 2: Proposed Action

Under Alternative 2, livestock grazing would be authorized on the A-1 Mountain Allotment. There are no currently occupied nests on the allotment and no suitable nesting

locations exist. Foraging habitat occurs in grassland habitats. Human disturbance associated with livestock management could potentially affect foraging golden eagles. These potential effects would be minimal as resource protection measures such as limiting the length of grazing of a pasture in a given year and using a rotational grazing management system would limit the amount of time livestock would spend during the breeding seasons near suitable habitat.

Maintenance of range improvements could have both negative and positive effects for golden eagles. Negative effects may occur as a result of noise and habitat disturbance for prey through maintenance of fences, earthen stock ponds and corrals. Birds can also become entangled in fencing materials. Thus, construction of the fences at the Fort Valley Pasture, 008 and 006 Pastures and the realignment of 300 feet of pasture fence between West and Belle Pastures and the construction of a permanent corral facility could result in increased potential for bird injuries or mortalities. However, fences will not be built near any known nest sites reducing the potential for encounters. These new fences would minimize potential effects of livestock grazing on potential foraging habitats at these locations by providing an opportunity to limit grazing in grassland habitat as an adaptive management strategy. Positive effects would be expected to occur from maintenance of earthen stock ponds, which provide water resources for prey species year round.

Maintenance of existing structures such as fences could result in human disturbance of nesting golden eagles where they occur near suitable nesting sites. Such disturbances would be expected to be localized and of a short duration and would not involve use of equipment louder than a vehicle or chainsaw. Based on this information, potential direct and indirect effects to nesting golden eagles from livestock grazing and related activities are expected to be discountable under Alternative 2.

Cumulative Effects

The geographical extent of the cumulative effects analysis is confined to the A-1 Mountain Allotment and a one-half mile buffer due to their larger home ranges. The timeframe selected for this cumulative effects analysis is 20 years. This includes ten years in the past and an additional ten years. This timeframe was selected because ground disturbing activities that have occurred within the analysis area are expected to exhibit recovery within ten years.

Cumulative effects to nesting golden eagles would result from those activities that result in human disturbance. Past, present, and reasonably foreseeable future projects that could be sources of noise disturbance include recreationists such as hikers, bikers, horseback riders, hunters, and dispersed camping, motorized users, wildfire suppression tactics, maintenance of powerlines and roads, and fuelwood harvest.

As described in detail for Navajo Mogollon voles and their habitats, most of the past, present, and reasonably foreseeable future activities would be expected to result in short-term noise disturbance impacts. Operation of motorized vehicles for recreation or chainsaws for wildfire suppression and fuelwood harvest could result in disturbance of nesting golden eagles. In addition, short-term disturbance could result from the presence of humans that are hiking, biking, hunting, or camping.

Cumulative effects for Alternative 2 would not result in long-term impacts to nesting golden eagles. Therefore, the potential impacts of livestock grazing and associated activities under Alternative 2 combined with past, present and reasonably foreseeable future projects on the allotment would not result in any additional effects to nesting golden eagles.

- Alternative 1 would not result in take of golden eagles as defined in the Bald and Golden Eagle Protection Act.
- Alternative 2 would not result in take of golden eagles as defined in the Bald and Golden Eagle Protection Act.

Federally Listed Species

The Endangered Species Act of 1973 (16 USC 1531 et seq.) directs federal agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats. It is Forest Service policy to analyze impacts to threatened or endangered species to ensure management activities are not likely to jeopardize the continued existence of a threatened or endangered species, or result in the destruction or adverse modification of their critical habitat.

The Forest Service Manual (FSM) requires that a Biological Evaluation (BE) be completed for all projects authorized, funded or conducted on the Coconino National Forest to determine possible effects of the proposed activity on threatened, endangered, and sensitive species (FSM 2672.4). These species are those that are:

- Listed or proposed to be listed as endangered or threatened by the U.S. Fish and Wildlife Service;
- Listed as sensitive by USDA Forest Service Region 3 (FSM 2670.44). Forest Service sensitive species are animal and plant species identified by the Regional Forester for which population viability is a concern. It is Forest Service policy to analyze impacts to sensitive species to ensure management activities do not create a substantial trend toward federal listing or loss of viability.

The Coconino National Forest list of threatened, endangered proposed and candidate species, as updated in March 2016, was reviewed for species that may be present on the Flagstaff Ranger District and found within or immediately adjacent to the project area. After a review of habitat requirements and existing habitat components, it was determined that only one listed species, the Mexican spotted owl (MSO), has habitat within the project area. No other threatened, endangered, proposed, or candidate species have habitat within or adjacent to the A-1 Mountain Allotment.

Mexican Spotted Owl

Alternative 1-No Action

Under this alternative, there would be no livestock grazing or construction of new structural improvements in MSO habitat. No effects from human disturbance and associated noise from livestock management activities would occur. Water availability

would most likely decrease overtime as stock ponds would no longer receive maintenance therefore reducing prey habitat for the MSO.

Alternative 2- Proposed Action

Potential effects from concentrations of livestock in suitable spotted owl foraging habitat, including wet meadows and other forest openings, result from reductions in prey. As stated under general effects, livestock grazing has the greatest effect to understory vegetation from trampling and compaction of soil, which can reduce hiding cover and food resources for prey. Water quality of streams, springs, wetlands, and stock ponds is also an important factor in prey habitat and changes in water quality, as described above, could potentially result in effects to hiding cover and food resources for prey species.

The Mexican Spotted Owl Recovery Plan encourages managing habitat for a diversity of prey species to help buffer against population fluctuations of individual prey species and provide a more constant food supply for the spotted owls (USFWS, 2012). The amounts of remaining vegetative biomass resulting from different levels of grazing have shown varying levels of impacts on small mammal populations important to MSO. Shifts among small mammal prey species on the A-1 Mountain Allotment would be expected to occur between areas with increased intensity grazing (10 – 50 percent) such as close to water, salt or mineral blocks, and those with decreased intensity to no grazing (0 – 10 percent) in areas farther from water or inaccessible to livestock (e.g. steep slopes). Managing grazing intensity and forage utilization of herbaceous vegetation at conservative levels (30 – 40 percent), as is proposed in Alternative 2, would help meet this objective.

Through project specific resource protection measures, no new improvements will be constructed within suitable owl habitat. However, maintenance of existing structural improvements such as fences could have effects on vegetative cover and soil conditions in suitable MSO foraging habitat. Reductions in herbaceous cover and potentially soil condition in the immediate vicinity of improvements would be expected to result in a potential decrease in hiding cover and food resources for prey. Effects would be limited to localized areas and be short in duration with recovery expected in one to two years under average or favorable climatic conditions. Based on this information, potential direct and indirect impacts from new or existing structural improvements on suitable spotted owl foraging habitat is expected to be insubstantial.

Cumulative Effects

Cumulative effects to the MSO and its habitats would result from disturbance of nesting spotted owls and changes in vegetative cover and soil conditions that affect spotted owl foraging habitat through changes in food resources and hiding cover for prey as well as water quality and availability at or near stock ponds, springs, and wetlands. Past, present, and reasonably foreseeable future projects that could be sources of noise disturbance to nesting spotted owls include 4FRI, FWPP, and Travel Management. Other activities including hiking, biking, horseback riding, hunting, motorized use, fuelwood harvest, and maintenance of roads and utility corridors can also contribute to cumulative effects. In general, most of the past, present, and reasonably foreseeable future activities would be expected to result in localized decreases in the quality and quantity of spotted owl foraging habitat on the allotment.

Recreational activities such as motorized and non-motorized travel, camping, hunting, and fuelwood harvest have the potential to affect vegetative cover and soil condition. System and user created roads remove vegetation and litter and compact soils, and therefore increase erosion (see Soil and Watershed Report for more detail). An increase in erosion could lead to a decrease in water quality in stock ponds. The Forest established new travel management rules (TMR) in 2011. As they are implemented over the next decade, these effects to owl prey will be reduced as non-system and unneeded roads are rehabilitated and vegetative cover increases within the allotment. Conversely, improvements to foraging habitat are expected in those areas where off-road travel is limited and road densities are reduced under TMR, and restoration activities are implemented under 4FRI project.

Effects from wildfire suppression tactics are evident in owl habitat on the allotment and can be expected in the future as a result of the human alteration of the natural fire regime. Effects depend on the time of year, scale of the fire, intensity, severity and associated management or suppression activities and can range from none to improvement or reduction of owl and prey habitat. Best management practices are incorporated into suppression activities as much as possible to conserve owl habitat and its components. Short-term effects of fire to herbaceous cover typically last one to three years but recovery depends on factors such as climate and burn severity. Water quality of stock ponds also can be affected, especially in areas where fire severity is moderate to high. As fuels reductions projects, including 4FRI and FWPP, are implemented effects of wildfires will decrease. While short-term effects to herbaceous cover would occur from the effects of activities such as logging equipment and broadcast burns, the long-term effects of increased herbaceous cover across the landscape would benefit owl prey.

As described in the Range and Soil and Watershed reports, effects are expected to be greater for Alternative 2 than Alternative 1, but would not cumulatively result in long-term losses in soil productivity or decreases in diversity, density, production, and quality of herbaceous vegetation throughout the allotment. Therefore, the potential impacts of livestock grazing and associated activities combined with past, present and reasonably foreseeable future projects on the allotment would result in effects in limited areas and with limited magnitude to spotted owls and their habitats on the allotment.

Determination

Based on the information above, it is determined that Alternative 1 would have “no effect” on MSO or its habitat.

Based on the above analysis, it is determined that Alternative 2 “may affect, but are not likely to adversely affect” MSO or its habitat.

Soils and Hydrology

This section describes the direct, indirect, and cumulative effects of implementing each alternative on affected soils and water resources. Affected soils are those soils occurring within the analysis area that may be impacted by the no action, current management or proposed action alternative. Affected water resources include watersheds that overlap the allotment boundary as well as water quality in stream courses that convey surface flow.

Direct/indirect and cumulative effects to soils were analyzed within the Allotment. This spatial scale of analysis is used as soils are most likely to be impacted by activities occurring at or in their immediate vicinity. For cumulative effects analysis, the temporal scale of analysis was five years into the past and five years into the future, for a span of ten years. This temporal scale was deemed appropriate as the impact of major disturbances to forest soils, such as wildfire, are likely to be abated within five years (Pietraszek, 2006) and the ability to predict land use activities that may cause disturbance to soils is limited beyond about five years.

In the case of watersheds and their associated stream courses, direct/indirect and cumulative effects are analyzed at the sub-watershed (6th code) scale since activities that may cause environmental consequences to water resources may occur anywhere within the sub-watershed(s) in which these activities occur. The temporal scale of analysis is the same as that for soils since the impact to watersheds from a major disturbance such as wildfire is typically abated within five years and the ability to predict future land management activities that cause watershed disturbance is generally limited to five years.

Alternative 1-No Action

Under this alternative, there would be no livestock grazing or construction/ maintenance of existing structural range improvements and as a result, there would be no direct or indirect effects from cattle grazing on soils, the watershed condition, or on water quality.

Soils

Under the No Action alternative, there is unlikely to be a change in soil condition as rated at the TEU-scale caused by not permitting livestock grazing. Soils around stock ponds would likely experience less disturbance under the No Action Alternative but since wildlife would likely still use these water features, elevated levels of soils disturbance would likely still be present. Figure 2 provides an example of soil disturbance that occurs in the immediate vicinity of stock ponds from wildlife and livestock.

The No Action Alternative does not provide for ongoing maintenance of stock ponds and it is anticipated that water availability for wildlife consumption would be reduced over time as these earthen ponds fill with sediment. A reduction in water availability is anticipated to reduce the draw to and thus concentrated use and elevated disturbance of these areas.

Figure 2. Soil disturbance from livestock and wildlife use of Echo Tank, a stock pond within the A-1 Mountain Allotment.

Hydrologic Resources

Under the no action alternative, there will be no direct/indirect effects to watershed condition nor will there be any direct/indirect effects to water quality from managed grazing on the A-1 Mountain Allotment since managed grazing would not occur.

Trends to watersheds and water quality would persist as a result of other activities occurring within the watersheds including recreation, forest restoration/fuels reduction activities, wildfire, climate change, and urbanization in the form of residential and commercial development.

Urbanization

The Upper Rio de Flag sub-watershed is currently rated as "functioning at risk" (USDA, 2010b). Functioning at risk means that the watershed is not meeting its full potential when it comes to the watershed condition indicators identified in the Watershed Condition Framework (USDA Forest Service, 2011a) and Watershed Condition

Classification Technical Guide (USDA Forest Service, 2011b).

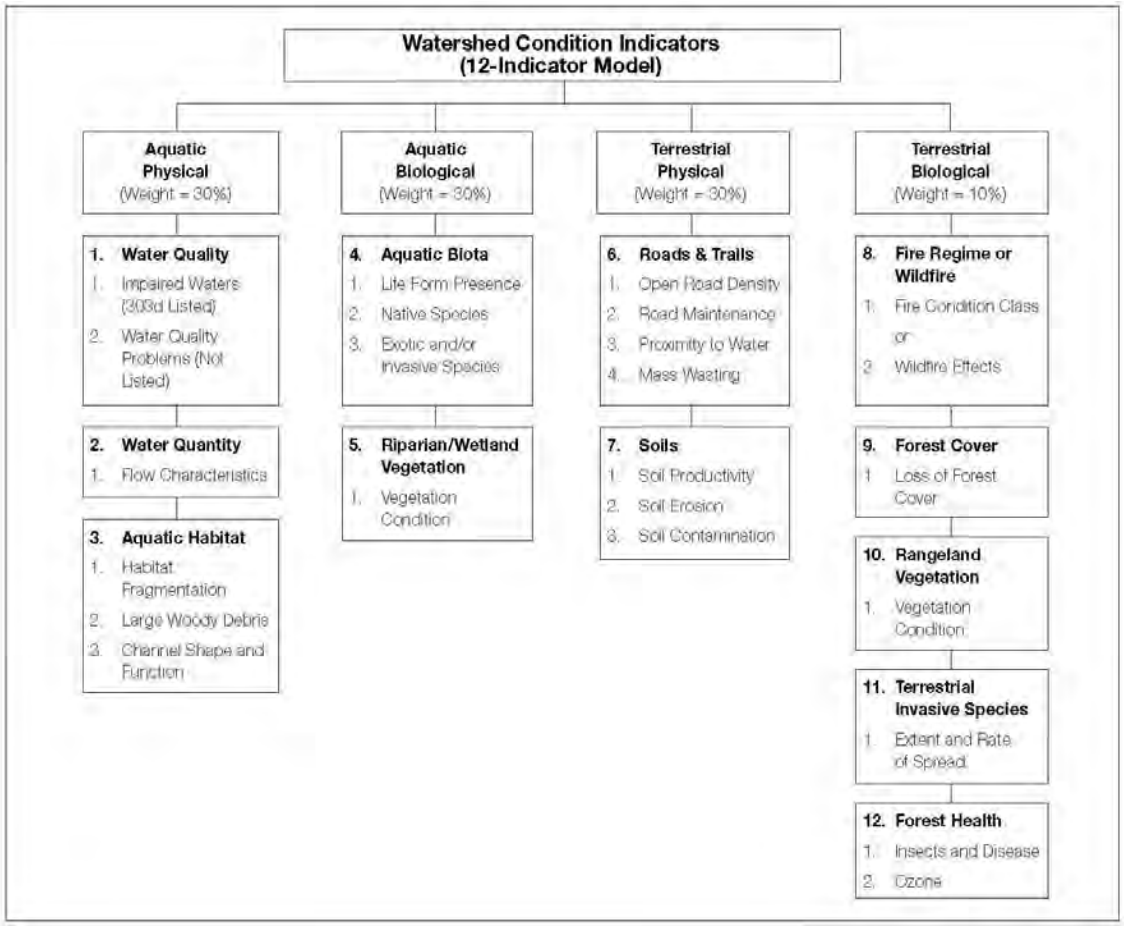

Figure 3. U.S. Forest Service watershed condition indicators.

Roughly six percent of the Rio de Flag is within the City of Flagstaff with another 21 percent under private ownership in unincorporated areas. The majority of the Rio de Flag sub-watershed, 71 percent, is on lands managed by the Coconino National Forest. Residential and commercial development activities are expected to continue on non-Federal lands within the sub-watershed. The extent to which development or urbanization of the sub-watershed has altered the response to precipitation is noted in a study by the United State Geological Survey (USGS) published in 1988 (Hill et al., 1988). This study found that "most of the discharge of the Rio de Flag originated in the urban area" and that channels "were much larger and more deeply incised downstream from the urban development". Urbanization tends to decrease flow duration and increase peak discharge because of the conversion of lands, which alters the ability of water to infiltrate these areas. Where water once infiltrated into the system it now simply runs off. This often leads to the degradation (incision) of stream channels as noted in the USGS study. Even though the majority of the sub-watershed is managed in more-or-less its natural state, the sub-watershed hydrology is dominated by urban development.

Other Grazing Allotments

Even though there would be no livestock grazing on the A-1 Mountain Allotment under the No Action Alternative, managed livestock grazing would continue in the Upper Rio de Flag sub-watershed. There are three other grazing allotments within the Upper Rio de Flag sub-watershed with a combined area of roughly 21,000 acres. These include the Maxwell Springs, Peaks, and Woody Mountain allotments. Under current conditions, vegetative ground cover generally exceeds tolerable vegetative cover and widespread accelerated erosion is not occurring. Furthermore, livestock do not have access to perennial streams where they might otherwise cause degradation of surface water quality (Buckhouse and Gifford, 1976). Therefore, impacts of managed grazing on watershed condition and water quality in the Upper Rio de Flag sub-watershed is thought to be minimal.

Water quality data within the sub-watershed has only been assessed for the Rio De Flag from its headwaters, located north of the allotment, 34.5 miles downstream to its confluence with the outfall of the City of Flagstaff's wastewater treatment facility (ADEQ, 2015). No exceedances of state water quality standards were detected during the most recent assessment period (ADEQ, 2015).

Wildfire

Wildfires can alter the runoff response to rainfall particularly during the summer when high intensity rainfall from convective storms occur. This altered runoff response typically results in higher peak discharges, reduced duration of flow events, and increased runoff volume. This can result in increased erosion of hillslopes and channels with associated impacts to water quality and downstream flooding.

There have been at least 44 wildfires encompassing a combined total of roughly 29 acres within the Upper Rio de Flag sub-watershed since 2011. Fire sizes ranged from roughly 0.1 acres to 15 acres with an average size of 0.66 acres. Because of the small size of individual wildfires and the combined area impacted by wildfires occurring within the sub-watershed over the past five years, there would not likely have been an altered runoff response to rainfall at the sub-watershed scale following any one event or from the combined wildfires.

Alternative 2- Proposed Action

This section is divided into two subsections, Soils and Hydrologic Resources.

Soils

Grazing, by livestock or wildlife, has the potential to impact soils primarily through impacts to vegetative ground cover. Vegetative ground cover protects the soil from raindrop impact and sheetflow, and through alteration of soil infiltration rates.

Rangeland management using the proposed grazing system and proposed maximum stocking rate has been determined to provide for sustained, multiple use (i.e., use by both livestock and wildlife) of semi-arid forested rangelands with bunchgrass understory (Skovlin et al., 1976). In fact, climate and overstory tree density rather than managed livestock grazing have been identified as the primary drivers of vegetative ground cover conditions in forested rangelands of northern Arizona (Bakker and Moore, 2007).

Bunchgrass density and variety have been shown to decline with an increase in ponderosa pine overstory and during periods of drought. Negative impacts to vegetative ground cover from grazing by both livestock and wildlife, however, are likely to occur in the immediate vicinity of stock ponds where animals congregate and the concentrated hoof action reduces or eliminates ground cover (see Figure 2).

On the A-1 Mountain Allotment, perennial bunchgrass ground cover is diminished or absent where closed overstory tree canopies exist. Bunchgrass needs open, park-like, stands for growth and closed canopies do not meet this criterion. Soils, however, generally remain protected from erosion by a thick covering of pine needles.

The effects of the hoof action of cattle can be detrimental to soils in terms of decreased infiltration and aeration of the soil through hoof compaction (Gifford and Hawkins, 1978). By reducing soil aeration and infiltration, soil compaction can decrease soil productivity and increase runoff exposing the soil to increased shear stress and erosion. However, areas of extensive soil compaction are generally only found in the immediate vicinity of water sources (e.g. stock ponds) where cattle tend to congregate.

Biological soil crusts, sometimes referred to as cryptogamic crusts or microphytic crusts, are found throughout the world and generally consist of non-vascular plant groups including lichens, mosses, and algae (Belnap, 2001). These crusts have important functions including, but not limited to, the protection of soils from wind and water erosion, and increasing soil nutrients (Beymer and Klopatek, 1992). Biological crusts are susceptible to trampling whether it be from humans, livestock, or wild ungulates. Cattle grazing was shown to reduce the total cover and biomass of biotic crusts in various sites in northern Arizona exposed to differing grazing histories in a study done by Beymer and Klopatek (1992). Wind and water erosion in those areas protected by biological soil crusts would likely increase if these crusts were disturbed by livestock trampling.

There are five structural range improvements identified in the proposed action including:

- adding one mile of pasture fence dividing Fort Valley Pasture,
- re-alignment of 300 feet of pasture fence between West and Belle Pastures,
- construction of 300 feet of fence between southern boundaries of pastures 008 and A-1 Mountain to remove a water lane,
- construction of up to 150 feet of fence around a cultural site, and
- construct a permanent 200 foot x 200 foot corral facility with portable loading chute.

In addition, roughly 0.83 miles of fence would be removed. The construction of new fence and removal of existing fence would have a negligible effect on soils. The greatest potential for effects to soils would be from the permanent corral facility, which would result in the most compaction of soils, and would eliminate most of the vegetation within the corral facility area, which would be approximately 40,000 feet squared. Since the corral facility would be a permanent structure, it would have long lasting effects to soils within the interior of the corral, which would affect less than one-tenth of one percent of the Allotment. Removal of vegetation can lead to increases in erosion of the soil, and decreased soil productivity.

Hydrologic Resources

Livestock grazing can impact water quality directly when livestock access water sources and cause disturbance to stream banks or shorelines or defecate in or adjacent to surface water. Stream courses within the allotment are ephemeral and, therefore, do not typically serve as a source of drinking water. Cattle, therefore, are unlikely to congregate adjacent to these stream channels where water quality degradation attributable to livestock grazing is most likely to occur (Buckhouse and Gifford, 1976). During the 2012/2014 ADEQ (2015) assessment of water quality for the Rio De Flag, no exceedances of state water quality standards were detected for the area measured. These results are consistent with observations that contamination of streams by livestock generally occurs only when livestock congregate within or adjacent to streams that serve as a source of drinking water for livestock.

Other indicators of watershed condition that would potentially be influenced by Alternative 2-Proposed Action include range vegetation and soils. Under current management, soils within the allotment and in areas of the Upper Rio de Flag watershed administered by the Coconino National Forest are generally protected against accelerated erosion by vegetative ground cover in excess of tolerable vegetative cover. The Range Specialist report summarizes trends in ground cover data as measured at permanent monitoring plots in the years 1963, 2014, and 2015. Vegetative ground cover showed a positive trend.

Therefore, the effects to soils from the proposed action are expected to be minimal.

Cumulative Effects to Soils

Cumulative effects to soils within the allotment boundary would occur as a result of the combined effect of proposed livestock grazing and other ground disturbing activities including various forms of recreation, timber harvesting, and prescribed burns.

Mechanized harvesting and prescribed burns, as is planned with the Four Forest Restoration Initiative (4FRI), would result in a short-term disturbance to soils when added in time and space to livestock grazing. This is because like grazing, mechanized harvest operations and prescribed burns temporarily remove ground cover in the form of vegetation. However, these effects are expected to be short-term. Ground cover in the form of vegetation would grow back within a few grazing seasons and other natural processes would allow for increased litter. Furthermore, implementation of project specific resource protection measures and National BMPs for Water Quality Management on National Forest System Lands' (USDA Forest Service, 2012) for both 4FRI and the A-1 Mountain Allotment will ensure that effects from these projects will protect soils within the A-1 Mountain Project Area.

Recreational activities with potential to impact soils include motorized and non-motorized travel, camping, hunting, and other related activities. In terms of these recreational activities, forest roads are the common thread through which most recreational uses of public lands occur. Forest roads have an impact on soils because soils are left unprotected (e.g., vegetation and/or litter is removed) and soils are compacted by use of these features. The combined effects of compaction and exposure of bare mineral soil on forest roads tend to increase soil erosion by reducing infiltration and exposing the

soil to raindrop impact, which detaches and displaces soil particles. Roads are frequently identified as the largest source of sediment delivery to stream courses. The amount of erosion associated with roads is a function of rainfall, road condition (e.g., rutted vs. non-rutted), amount of maintenance, road gradient, and traffic type and volume. As the TMR is implemented, and open road density and motor vehicle access is reduced, soil conditions are expected to improve throughout the allotment by reducing erosion of roadbeds, a process that is enhanced by traffic (Grace and Clinton, 2007). Although changes to road designations may occur within the allotment over the next five years, the improvements to soils from implementation of TMR are likely to have a long-term benefit to soils lasting well beyond five years. This combined with project specific resource protection measures, BMPs, and an adaptive management strategy designed to reduce effects from grazing livestock within the A-1 Mountain Allotment is expected to result in a net benefit to the allotment through reduced soil disturbance.

The importance of vegetative cover in preventing accelerated erosion is perhaps best exemplified by the use of vegetative cover factors as response variables in equations used to predict sheet and rill erosion such as universal soil loss equation (USLE) (Wischmeir and Smith, 1978). It is largely through its impacts to vegetative cover that climate may affect erosion. Vegetative cover fluctuates naturally in response to inter-annual and longer climate variability. For example, Loeser et al. (2007) measured a ten percent decline in total canopy cover in an ungrazed plot in northern Arizona that had experienced eight years of below normal precipitation , during which each year’s precipitation fell below the twenty year mean.

Climate change in the North American southwest is predicted to lead to decreased winter precipitation throughout the current century (Seager and Vecchi, 2010). This decline in winter precipitation could lead to a decrease in herbaceous cover dependent on winter precipitation. Although winter precipitation is important for annuals and cool season grasses as well as replenishment of soil moisture, rangeland productivity in the southwest is primarily controlled by summer precipitation delivered by the North American monsoon (NAM) (McCollum et al., 2011). The effect of climate change on the NAM, which accounts for roughly half the precipitation on the A-1 Mountain Allotment, is uncertain. However, recent research suggests a delay in the onset of the NAM with no change in total precipitation (Cook and Seager, 2013). A delay in the onset of NAM could extend the fire season by increasing the length of time between early spring snowmelt and NAM. An extended fire season would likely translate to additional areas of soil impacted by fire.

The A-1 Mountain Allotment lies within the footprint of the Four Forest Restoration Initiative (4FRI) Phase I planning area. This initiative involves the implementation of a suite of restoration treatments designed to improve forest structure including, but not necessarily limited to, mechanical thinning and prescribed burns. A Record of Decision for this first phase was published in April 2015 and this phase would be implemented over a 10-year period or until objectives are met. The area affected by this decision includes approximately 355,707 acres on the Flagstaff, Mogollon, and Red Rock Ranger Districts of the Coconino National Forest and approximately 230,402 acres on the Williams and Tusayan Ranger Districts of the Kaibab National Forest.

Four FRI-related thinning and prescribed burns within the FS-managed lands of the allotment is planned to begin by 2021 and would include mechanized thinning followed by prescribed burns within an area of about 3,346 acres. Another roughly 1,600 acres of FS-managed lands within the allotment would be treated only by prescribed burns. Mechanical thinning would likely cause a temporary (less than five years) disturbance to soils particularly where vegetation is removed and soils are compacted including temporary roads, log landings where logs are processed and loaded on to trailers for hauling, and where slash piles are created and subsequently burned. This disturbance may cause local instances of accelerated erosion until disturbed areas are stabilized by vegetation. Sediment derived from accelerated erosion following forest disturbance by mechanical thinning often gets deposited on lower portions of hillslopes where a change in gradient or hillslope roughness induces sediment deposition rather than being deposited within a stream channel.

This is particularly the case where stream buffers or aquatic management zones (AMZs) are used as best management practices (BMPs) to limit or prevent disturbance within the areas immediately surrounding stream courses or other water bodies. AMZs are areas of minimal to no disturbance in which such features as temporary roads, skid trails, landings, prescribed burns containment lines, and equipment staging/maintenance is prohibited. The designation of AMZs around certain water bodies is required under the Forest Service's National Best Management program. On the Coconino National Forest, perennial and intermittent water bodies are generally designated as AMZs. The temporary disturbance of logging benefits soils in the long term by increasing herbaceous growth and the resulting cycling of nutrients that may be impaired when the forest floor is covered by a thick layer of pine needles. In addition, thinning as planned under 4FRI would allow the return of low intensity, frequent fire to the allotment improving soil nutrient cycling and reducing the susceptibility of the forest to uncharacteristic fire.

Cumulative Effects to Hydrologic Resources

Cumulative effects to watershed condition and water quality in the Upper Rio de Flag sub-watershed could occur because of the combined effect of proposed livestock grazing when added to other ground disturbing activities as identified and described above.

The 4FRI planning area encompasses the Upper Rio de Flag sub-watershed. In addition to planned thinning and prescribed burns under 4FRI, various thinning and prescribed burns efforts within the sub-watershed are already underway or will likely occur within the next five years as part of timber sale contracts not associated with 4FRI. The total combined area of planned or ongoing mechanized thinning over the next five years within the sub-watershed is roughly 17,000 acres. Areas planned for thinning are also generally planned for prescribed burns. Under 4FRI, in addition to the acres identified for thinning with prescribed fire, roughly 2,300 acres would be treated by prescribed burns with no thinning. Prescribed burns without thinning is also planned for an additional 312 acres, roughly, not included in 4FRI.

The impacts to water quality from thinning and prescribed burn activities are expected to be minimal as these activities would be conducted using BMPs specifically designed to be protective of water quality. For example, stream channels would be protected though designation as AMZs. In addition, thinning and prescribed burns activities would be

spread out over space and time. Furthermore, prescribed burns would be conducted when moisture conditions are such that negative impacts to soils are minimized, usually through spring time burning. Due to moisture conditions in the atmosphere and in forest fuels when prescribed burning is conducted, vegetative ground cover is only partially consumed leaving the soil protected from raindrop impact and shear stress from sheet flow. This means that there is likely to be minimal to no accelerated erosion and negative impacts to water quality. Conversely, thinning and prescribed burns activities are expected to have a long-term benefit to watershed condition and water quality by reducing the likelihood of wildfires with severe consequences to watershed function.

Rules promulgated under TMR are expected to improve watershed conditions by prohibiting off-road travel except in instances of game retrieval and fuelwood harvesting, and by reducing the network of roads designated as open to the public for motor vehicle use. Urbanization of the sub-watershed on lands not managed by the Coconino National Forest would be expected to continue with negative impacts to steam channels from increased peak discharges as more undeveloped land is converted to developed land with less area available for infiltration of precipitation.

The effects from the proposed action on watershed condition are very limited due to the number of resource protection measures including utilization limits. Only in situations where there are severe effects from motorized recreation, heavy equipment use associated with thinning or prescribed fire treatments, is there likely to be a cumulative effect from the combined impacts of livestock grazing. In these situations, the combined effect would likely be very localized (< 1 acre in size), and though it may result in increased erosion, this increase would not likely be measureable at the sub-watershed scale. Because of the buffering of stream courses by designating them as AMZs, sediment derived from erosion in upland areas would likely be deposited outside stream channels or along hillslope segments where a change in slope occurs. Other cumulative actions such as travel management implementation may counteract the cumulative impact of grazing and forest treatments.

Noxious or Invasive Plant Species

The focus of this analysis is on the spread of noxious or invasive species (weeds) through livestock grazing and management. These actions are confined to the A-1 Mountain Allotment, and as a result, the spatial extent of direct and indirect effects analysis is confined to the A-1 Mountain Allotment boundary. The temporal extent for this analysis is 20 years, ten years in the past and ten years in the future. This timeframe has been selected because the area experiencing ground-disturbing activities would be expected to exhibit recovery within ten years.

Cumulative Effects Boundaries

The cumulative effects boundaries, both spatially and temporally, are the same as the boundaries for direct and indirect effects. The past, present, and reasonably foreseeable future activities considered in the cumulative effects analysis that may influence the spread of invasive species include: timber sales, fuels reduction projects, prescribed burning, weed treatments, recreation, hunting, firewood gathering, OHV use, and wildlife use.

Alternative 1- No Action

No grazing would occur under this alternative. As a result, there would be no effects to noxious or invasive weeds from grazing or livestock management activities. There would be no disturbance from the maintenance or construction of range improvements or the potential for expansion or introduction of noxious or invasive weeds as a result of these activities. Likewise, if a permit is not authorized, there would be no participation by the permittee in monitoring for new weed infestation. This could result in a decreased rate of detection in the establishment and spread of weeds, both within the allotment and from nearby lands (DiTomaso, 2000). A decreased rate of detection of invasive species establishment and spread may result in the occurrence of larger weed populations that are difficult to effectively treat and manage.

Weeds treatments are currently occurring in portions of the allotment and would continue regardless of the alternative selected under this analysis. As infested areas are treated, the size and number of weed populations would be reduced and native vegetation would be expected to recover. Establishment or spread of new populations if invasive weeds in the allotment is also possible from a variety of activities from recreational use, forest restoration treatments, or other activities.

Vegetation density, diversity, cover and available water fluctuate naturally in response to inter-annual and longer periods of climate variability. Periods of favorable climatic conditions can result in increased growth and spread of weeds, while in periods of unfavorable climatic conditions the reverse can occur. Climate change is predicted to result in periods of extreme climatic conditions in both temperature and precipitation. As described in the Rangeland Resources and Soils sections, climate change in the southwest is predicted to lead to decreased winter precipitation and delays in the onset of the monsoon. These changes could result in drier conditions and an extension of the fire season resulting in increased areas that currently support native plants to be impacted by wildfire on the allotment. This could result in an increase in the spread of weeds into areas where native plant cover is reduced.

Alternative 2- Proposed Action

The weeds known to occur on or adjacent to the A-1 Mountain Allotment can result in a reduction of forage quantity and quality. One study has found that grazing probably has little effect on the accelerated spread of most exotic plant species at landscape scales in grasslands similar to those on the A-1 Mountain Allotment and that few invasive plant species show a direction response to grazing and cessation of grazing (Stohlgren et al., 1999). Weeds can decrease grazing opportunities by invading an area and outcompeting native plant species that provide a large quantity and better quality of forage for livestock. Parks et al., (2005) demonstrated that properly managed grazing results in fewer opportunities for invasive species establishment and spread, and usually results in invasive species populations similar to ungrazed areas. Therefore, it is important to employ good grazing management practices to limit the risk of the spread of existing weeds and the introduction of new species. Project specific resource protection measures and BMPs for noxious or invasive weeds are designed to reduce these risks and address weed concerns. Some of these methods include limiting the length of grazing of a pasture in a given year, the use of a rotational grazing management system, and managing

seasonal and yearly utilization for herbaceous vegetation. These measures would help maintain conditions that favor native plants and limit the establishment and spread or invasion of weeds on the A-1 Mountain Allotment.

Construction of new structural range improvements would result in ground disturbance and could increase the risk of spreading existing weeds and introducing new species. Prior to the start and after completion of construction and maintenance of structural range improvements, mud, dirt, and plant parts would be removed from all tools, equipment, and vehicles used during these activities to prevent the spread or introduction of invasive plants or noxious weeds. Ground disturbance as a result of these new improvements would be limited in size (~1 acre), so potential effects from the proposed improvements would be expected to be minimal.

Cumulative Effects

Cumulative effects on invasive species populations would be expected from disturbance that changes vegetative cover and soil conditions due to authorizing livestock grazing combined with additional management activities on the A-1 Mountain Allotment. Activities that could cumulatively effect weeds include recreation including dispersed camping, horseback riding, and illegal road and trail creation, OHV use, fuelwood harvest, wildfire suppression activities, road closures, control of weeds, and maintenance of Forest Service roads,.

Effects from prescribed burns and suppression tactics for wildfires are evident on the allotment and can be expected in the future as a result of the human alteration of the natural fire regime. Effects depend on the time of year, scale of the fire, intensity, severity and associated management or suppression activities and can range from none to reductions in native plant cover and soil conditions. Studies in northern Arizona have found that nonnative species presence increase after fire, but abundance of these species remain low (<10%) with nonnatives tending to increase with increasing fire severity (because of less competition from native plants) (McGlone and Egan, 2009). BMPs are incorporated into suppression activities as much as possible to reduce impacts to native vegetation and some species benefit from the effects of low intensity fire. Any short-term effects of fire would typically last one to three years, which is when invasive species establishment and spread is greatest, but recovery depends on factors such as climate and burn severity.

Recreational activities such as motorized and non-motorized travel, camping, hunting, and fuelwood harvest have the potential to result in a reduction of vegetative cover and impacts to soil conditions. System and user created roads can lead to the crushing of native plants and ground disturbance that favor weeds. New TMRs established by the Forest in 2011 have reduced the densities of open roads on the Forest and created the opportunity for road closures. As they are implemented, effects to native plant cover and soil conditions would be reduced, limiting the suitable habitat for weeds.

Weeds treatments currently occur in portions of the allotment, mainly along roads. As infested areas are treated, the size and number of weed populations would be reduced and native vegetation would be expected to recover. As these populations are reduced the potential for spread from livestock will also be reduced.

Road maintenance within the allotment has the potential to result in the loss of vegetative cover and impacts to soil conditions. The use of heavy equipment and vehicles along roads and off-road could result in the crushing of native plants and ground disturbance that favor weeds. BMPs for noxious or invasive weeds as listed in Appendix B of the 2005 Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds are implemented during these activities to limit the introduction and spread of weeds in these areas.

In general, most of the past, present, and reasonably foreseeable future activities would be expected to result in localized increases in suitable habitat for weeds on the allotment. Conversely, suitable habitat for weeds would be expected to decrease in those areas where off-road travel is limited and road densities are reduced through closures, where weed populations are treated through the Final Environmental Impact Statement for weeds (USDA, 2xx), and where thinning and other forest treatments will improve understory vegetation conditions for native plant species. .

Under this alternative the proposed action when added to other past, present and reasonably foreseeable further projects could result in an increase in impacts to vegetative cover and soil conditions on the allotment through increased potential for invasive species establishment and spread. These effects would be mitigated through ongoing detection and invasive species treatment and would are expected to be minimal.

Cultural

The following section will focuses on discussing rangeland management and cultural resources. For more detailed information on existing conditions, please visit the Heritage Specialist Report in the project record.

General Effects of Livestock Grazing on Cultural Resources

Various activities associated with rangeland management, such as salt placement and water sources, have the potential to affect historic (i.e. listed, eligible and undetermined) properties. In most cases, this effect will not be adverse. Guidelines developed in consultation with Region 3 of the Forest Service and the Arizona and New Mexico Historic Preservation Offices serve to standardize the National Historic Preservation Act requirements for Allotment Management Plans (USDA Forest Service, 2007). As part of this guidance, Coconino National Forest personnel assessed cultural site conditions in November of 2015.

A sample of five previously recorded cultural resource sites were revisited using the information and data gathered during a literature review. A sixth site, 02-549, could not be located during this assessment. This site-assessment endeavor sought to assess effects of cattle grazing activities to archaeological sites and to provide appropriate measures to mitigate any such effects. None of the assessed sites had evidence of on-site cattle grazing (such as cow pies and cattle bedding areas). As a result, none of the assessed sites were determined to have sustained adverse effects caused by cattle grazing activities.

One site, 03-04-03-40 is within 656 feet (200 meters) of a stock pond and showed evidence of ungulate bedding within a historic house foundation. However, the bedding is more likely from deer and/or elk as this particular pasture has not been used by livestock

for over 20 years (Gary Hase and Mandy Ball, Flagstaff Ranger District Range Staff, personnel communication February 2016). The feature in question was damaged by vandals sometime between 1993-1995 and repaired/reconstructed by Forest Service archaeologists in 1995 (Farnsworth, 1993/Coconino National Forest Report 1993-37C).

Alternative 1- No Action

Alternative 1 is a no action alternative. Under this alternative, livestock grazing would not occur and as a result, there would be no direct or indirect effects from cattle grazing on cultural resources within the A-1 Mountain Allotment.

If no action is selected, the project area would not remain static over time. Like all features on the landscape, cultural resource sites and artifacts are susceptible to the ravages of time, weather, and other disturbances. Known and unknown cultural sites could change as a result of natural events such as vegetation growth, blowdown, and wildfire. Human influences, such as vandalism can also result in degradation of cultural resource sites. Wildlife can also contribute to site displacement or damage through trampling, rubbing or bedding.

Alternative 2- Proposed Action

The alternative was measured by comparing potential impacts against current conditions. Direct, indirect and cumulative effects boundaries for this analysis consider cultural resource site locations within the A-1 Mountain Allotment. Effects analysis are temporally bound by the most recent recording of each cultural resource site, which ranges from 5-40 years in the past. It is anticipated that this analysis will remain temporally relevant for at least the next ten years. This timeframe has been determined appropriate because it based on the expected (natural) deterioration of historic materials.

Site assessment within the A-1 Mountain Allotment demonstrates that there is minimal interface of cattle and cultural resource sites within this allotment. No field observations indicate adverse effects from livestock grazing. It is recommended that fencing be placed around a rock foundation at site 03-04-03-40. Provided this mitigation measure is met, this alternative would result in no adverse effect to cultural resources.

Any proposed structural improvement areas will be inventoried for cultural resource per Region 3 Programmatic Agreement standards and all National Register eligible properties will be avoided. Therefore, there would be no adverse effects to cultural resources as a result of installation or removal of structural range improvements.

Cumulative Effects

Cultural resources in the project area are subject to impacts from land use such as hiking, hunting, road use, and dispersed camping. Proposed or ongoing Forest Service projects within the allotment, such as the Four Forest Restoration Initiative (4FRI), avoid sites per stipulations in the Region 3 Programmatic Agreement with the Arizona State Historic Preservation Officer, Appendix J.

Any additional ground disturbing range developments or treatments proposed within the A-1 Allotment will comply with the existing Region 3 Programmatic agreement with the Arizona State Historic Preservation Officer, dated December 24, 2003, and shall

constitute an additional undertaking for Section 106 compliance outside of this Allotment Management Plan Report.

When combined with past, present, and reasonably foreseeable future projects, the A-1 Mountain Allotment is not expected to add to cumulative effects to cultural resources.

Economics

Livestock grazing contributes to the livelihood of the A-1 Mountain Allotment permittee as well as to the economy of local communities. The A-1 Mountain Allotment is located in Coconino County and is currently permitted 99 head of adult cattle with a season of use from June 1 thru October 31. The nearest community to the Allotment is Flagstaff, Arizona. This community has a large and fairly diverse economy with livestock grazing associated revenues making up a very small portion of the economy. Individual allotments provide incremental contributions to local economies; a change to one allotment may result in no impacts to the local economy, but changes in several allotments would most likely result in an impact to the area economy.

Affected Environment

Coconino County receives revenue in several ways: county sales taxes, state-shared sales taxes, highway user revenues (gasoline taxes), property taxes, and National Forest fees. The greatest revenues come from the county and state-shared sales taxes. National Forest fees, which include payments from timber harvesting, mining, recreational uses, and cattle grazing, are an important part of county revenues, but provide only a fraction of available funds (EPS-HDT, 2016). Coconino County also receives National Forest fees from uses on the Apache-Sitgreaves and Kaibab National Forests. National Forest fees are used primarily for highway maintenance and public schools in Coconino County. The A-1 Mountain Allotment permittee directly contributes revenues to Coconino County through property taxes.

Estimates of direct and indirect jobs and payments to Coconino County from Federal receipts provide a relative comparison of economic effects that could occur due to changes in livestock grazing. Table 18 estimates the effects expected on these indicators in Coconino County from implementing the No Action Alternative, the Current Management Action, the Proposed Action Alternative, and the Removal of South Flag Pasture Alternative on the A-1 Mountain Allotment.

Table 18. Estimated economic effects for Coconino County.

Economic Effects	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Direct and Indirect Jobs*	0	0.69	0.69	0.59
Federal Payments to Counties**	0	$210.41	$210.41	$178.72

*Approximately 0.70 jobs per 100 cattle (Kerna et. al., 2014); **The amount shown Alternatives 2-3 is based on 25 percent of the A-1 Mountain Allotment grazing fees paid to Coconino County at the 2015 grazing fee rate of $1.69/HM and at the maximum permitted Head Months of 498. The amount shown Alternative 4 is based on 25 percent of the A-1 Mountain Allotment grazing fees paid to Coconino County at the 2015 grazing fee rate of $1.69/HM and at the maximum permitted Head Months of 423. Not shown in this amount are the taxes that the county collects on range structural improvements. These taxes are based on a percentage of the assessed values of those improvements and the materials purchased for the construction of these improvements.

Quantifiable factors such as economic costs and outputs, along with projected head months (HM) or AUMs have been used to help describe the economic effects of grazing on the A-1 Mountain Allotment. The QuickSilver economic analysis program (2015) was used to calculate these factors. Although projections from the QuickSilver model are precise in measurement, they are best used as an indicator of change rather than a precise measurement. Additionally, identifying some of these effects is difficult, if not impossible, as economic effects tend to deal with personal issues.

An investment analysis anticipates the rate of return for the projected expenditures by the permittee and Forest Service on the A-1 Mountain Allotment over a ten year period. Measures used to conduct an investment analysis include: present value of benefits, present value of costs, present net value and the benefit/cost ratio. Table 2 in the Range Specialist report displays the results of this investment analysis for the No Action Alternative, the Proposed Action Alternative, the Current Management Alternative and the Removal of South Flag Pasture Alternative for the A-1 Mountain Allotment.

Gross revenue estimates are created by estimating the amount of calves produced each year for each alternative. Table 19 shows that Alternatives 2 and 3 have the best potential for revenue on the A-1 Mountain Allotment.

Table 19. Estimated gross annual revenue.

Value	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Estimated Gross Annual Revenue	$0.00	$39,092.63	$39,092.63	$33,169.50

Environmental Consequences

This section analyzes the economic effects of livestock grazing on the A-1 Mountain Allotment. Alternatives considered in this section include both alternatives considered in detail: Alternative1-No Action and Alternative 2- Proposed Action, and the two alternatives removed from further consideration: Alternative 3-Current Management and Alternative 4-Removal of South Flag Pasture. This analysis is based on national forest fees, jobs, and an investment analysis that includes the costs and benefits of livestock grazing under the various alternatives.

Alternative 1- No Action

The No Action alternative would result in the loss of annual Federal payments to Coconino County for livestock grazing on the A-1 Mountain Allotment. This loss, by itself, is not substantial. However, Coconino County would also lose revenue from taxes on structural improvements and the State would lose tax revenues based on the permittee's use of federal lands. Under this alternative, all jobs directly associated with livestock grazing on the A-1 Mountain Allotment would be eliminated. Some of the jobs indirectly associated with livestock grazing on the A-1 Mountain Allotment may also be eliminated. However, most indirect jobs would likely be maintained because the need for ranching supplies and services would continue to be filled by other area ranches and individuals/businesses from the surrounding communities. Since livestock grazing does not limit recreational uses or other permitted activities on NFS lands, it is not anticipated

that the local economies would be enhanced due to increased recreational use or an increase in other permitted activities once livestock are removed.

Alternative 2- Proposed Action and Alternative 3- Current Management

As shown in Tables 18 & 19, Alternatives 2 and 3 would help maintain current jobs within the surrounding communities and revenues to Coconino County and the State of Arizona. If changes are made in the use of the A-1 Mountain Allotment in the future, contributions to State, County and local economies from fees, taxes and jobs associated with cattle grazing on this Allotment would change accordingly.

Alternative 4- Removal of South Flag Pasture

Alternative 4 would maintain slightly fewer jobs (Table 18) within the surrounding communities and revenues to Coconino County and the State than Alternatives 2- Proposed Action and Alternative 3- Current Management.

Environmental Justice

Executive Order 12898 directs federal agencies to consider Environmental Justice under NEPA. Environmental Justice requires evaluating whether a proposed action would have a disproportionately high and adverse human health or environmental effect on minority and/or low-income populations or Indian tribes, and consideration of that effect when making a decision.

Affected Environment

In Coconino County, minority groups present in a percentage greater than the Arizona state percentage are American Indian and Alaska Native persons and persons claiming two or more races. In Coconino County, the poverty level is higher than the state percentage, indicating a low-income population (EPS-HDT, 2016).

Environmental Consequences

There would be no effect related to Environmental Justice under all alternatives. Although minority and low-income populations are present, none of the alternatives would result in adverse, disproportionate effects to those groups. There is no data to suggest current ranch operations, and employment at the ranch is uniquely depended upon by any minority or low-income populations. Therefore, there would be no adverse, disproportionate effects to minority and/or low-income populations under any of the alternatives.

Agencies and Persons Consulted

This section summarizes the opportunities the public has had to be involved in this project. A list of the agencies, organizations, and individuals we contacted during scoping and other public involvement opportunities can be found in the project record. To date, you have been invited to participate in the project in the following ways.

Project Scoping

On December 21, 2015, we distributed a letter providing detailed information on the proposed action. Mailings included federal, state, and local agencies, affected organizations and individuals, and tribes. We asked for responses that included comments and concerns regarding the proposed action.

We also listed the proposed action in the Forest "Schedule of Proposed Actions" beginning January 2016, where it has appeared in each subsequent issue. We have made the proposal and associated documents available on the project website at: http://www.fs.usda.gov/project/?project=48083

Tribal Input

The Forest Service has trust responsibilities and treaty obligations that require consultation with federally-recognized Tribes. These processes are intended to strengthen relationships and promote tribal sovereignty. The Coconino National Forest, in cooperation with The Hopi Tribe, developed a Memorandum of Understanding in 2003 which outlines our responsibilities in consulting on proposed forest projects. We have initiated consultation for the A- 1 Mountain Project with representatives of The Hopi Tribe and will continue discussions according to the Memorandum of Understanding as the project progresses. We received a letter of support from the Hopi for this project, with stipulations for cultural resource protection and discovery. Resource protection measures have been developed specifically to address to provide protection measures for existing and in the event of new discoveries. We also contacted representatives of The Hualapai Tribe, The Navajo Nation, Yavapai Prescott Indian Tribe, Pueblo of Zuni, Yavapai-Apache Nation, White Mountain Apache Tribe, Tonto Apache Tribe, San Juan Southern Paiute Tribe, The Havasupai Tribe, Fort McDowell Yavapai Nation, and Pueblo of Acoma.

Other Agencies

Through the scoping process, we involved local government agencies, including Coconino County, the City of Flagstaff, the Arizona Game and Fish Department (AZGFD), Arizona State Lands Department, and neighboring US Fish and Wildlife Service offices. We notified other government agencies via the Forests' Schedule of Proposed Actions.

Appendix A: Alternatives Considered but Eliminated from Detailed Study

Alternative 3- Current Management

Specifically, Alternative 3-Current Management includes four major components: authorization, a drought management strategy, monitoring, and an adaptive management strategy.

Authorization

Under Alternative 3-Current Management, livestock grazing for the A-1 Mountain Allotment would continue under the following terms:

- Permitted livestock numbers: Permitted livestock numbers would be a maximum of 498 AUMs, which is the equivalent of 99 head of adult cattle for approximately five months. This represents a conservative stocking level that is based on existing conditions.
- Annual authorized livestock numbers: Annual authorized livestock numbers would be based on existing conditions, available water and forage, and predicted forage production for the year. Adjustments to the annual authorized livestock numbers and AUMs (increase or decrease) may occur during the grazing season, based on conditions verified by range inspections. Annual authorized livestock numbers would not exceed permitted numbers and therefore would always be between 0 and 498 AUMs.
- Permitted season of use: The permitted season of use would be June 1 through October 31.
- Grazing Management: Grazing would occur using a deferred rotation management system, which would allow for plant growth and recovery. Additional grazing management guidelines include:
    - Generally pastures will be grazed only once during the grazing season. A second grazing period of a previously grazed pasture during the grazing season will only be authorized by the Responsible Official when conditions warrant and it has been determined through range inspections that soil, water and vegetation conditions are appropriate, and that forage utilization guidelines for the pasture will not be exceeded as a result of a second grazing period.
    - In some cases pasture re-entry may be needed to facilitate livestock movement on the allotment such as trailing livestock from one pasture to another. This is not the same as a second grazing period. Pasture re-entry for livestock movement purposes will be allowed provided the livestock actively herded through previously grazed pastures.
- Forage Utilization Guidelines: Current management uses a management guideline of 35 percent forage utilization, which is considered conservative, to

maintain and improve range vegetation and long term soil productivity. Allowable use guidelines take into account the cumulative effects of wildlife and livestock.

- Seasonal Utilization: Current management strives to achieve a light to moderate seasonal utilization of 21 to 50 percent.
- Pasture Grazing Periods: Actual grazing period within each pasture would depend on current growing conditions and the need to provide for plant recovery following grazing. The length of the grazing period within each pasture would continue to be determined using seasonal utilization guidelines.

Drought Management Strategy

Region 3 and Coconino National Forest drought management policies identify numerous adaptive management actions for mitigating grazing effects during drought. Current management on the A-1 Mountain Allotment include the same drought management strategy as identified for Alternative 2- the Proposed Action.

Adaptive Management

The adaptive management strategy for Alternative 3-Currnet Management is similar to that of Alternative 2- Proposed Action with a few exceptions. As discussed earlier and depicted in Table 16, the core differences between the two alternatives are as follows:

- In Alternative 3, adaptive management will allow the grazing season to be shortened, but does not allow it to be extended or shifted.
- In Alternative 3, the adaptive management strategy does not allow for both the deferred and/or deferred-rest rotation management.
- Alternative 3 does not have an adaptive management strategy that would allow construction of new range structures to address allotment management.
- Alternative 3- Current Management does not include any new structural range improvements. Nor does it include the removal of existing structural range improvements that are no longer needed for allotment management.

Alternative 4- Removal of South Flag Pasture

The Forest Plan indicates that South Flag Pasture is suitable for livestock grazing and capability analysis indicates the entirety of South Flag Pasture can be classified as “Full Capability”. For more information, see capacity write up pages in the Range Specialist report.

The South Flag Pasture falls completely within Management Area (MA) 3, for which the emphasis in the Forest Plan is to manage the area as “open” to livestock grazing and to “manage livestock grazing at the C and D level[16]”(Replacement page, 118). Currently we

[16] Level C – Livestock grazing is controlled through structural improvements and by physically moving livestock. Long-term capacities are balanced with use by adjusting numbers of livestock. Any forage improvement is generally the result of meeting other resource objectives, such as wildlife habitat improvement. Level D – Areas under Level D management are managed intensively for livestock grazing

manage livestock at the C level. Data collected at long term monitoring plot C4, located in South Flag Pasture, indicates we are meeting desired conditions for perennial grass cover, number of perennial grass species, vegetative ground cover and composition of cool and warm season grasses.

within an overall multiple use concept. Any structural or nonstructural (forage) improvement technique may be used as long as it fits with the natural environment. Reasonable and approved management techniques are applied to sustain capacity and use at high levels.

Appendix B- Maps

The following are project area maps and are referenced within this EA.

A-1 Mountain Allotment Locator Map

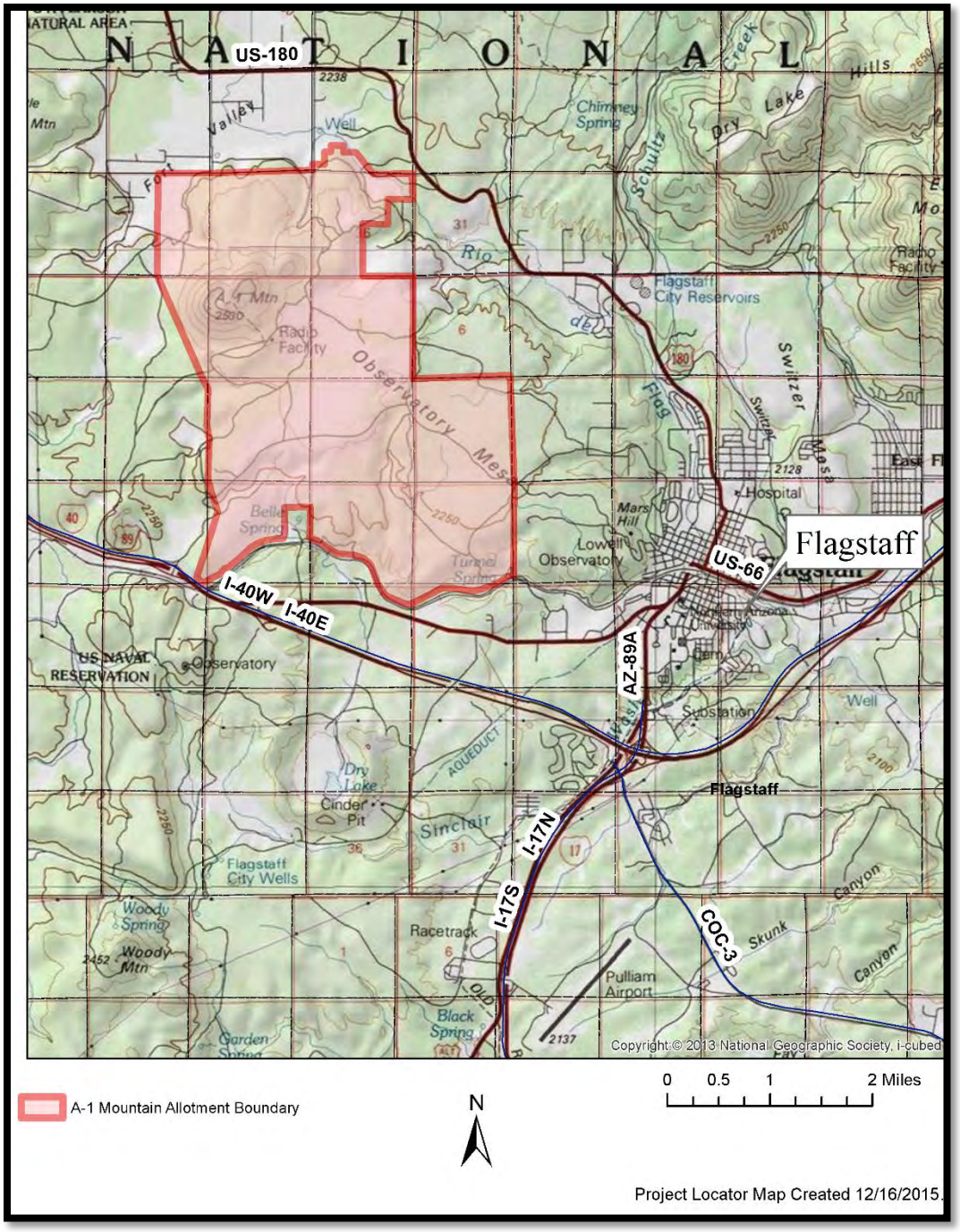

Figure 4- A-1 Mountain Allotment Locator Map

A-1 Mountain Ownership Map

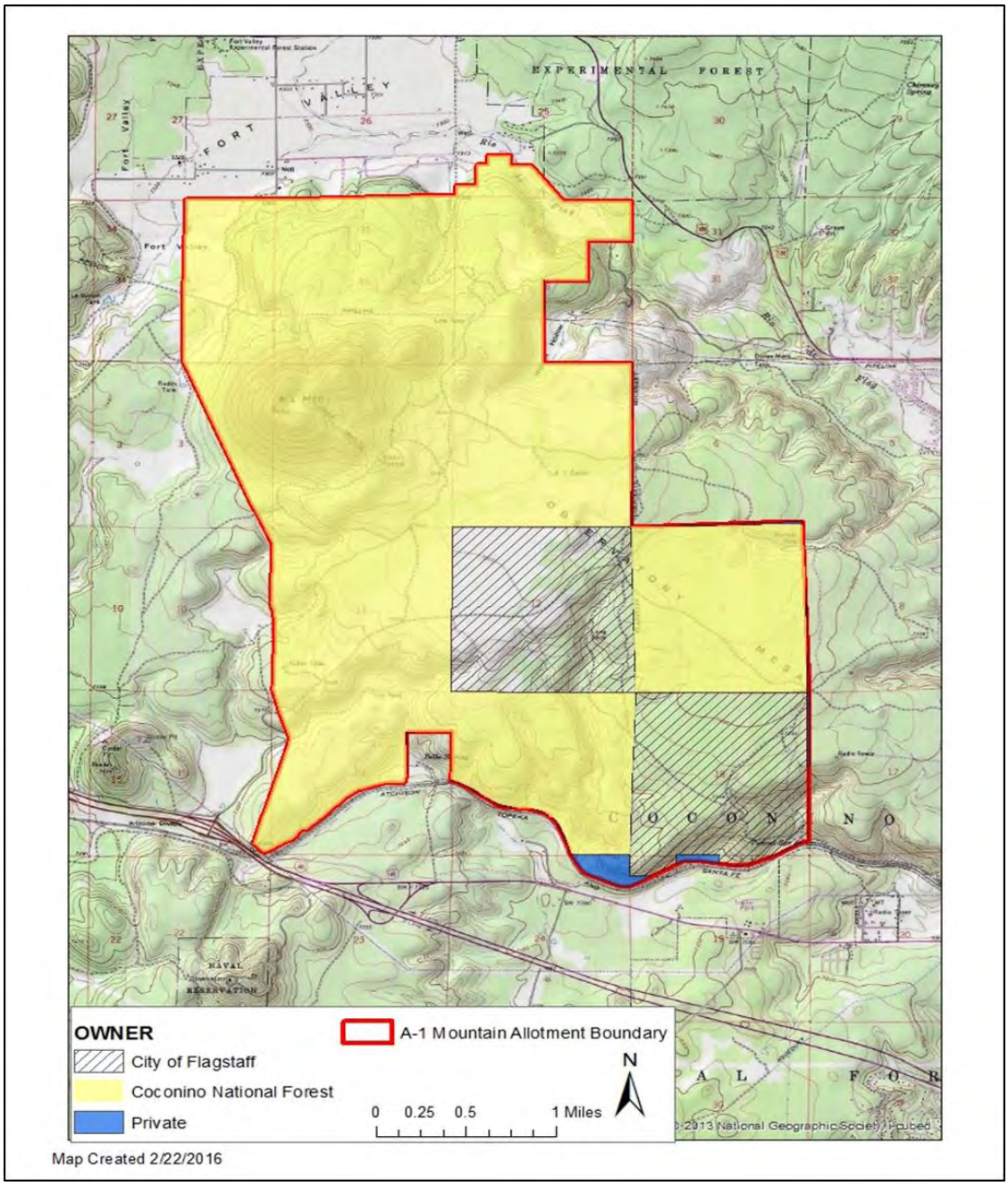

Figure 5. Ownership within the A-1 Mountain Allotment.

A-1 Mountain Pastures Map

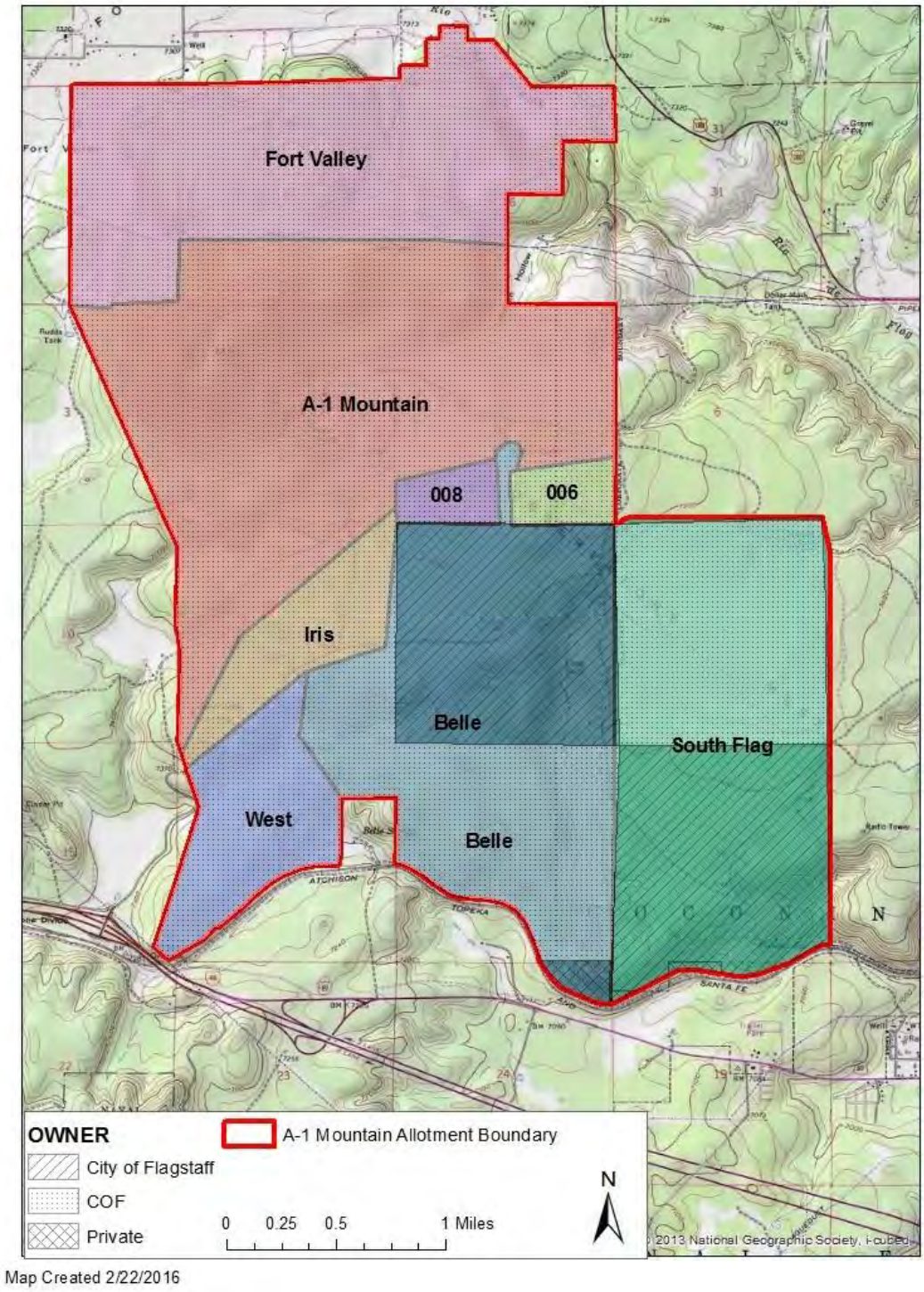

Figure 6- Existing pastures within the A-1 Mountain Allotment.

A-1 Mountain Pasture Proposed Action Map

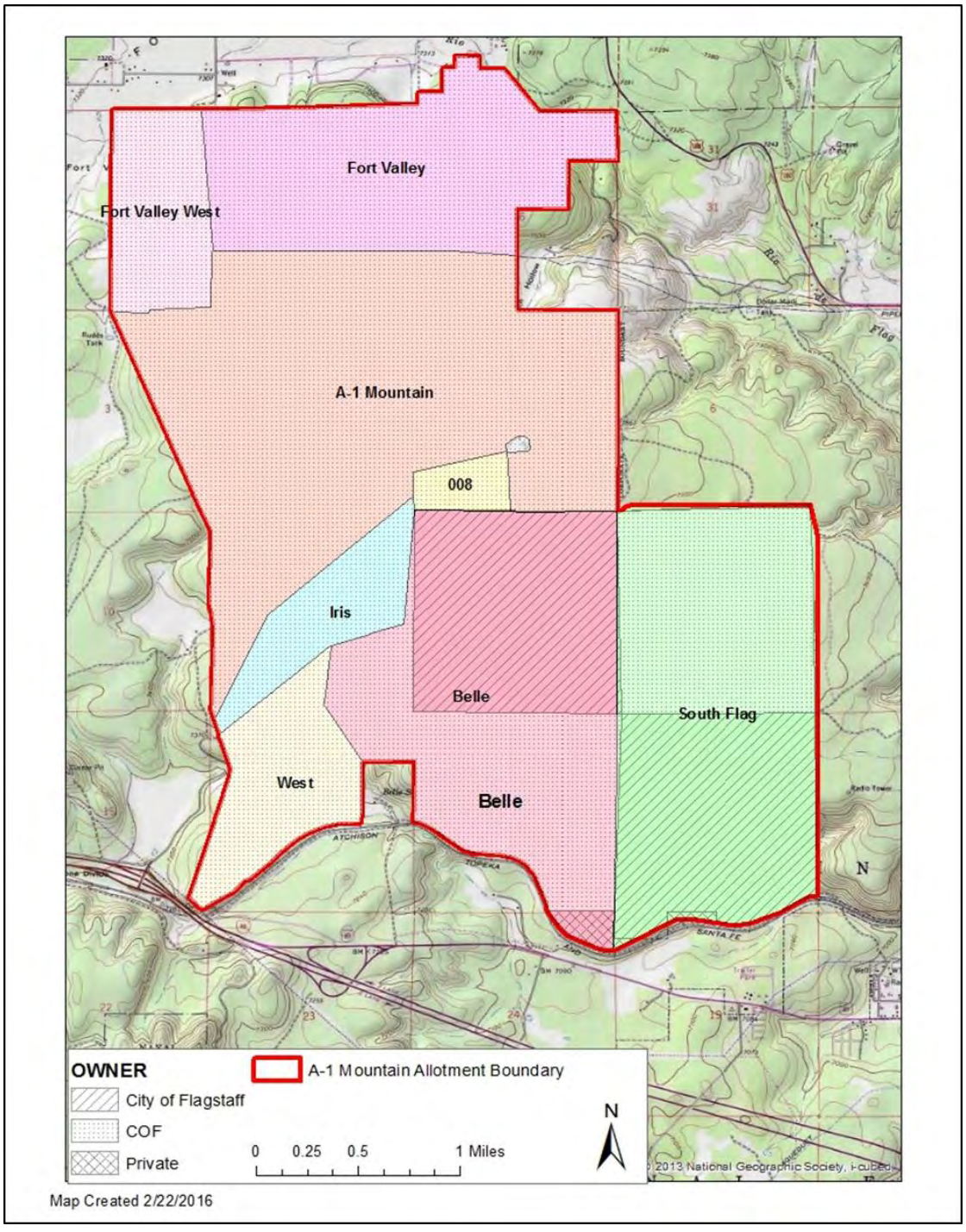

Figure 7- A-1 Mountain Allotment pastures based on Alternative 2- Proposed Action.

A-1 Mountain Allotment Proposed Action Fencing Removal Map

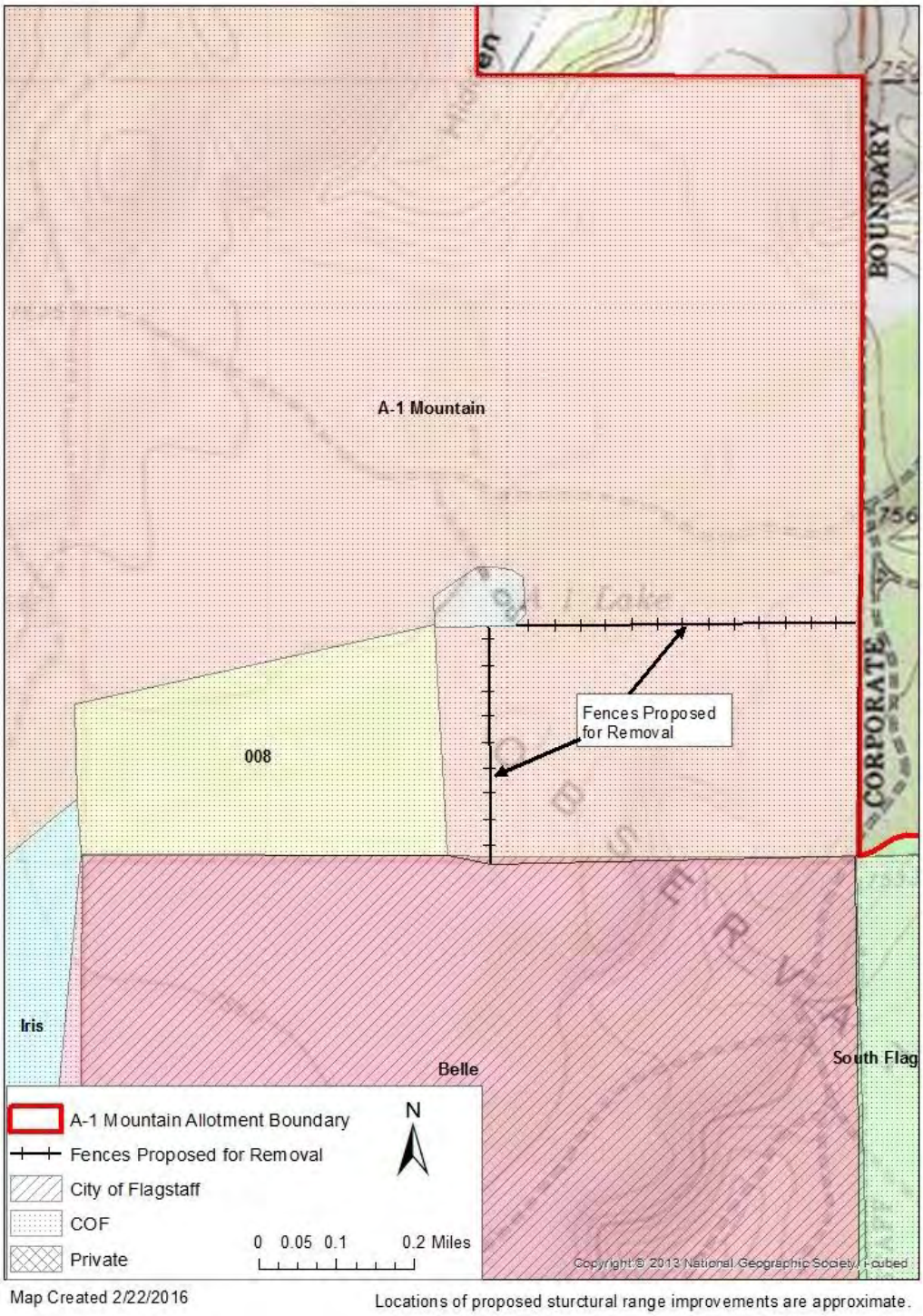

Figure 8. Section of fence to be removed under Alternative 2- Proposed Action in the 006 Pasture on the A-1 Mountain Allotment.

A-1 Mountain Allotment Proposed Action Fort Valley Fence

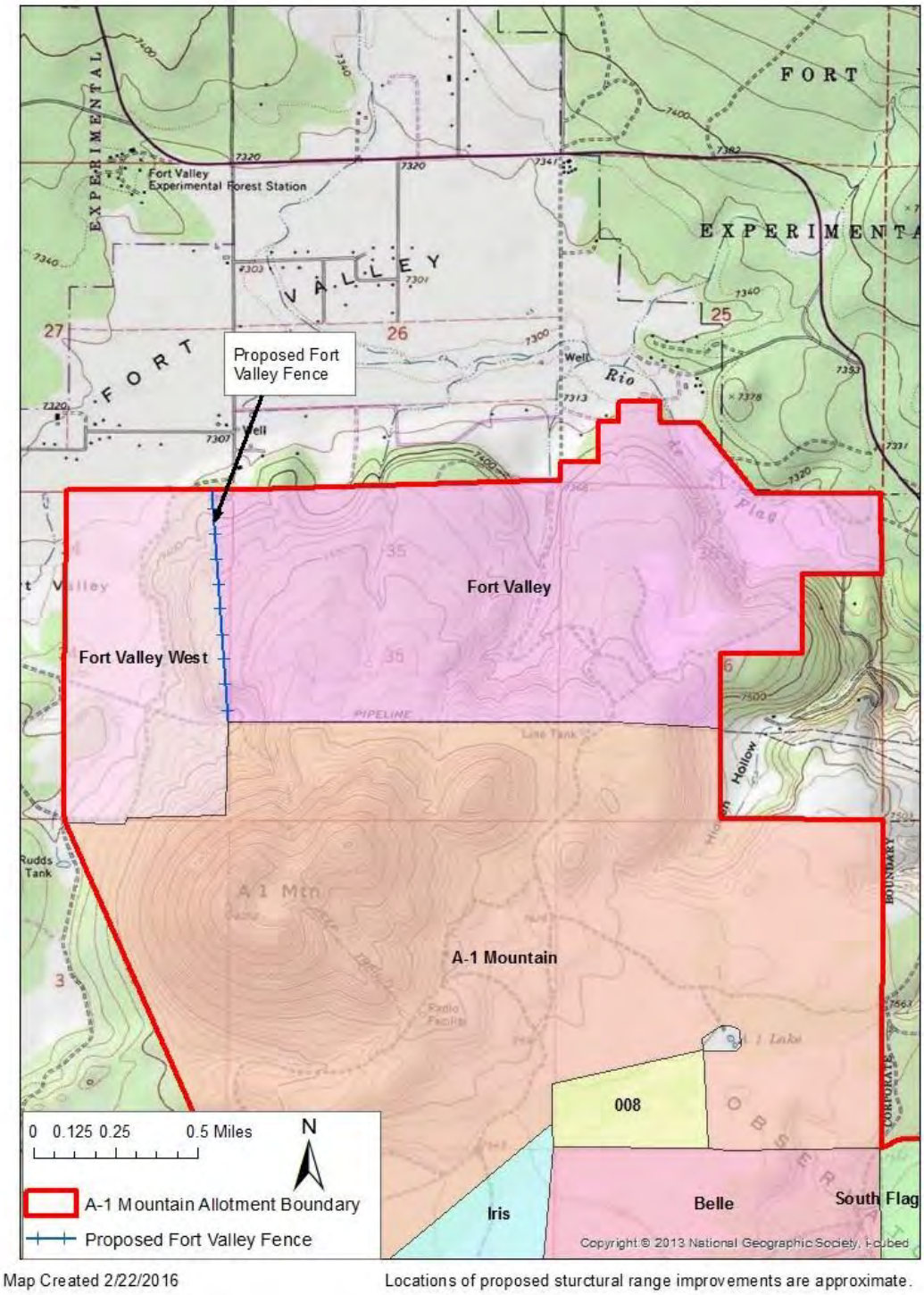

Figure 9. Location of proposed Fort Valley fence, which would bisect the Fort Valley Pasture creating a Fort Valley West Pasture.

A-1 Mountain Allotment Proposed Action Realignment of West Pasture Fence

Figure 10. Location of proposed boundary fence realignment to move fence back onto Allotment boundary.

A-1 Mountain Allotment Proposed Action Connector Fence

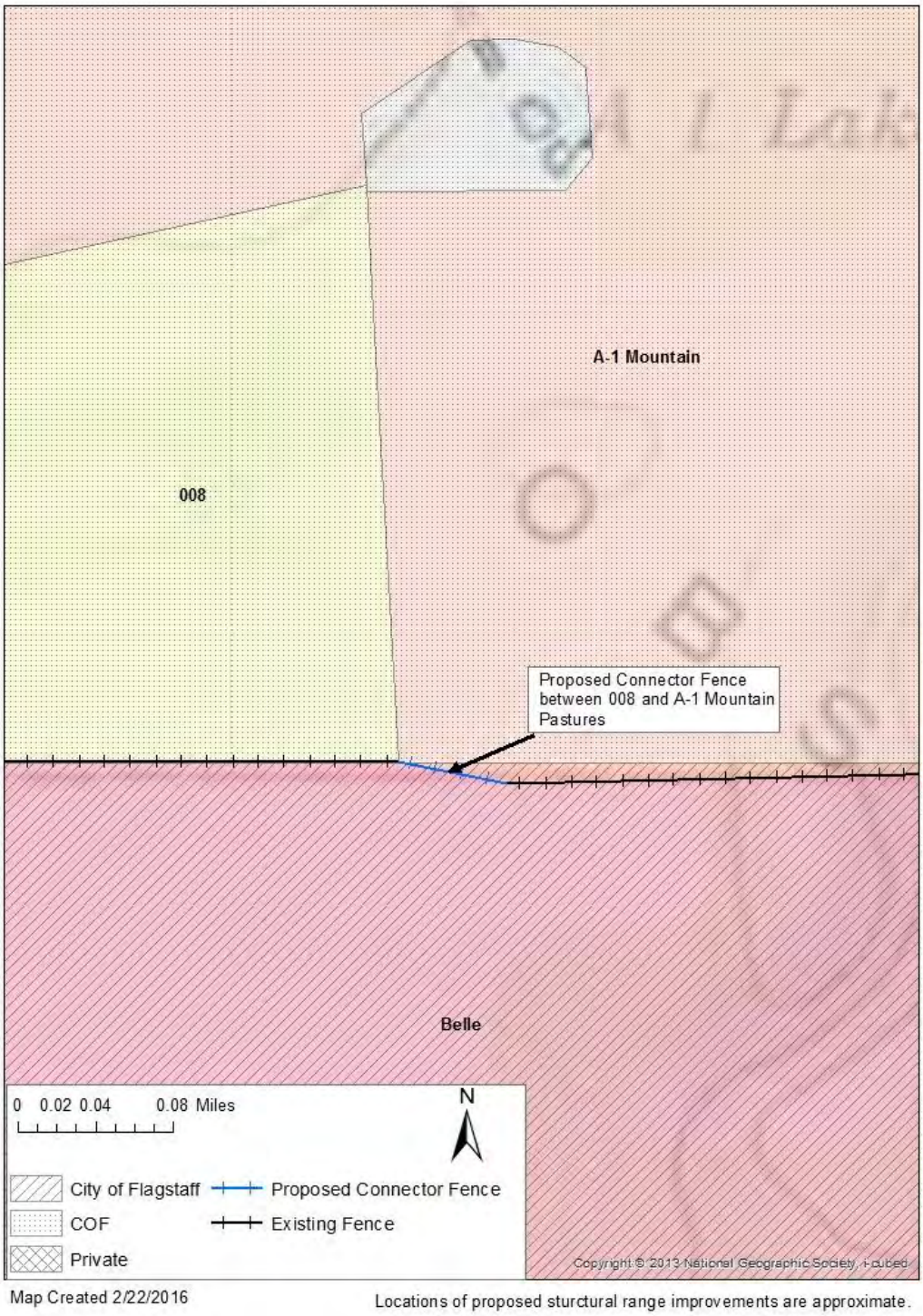

Figure 11. Location of proposed fencing along the boundary of the Belle Pasture. Proposed fencing would separate the Belle Pasture from the modified A-1 Mountain Pasture, and is being proposed to removal a water lane.

A-1 Mountain Allotment Proposed Action Corral Location Map

Figure 12. Location of corral under Alternative 2- Proposed Action.

Appendix C- Past, Present, and Reasonably Foreseeable Future Actions Considered in the Analysis

A-1 Ecosystem Management Guide EA

- Timber Project
  - A-1 Payment Unit One — Complete
  - A-1 East — Complete
  - A-1 West — Complete
  - A-1 West 2 — Complete
- All Pile Burning — Complete
- Rx Burning — On-going

Arizona Snowbowl Facilities Improvement Project

- Humphrey's Pod and Trail — Complete
- New Express Ski-lift — Complete
- Retention Pond and water supply pipelines
  - Tree clearing, pile burning — Complete

City of Flagstaff

- Hand thinning
  - The "Y" — Complete
  - Brookbank Meadow — Complete
  - Equestrian Estates — Complete
  - 2016 FWPP Units (Thinning completed, pile burn status unknown)
    - Gore West
    - WM
    - Section 18 (T21N R6E)
    - Section 8 (T21N R6E)
    - Massey
    - Linwood Jesse Gregg
    - Ferguson
    - Blakely

- Observatory Mesa - State Trust land acquisition

Coconino County

- Weather Station – Long-term permit renewal — CE Project
  Fall 2015

Eastside Fuels Reduction and Forest Health

- Hand thinning
  - Arena — Complete
    - Pile burning — Complete
- Timber Project
  - Ft. Valley Restoration Phase 1 - Stewardship Project 2001 — Complete
  - Ft. Valley Restoration Phase 1 — Complete
  - Ft. Valley Restoration Phase 2 — Complete
  - Ft. Valley Experimental Forest Station HQ — Complete
  - Ft. Valley Restoration Final Blend — Complete
- All Pile Burning — Complete
- Rx Burning — On-going

Flagstaff Loop Trail

- Trail Construction, conversion (social trail, road), maintenance — On-going

Flagstaff Urban Trail System

- Trail planning, construction, maintenance — On-going

Flagstaff Watershed Protection Project

- Timber Project
  - FWPP DLH Phase 1 — 2016 4FRI
    Task Order
  - FWPP DLH Phase 1 - Hand thin — Almost
    ready to offer
  - FWPP DLH Phase 2 — 2017 4FRI
    Task Order
- Temp Road construction for FWPP DLH Phase 1 — Contracting
- Road maintenance & improvement (FR 420) — Completed

Fort Valley Experimental Forest

- Research Projects
  - Taylor Woods (FRD personnel hand thin & pile) — Planning
  - Un-even aged Management Study — On-going
  - Chimney Springs Fire Return Interval (Riverside Fire Lab) — On-going
  - Seedling regeneration plots — On-going
  - Wood density study — On-going
  - Soil moisture study — On-going
- Snowtel site installation, equipment calibration & maintenance — Complete

Grazing Allotments (adjacent to A-1 Mountain)

- Maxwell Springs Allotment — Active
- Peaks deferred — Area
- Windmill West deferred — Area

Hart Prairie

- Timber Project
  - Hochderffer Task order — 2015 4FRI

Hunter Access to Aspen Depredation Area CE (Peaks Hunt Unit)

- Roads given seasonal designation — On-going

Jack Smith/Schultz Fuel Reduction and Forest Health Project

- Timber Project
  - Orion Timber Sale 7, 11 cut & piled — CU 2, 3, 4,
- Hand thinning
  - Schultz Creek — Complete
    - Pile burning Winter 2016-17 — Planned
  - Pit — Complete
    - Pile burning — Complete
- FWPP Demonstration Area — Finished

Kinder Morgan (El Paso) Gas Pipeline

- Facility improvement and maintenance
  - Right of way vegetation clearing — On-going
  - 2 Remediation Anomaly Digs (one on private) Project Spring 2016 — CE

Mars Hill (T21N R7E Sec. 17)

- Hand thinning
  - City of Flagstaff - thin around Lowell Observatory — Complete
- Rx Burning Complete — All IE

Mount Elden Dry Lake Hills Recreation Project — ***On Hold***

Railroad Forest Health and Fuels Reduction Project

- Timber Project
  - Railroad Timber Sale — 2015 FRD
- Hand thinning & Pile burning — Complete

Research Projects

- Hill-Wild Bill Research Plots (NAU - Dr. Moore) On-going
- Bat Study (NAU – Clarissa Starbuck; Prof. Chambers) CE Project Fall 2015

Rio de Flag Flood Control Project

- Clay Avenue Detention Basin (twice) Complete?

Special Use Permits

- NAU Park & Rec Mgmt Program – Wilderness Dependent Education Course
  - Kachina Trail #150 CE Project Spring 2016
- Wedding Planner – Outfitting and Guiding SUP CE Project Spring 2016

Suddenlink (NPG Cable)

- Facility improvement and maintenance On-going
  - Right of way vegetation clearing On-going

Transwestern Gas Pipeline

- Facility improvement and maintenance On-going
  - Right of way vegetation clearing On-going

Wildfires *(final perimeter > 10 acres)*

- Woody (Private) – 107 acres 6/14/2006
- Wing – 25 acres 6/22/2007
- Schultz – 10 acres (5 acres in HUC bdy) 7/9/2007
- Observatory – 15 acres (13 acres in HUC bdy) 10/22/2008
- Colton – 15 acres 7/5/2013

Wing Mountain Fuels Reduction and Forest Health Restoration Project

- Timber Project
  - Wing East 2015 4FRI Task order
  - Wing Mountain- Snowplay 2016 4FRI Task Order

Wing Mountain Snow Play Area

- Term Special Use Concession Operation On-going

Woody Ridge Forest Restoration Project

- Timber Project
  - Woody 04 Complete
- Pile burning Complete
- Rx Burning On-going

4FRI - FRD 5 yr Plan

- Timber Offerings
  - A-1 2017
  - Ft. Valley - Chimney Springs Not Started
- Rx Burn (*Dates subject to veg treatment completion*) Not Started
  - A-1
  - Ft. Valley
  - Ft. Valley West
  - FWPP I
  - FWPP II
  - Mars Hill Section 17
  - Maxwell Springs
  - Orion
  - Railroad
  - Wing East
  - Wing East - Leroux
  - Wing West
  - Woody - Naval

Glossary

Adaptive Management: A formal, systematic, and rigorous approach to learning from the outcomes of management actions, accommodating change, and improving management.

Animal Unit (AU): Considered to be one mature of about 1,000 pounds, either dry or with calf up to 6 months age, or their equivalent, consuming about 26 pounds of forage on an oven-dry basis.

Animal Unit Month (AUM): The amount of oven-dry forage (forage demand) required by one animal unit for a standardized period of 30 animal-unit-days. The term AUM is commonly used in three ways: (a) stocking rate, as in "X acres per AUM"; (b) forage allocations, as in "X AUMs in Allotment A"; (c) utilization, as in "X AUMs utilized in Unit B".

Carrying Capacity (Grazing Capacity): The average number of livestock and/or wildlife which may be sustained on a management unit compatible with management objectives for the unit. In addition to site characteristics, it is a function of management goals and management intensity.

Deferred Rotation Management: A grazing system that provides for a systematic rotation of the deferment among pastures to provide for plant reproduction, establishment of new plants, or restoration of plant vigor.

Deferred- Rest Rotation Management: A grazing system that provides for a systematic rotation of the deferment among pastures and in which one or more individual pasture(s), or grazing unit(s), is given complete rest from livestock grazing for an entire year. The rested pasture will be changed annually to provide all pastures on an allotment with a rest period. Provides for plant reproduction, establishment of new plants, or restoration of plant vigor.

Forage: Browse and herbage which is available and may provide food for grazing animals or be harvested for feeding.

Forage Production: The weight of forage produced within a designated period of time on a given area. Production may be expressed as green, air dry, or oven dry weight. The term may also be modified as to the time of production such as annual, current year, or seasonal forage production.

Grazing Capability: The inherent ability of an ecosystem to support grazing use by various kinds and classes of livestock while maintaining sustainability of the resource and providing for multiple uses and ecosystem services. Grazing capability of an area is dependent upon the interrelationship of the soils, topography, vegetation, forage production, and animal behavior.

Grazing Capability Classes: The four capability classes are Full Capability, Limited Capability, Potential Capability, and No Capability. The following are the main elements of the four capability classes.

Full Capability (FC): Full Capability areas are those which can be used by grazing animals under reasonable and proper management while maintaining or moving towards desired conditions. Areas with satisfactory soil condition are normally assigned a grazing

capability class of FC. Although exceptions may occur, slopes of 0-15 percent are commonly considered FC.

Limited Capability (LC): Limited Capability areas have some natural characteristic(s) that limits the capability of these areas for grazing; however, these characteristics do not totally prevent the area from being utilized by some level of grazing. Common situations of limited capability include slopes usually in excess of 40 percent but in some situations could be less and/or some areas with inherently unstable soils. These areas may or may not be low forage producing areas. Although these areas may have some inherent characteristics that limit the grazing management opportunities they may be functioning normally considering characteristics for the site. The limitations in these areas are naturally occurring; management will not change these limitations. However, with prudent management these areas can provide forage for livestock. Specific management of these areas may include additional impact-mitigating infrastructure, shortened grazing times, and monitoring to ensure limiting characteristics are not exacerbated by grazing management. Generally, limited grazing capacity is estimated for these areas, depending upon the degree of limitations present (Holechek, 1988). However, in some situations no grazing capacity may be assigned to limited capability areas. Interdisciplinary teams will assess local landscapes, and consistency with local directions such as Land Management Plans to determine the appropriate capacity analysis. The Coconino National Forest Plan (1987, as amended) limits the assignment of Full, Limited and Potential Capability to acres with slopes equal to or less than 40 percent; therefore acres with slopes greater than 40 percent have been assigned No Capability. No other acres were identified as Limited Capability by the resource specialists for the A-1 Mountain Allotment.

Potential Capability (PC): Potential Capability areas are those which can be used by grazing animals under proper management but where such factors as available water, livestock access, management infrastructure, and sufficient vegetative ground cover and or forage production are currently lacking. Soil condition may currently be impaired or unsatisfactory, however with proper management satisfactory soil condition could be achieved. These areas may also be in satisfactory soil condition, however are presently not usable by livestock due to limitations such as lack of water, current accessibility or current poor distribution of livestock. These areas are different than Limited Capability because management may provide opportunities for change in the grazing capability classification.

No Capability (NC): No capability areas are those which are inherently inaccessible to livestock or cannot be used by livestock under reasonable management while maintaining or moving towards desired conditions. Often, these areas produce low amounts of forage, are barren, consist of rock outcroppings and/or are otherwise inaccessible to livestock. No capability areas often correlate with areas termed unsuited or inherently unstable in some TES and TEUI publications. They are typically classified as unsuited or inherently unstable due to the relationship of soils, vegetation and topography with slopes above 60 percent. Low forage producing sites or barren sites may also be classified as NC regardless of slope.

Grazing Capacity: See Carrying Capacity.

Impaired Soil Condition: Impaired soil condition indicates soil functions have been reduced. Management practices need to be evaluated to determine if current practices are responsible for the decline in soil function. Proposed management will be evaluated on the likelihood of continued declining soil conditions and be adapted to improve soil condition.

Key Area: A relatively small portion of a management unit selected because of its location, use, or grazing value as a monitoring point for grazing use. It serves as a monitoring and evaluation point for range condition, trend, or degree of grazing use. Properly selected key areas reflect the overall acceptability of current grazing management over the rangeland. A key area guides the general management of the entire area of which it is a part.

Litter: The uppermost layer of organic debris on the soil surface; essentially the freshly fallen or slightly decomposed vegetal material.

Litter (Effective): USFS Region 3 considers a litter thickness of 0.5 inches or greater to be effective at reducing erosion (Robbie, 2013).

Management Intensity Levels (grazing): Management intensity levels refer to how livestock are managed on the ground (e.g. use of fencing or day herding livestock). This term does not refer to forage utilization levels or seasonal utilization levels. The Coconino National Forest Plan identifies 5 grazing management intensity levels:

Level A: Livestock grazing is eliminated or restricted to situations where it will meet other resource objective, such as fuel hazard reduction in recreational area. Areas managed under Level A are not counted in determining livestock forage capacities.

Level B: Livestock grazing is very limited. Management is generally accomplished by moving livestock from one place to another. Capacity and actual use are kept in balance by removing or adding livestock. There is very little structural improvement work done, such as fences or water development, and no forage improvement work, such as seeding.

Level C: Livestock grazing is controlled through structural improvements and by physically moving livestock. Long-term capacities are balanced with use by adjusting numbers of livestock. Any forage improvement is generally the result of meeting other resource objectives, such as wildlife habitat improvement.

Level D: Areas under Level D management are managed intensively for livestock grazing within an overall multiple use concept. Any structural or nonstructural (forage) improvement technique may be used as long as it fits with the natural environment. Reasonable and approved management techniques are applied to sustain capacity and use at high levels.

Level E: Level E management is applied to areas to achieve the maximum livestock production capacity that the land can support. Any management technique can be applied as long as basic watershed values are protected. Some management activities, such as irrigating or large scale planting of non-native grass species, may change the natural character of the land. It could include high intensity – short duration grazing systems, but his in not a necessary prerequisite for Level E management.

***Rest- Rotation Management*:** A grazing management system in which an individual pasture(s), or grazing unit(s), is given complete rest from livestock grazing for an entire year. The rested pasture will be changed annually to provide all pastures on an allotment with a rest period. Varies from deferred- rotation management in length of time the area is not grazed by livestock: 12 months rather than a portion of the growing season.

Satisfactory Soil Condition: Satisfactory soil condition indicates soil functions properly and maintains inherent productivity.

***Seasonal Utilization*:** The percentage of the forage produced in the current season to date of measurement that has been consumed or trampled by animals. It is a comparison of the amount of herbage left compared with the amount of herbage that has been produced to the date of the measurement. Seasonal Intensity/seasonal utilization is measured at the end of the grazing period. Seasonal intensity/seasonal utilization differs from forage utilization because it does not account for subsequent growth of either the ungrazed or grazed plants.

***Suitability*:** "The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices," (36 CFR 219.3).

***Trend*:** The direction of change in resource value ratings or attributes as observed over time. Trend is usually described as up (moving towards meeting objectives), down (moving away from meeting objectives), static, or not apparent. Apparent trend is an interpretation of trend based on observations and professional judgement at a single point in time. Measured trend is quantitative changes in vegetative or soil conditions over time, which can be measured in terms of plant communities or resource values.

Unsatisfactory Soil Condition: Unsatisfactory soil condition indicates a loss of soil function. These soils have degraded to a point that, for most ecosystems rest or deferment from grazing alone will not likely allow them to recover their function in a reasonable time period.

Utilization: The proportion or degree of current year's forage production that is consumed or destroyed by animals (including insects) compared with the total amount of forage produced during the year. Utilization is measured at the end of the growing season when the total annual production can be accounted for and the effects of grazing in the whole management unit can be assessed.

Utilization Guidelines: Guidelines intended to indicate a level of use or desired stocking rate to be achieved over a period of years.

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Commenter	Comment Number	Comment	District Response
Burgess	B1	On page 7 of the EA, wherein you discuss your proposed action, you say that you are proposing to maintain the currently permitted maximum of 498 animal unit months (AUMs), the equivalent of 99 head of adult cattle for about five calendar months per year. But on page 20 it shows that the actual use of this allotment has been much lower than this for the last decade, averaging only about 51% of the permitted numbers. Since range conditions on the allotment were found to be satisfactory with this reduced level of use, why do you think it's appropriate to continue to permit more cattle than the average recent actual use, especially considering the large number of elk that also grazing the allotment?	Starting on page 27, the EA explains the process of determining the estimated grazing capacity of the allotment. Grazing capacity is a function of grazing capability, forage production, topography, allowable use, and the level of management that may be applied. A spreadsheet-based analysis for determining the estimated grazing capacity has been provided in Appendix C of the Range Specialist report. Page 7 of the EA also states that annual authorized livestock numbers would be based on existing conditions, available water and forage, and predicted forage production for the year. Figure 1 on page 20 of the EA reflects the variability in annual authorized livestock numbers that has occurred on the allotment over the past 10 years in response to climatic conditions and other considerations. Permitted livestock numbers represent the maximum number of livestock that would be authorized on the allotment for the permitted season of use. Whereas annual authorized livestock numbers represent the level of stocking that is appropriate for the allotment given the resource conditions and operational needs of the permittee for a particular year. Limiting the permitted livestock numbers to actual use that occurred in the past decade does not account for potential forage improvements that may occur from optimal livestock management nor does it allow for flexibility in situations where there is favorable climate or forage growth. Estimated grazing capacity takes wildlife into consideration and represents the ability of Full Capability lands to provide forage for wildlife and livestock use (EA, pp. 28). On the A-1 Mountain Allotment, estimated elk use is approximately 250 AUMs. When combined with the maximum permitted livestock use of 498 AUMs is less than the estimated grazing capacity for the A-1 Mountain Allotment by approximately five percent.
	B2	Another issue is the suitability of this allotment for livestock grazing, an issue that federal law requires you to evaluate.	This comment is outside the scope of this project. Rangeland suitability determinations are done at the Forest Plan planning level, not at individual project levels (FSH 2209.13 91). The A-1 Mountain Allotment has been determined as suitable for grazing under the existing Forest Plan.

	B3	The EA explains the City of Flagstaff questioned the grazing suitability of the allotment's South Flag Pasture, which is adjacent to [c]ity land on three of its four sides. The [c]ity believed continuing to graze it would create "numerous management issues" and would conflict with the "philosophical mission of providing protected open space for the Flagstaff community". They also worried it had the "potential for exacerbated resource degradation on City lands, " by facilitating the spread of invasive species, inflicting soil disruption and erosion, negatively affect wildlife behavior, and causing damage on [c]ity lands from trespassing livestock due to the allotment's "limited fencing." Obviously, these are valid concerns - but you rejected them. You explained that most of these concerns would be addressed by specific resource protection measures and best management practices regularly employed by your agency.	Pages 14-16 of the EA discusses how BMPs and resource protection measures will be implemented. Grazing has been actively managed within this allotment since the early 1900s. As a result, the baseline conditions used for this analysis included the effects of grazing this allotment. We believe we have addressed the City's concerns and reviewed them as can be found starting on page 17 of the EA. The removal of the South Flag Pasture has been reviewed as an alternative that was ultimately removed from further consideration (§1502.14[a]). As stated on page 19, "the closing and subsequent removal of the South Flag Pasture from the A-1 Mountain Allotment is within the range of activities between Alternative 1- No Action and Alternative 2- the Proposed Action, and as such will not be analyzed as a separate alternative." Furthermore, a more detailed discussion of Alternative 4- Removal of South Flag Pasture is located in Appendix A: Alternatives Considered, But Removed from Detailed Study.
	B4	You also pointed out that Arizona's open range law requires the city to fence the cattle out if they don't want them trespassing on city land. [y]ou appear to be employing a double standard in regards to the fencing for this allotment. Your proposed action calls for the construction of three new fences, the relocation of another fence, the removal of a fence, and a plan to build another fence in the future, if it turns out to be necessary, in order to better manage the cattle. It seems that you have no problem with fences – as long as they benefit the grazing permittee's cattle operation.	Federal courts have rendered decisions (Shannon v. United States, l60 Fed. 870 (Cir. 9 1908); Light v. United States, 220 U.S., 523; United States v. Gurley, 279 Fed. 874 (N.D. GA. 1922); United States v. Johnston, 38 F. Supp. 4 (S.D.W.VA. 1941)) holding that the United States is not required to fence its lands to protect them against unauthorized livestock or to control the livestock permitted to graze on the National Forest (FSM 2230.6). In essence, the United States is not responsible for intrusion of permitted livestock upon private lands or for the settlement of controversies between the owner of the livestock and the owner of the land. In discussing Arizona's Open Range Policy we are providing information that is readily available on the Coconino County web page regarding fencing requirements. The proposed fencing is needed to better facilitate livestock management activities on the allotment such as to improve forage utilization, and to protect and manage resources.
	B5	The EA explains that removing the South Flag Pasture from the allotment would decrease the permitted number of cattle on the allotment by a mere 15 head, which would still permit many more cattle than the average recent actual use of the allotment	See response to B1.

	B6	Furthermore, there isn't any mention in the EA of how much all of this proposed fence work would cost, or who would pay for it. It's important to know if the taxpayers are going to get stuck paying for it because, if they are, the expense should be justified in relation to the number of cattle using the allotment.	The Forest Service provides materials, while the permittee is responsible for providing the labor to install, construct, and maintain the structural range improvements (Forest Plan, replacement page 67). Funding for materials comes in the form of Range Betterment Funds and are generated through annual grazing fees paid by the permittee. Approximately 50 percent of the grazing fee receipts are applied to this fund (see FSM 2241.11 for more information on the Range Betterment Fund). See economic analysis in Environmental Assessment for more information.
	B7	There's precedence for this analysis [fence] elsewhere on the Coconino National Forest. Last month your Red Rock Ranger District issued a proposal to permanently retire the Ike's Backbone allotment because it's unsuited for livestock grazing. One of the primary reasons they decided the allotment should be retired is because the amount of money it would cost to build all the fences and livestock waters required to adequately manage cattle on the allotment would be about 75 times the amount of income the permittee would generate from grazing cattle there.	The Ike's Backbone Allotment is not comparable to the A-1 Mountain Allotment as existing conditions within the two project areas are very different. The economic feasibility of the Ike's Backbone Allotment is also very different from that of the A-1 Mountain Allotment. The Ike's Backbone Allotment analysis has shown that the allotment is proposed for closure to livestock grazing because it is not feasible for grazing or Forest Service administration of livestock grazing. This is due to topography, steep slopes, and a very limited amount of available forage. In addition, the Ike's Backbone Allotment would require an extensive amount of new fencing (over 8 miles) to protect resources including sensitive streamside areas and designated wilderness, none of these elements are present in the A-1 Mountain Allotment. Furthermore, Ike's Backbone Allotment has not been grazed for 15 years which has contributed to the deterioration of the existing range infrastructure, which would impose additional costs and challenges associated with reinitiating grazing on the allotment. There is also very little interest in the ranching community to graze within the Ike's Backbone Allotment due to the amount of fencing and water development that would be required to make the allotment useable.
	B8	[w]hat is the total cost of all the fence work you have proposed for the A1 Mountain allotment? Will the taxpayers have to pay for it in the form of Forest Service range betterment funds or an Environmental Quality Incentives Program (EQIP) grant?	This information is included in the original economic analysis, and is included in the project record for review. Also see the response for B6 on Range Betterment funding. The EQIP program is administered by the Natural Resource Conservation Service and as such, the potential use of that program is outside the scope of this project.
	B9	[w]hat is the ratio of this expense compared to the estimated income this allotment will generate under your proposed action?	We do a cost benefit analysis which factors in expenses to the agency and expenses to the permittee. This analysis is included in the Range Economic Analysis Report, as part of the project record and on the project's website.
	B10	Thank you for this opportunity to participate and please keep me updated on the status of this, and all of your livestock management projects	Mr. Burgess will be notified of the final EA and start of the objection filing period.

Malouff	M1	In the EA, the U.S Forest Service Identifies five (5) resource concerns: 1. Enhanced Flexibility in Allotment Management 2. Reduce Unneeded Structural Range Improvements 3. Improve Allotment Management 4. Ensure Cultural Resources are Protected 5. Ensure Accuracy with Pasture Boundaries	Thank you for your comment and for supporting the A-1 Mountain Range Management Project planning effort.
	M2	After reviewing the document, my family and I feel that Alternative 2 best addresses the resource concerns identified. By not only allowing for the grazing season to be shortened, but also to be extended or shifted, Alternative 2 allows for greater flexibility to meet the desired conditions in response to changing ecological and climatic conditions.	Thank you for your comment. We agree that Alternative 2 provides the greater flexibility in meeting our desired conditions.
	M3	The proposed new structural range improvements and removal of non-essential range improvements will ensure the accuracy of pasture boundaries, improve allotment management and enhance the flexibility for allotment management.	Thank you for your comments and for supporting the A-1 Mountain project. The activities you have identified are key to Alternative 2, our preferred alternative.
	M4	Ensuring that pasture boundaries are accurately aligned will mitigate any future disputes between land users.	We agree that ensuring properly aligned boundaries is important to properly managing our resources and reducing potential conflicts between uses of the National Forest.
	M5	The proposed activity will help my family to more equally distribute utilization across the allotment, as well as defer pastures when necessary. More equitable distribution of utilization will help in maintaining the vigor and reproductive capability of forage species on the allotment.	Alternative 2-proposed action does provide for greater allotment management through the proposed improvements and management plan.
	M6	By maintaining the health and vigor of the forage species present, it will be more difficult for noxious, invasive and other non-desirable species to become established.	Thank you for your comments and for supporting the A-1 Mountain project
	M7	The proposed monitoring plan meets all the criteria for monitoring put forth by the U.S. Forest Service. The attributes identified for monitoring will help in the determination of range readiness and the timing of grazing rotation.	Thank you for your comments and for supporting the A-1 Mountain project
	M8	Also, the proposed monitoring will help identify if any changes in management need to be made before any serious long term negative effects occur.	Monitoring plans, as you indicate, are key to being able to manage resources and make modifications to protect those resources.
	M9	The proposed monitoring plan will further help to ensure that any cultural resources that may be present are protected.	The protection of cultural resources is of the upmost importance to the District and the Forest, and we believe that the resource protection measure included with Alternative 2 will ensure the protection of these valuable resources.

	M10	By monitoring that utilization does not exceed the established conservative levels and ensuring that extensive soil compaction only occurs in the vicinity of livestock water sources, soil stability should not become a problem.	Thank you for your comments and for supporting the A-1 Mountain project. Effects to soils are discussed on page 78 -87.
	M11	Maintaining soil stability will contribute to any undisturbed cultural resources remaining undisturbed.	Thank you for your comments and for supporting the A-1 Mountain project.
	M12	The extensive research executed in the compilation of this document clearly illustrate that livestock grazing is consistent with the goals, objectives and the standards and guidelines of the Coconino National Forest Plan.	Thank you for your comments and for supporting the A-1 Mountain project. The Forest Plan is our guiding document for land management planning. As such it is important that we are able to illustrate the connection between our project and the Forest Plan. We are always working to make this connection better. Your comments help use to do that.
	M13	As for the concerns put forth by the City of Flagstaff, all of their questions regarding the establishment and spread of invasive species and the impacts to sensitive wildlife populations and habitat are answered in this document and clearly addressed in Alternative 2.	Thank you for your comments and for supporting the A-1 Mountain project.
	M14	It is my opinion that their {City of Flagstaff} desire to have the South Flag Pasture excluded from livestock grazing does not arise from any ecological concern based on substance, but simply from an unwillingness or fiscal inability to construct and maintain infrastructure enclosing their property.	Thank you for your comments and for supporting the A-1 Mountain project.
	M15	Furthermore, by forcing the U.S. Forest Service to exclude grazing from the South Flag Pasture and refusing to construct boundary fencing the City is increasing the amount of property it controls and has access to without providing compensation to the Federal Agencies and individuals involved.	Thank you for your comments and for supporting the A-1 Mountain project.
Sierra Club	SC1	Please accept these comments on the proposal on behalf of the Sierra Club's Grand Canyon (Arizona) Chapter and our more than 40,000 members and supporters, including many members and supporters in northern Arizona. Sierra Club is one of the oldest grassroots environmental organizations in the country. Sierra Club's mission is "to explore, enjoy, and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; and to educate and enlist humanity to protect and restore the quality of the natural and human environments." Our members use and enjoy the lands affected by the A-1 Mountain Grazing Allotment and have a significant interest in its management.	Thank you for your comments.

	SC3	Livestock grazing is not a sustainable use for this land and we suggest that the Alternative 1 - No action be selected.	Based on the analysis in the EA and a review of comments, the Deputy District Ranger, who is the deciding official for the A-1 Mountain Allotment will make the final determination/selection on whether to authorize the proposed project and alternatives, and the degree to which it will be implemented. Grazing has been identified as a sustainable activity on National Forest lands through the Multiple Use Sustained Yield Act of 1960.
	SC4	Since this area is under threat of catastrophic wildfire and some portions have had fires and/or will be treated through the Flagstaff Watershed Protection Project (FWPP) and Four Forest Initiative (4FRI), it is imperative to let this allotment rest.	Prior to authorizing livestock use, allotment conditions are, and will continue to be, assessed to determine the appropriate level of stocking for a given year. As stated on Page 7 of the EA, "Annual authorized livestock numbers would be based on existing conditions, available water and forage, and predicted forage production for the year. Additionally, on page 12 of the EA "Forest Service personnel assess range readiness prior to the start of the grazing season to determine if vegetative conditions are ready for livestock grazing." And on page 13 of the EA, "Forage production assessments will be made to determine stocking levels for the grazing season and will also be used during the grazing season to determine if adjustments in the stocking level should be made. If resource conditions are compromised, adjustments will be made to the annual authorized livestock numbers (EA, pages 7-8) and various adaptive management actions (EA, pages 10-11) would be utilized to mitigate grazing effects.
	SC5	Forest restoration should not be done to further the purposes of livestock grazing.	This comment is outside the scope of this project because both 4FRI and FWPP have different project objectives and purposes and needs. 4FRI is a landscape restoration based project, while FWPP is a fuels reduction based project, and A-1 is a grazing authorization project. Please refer to the 4FRI and FWPP EISs for a detailed analysis of the effects of grazing with relation to these projects. Information regarding both these projects are available on the Coconino National Forest webpage, http://www.fs.usda.gov/coconino/?project=34952
	SC6	This environmental assessment (EA) described that we are in period of increased aridity and grazing does not help the landscape thrive. *One factor contributing to changing and uncertain conditions in the southwest is climate, which is a major contributing factor affecting range condition and trend (Periman et al., 2009). This is because of its ability to effect the vitality and productivity of range plants. Climate model projections for the southwest United States predict average temperatures will continue to rise as will the potential for an increase in the frequency of extreme heat events (Crimmins et al., 2007). As temperatures increase, drought will likely increase and intensify (USDA, 2012).* EA Page 4	Citation taken out of context. The EA discusses the uncertainty of conditions in the southwest and how climate can be a contributing factor to this uncertainty. Specifically, we discuss the relationship between increased temperatures and decreased precipitation, and how when combined they could lead to lower plant productivity and cover, which in turn, would decrease litter cover (EA, p.4). To address these concerns we are proposing an adaptive management strategy, which would incorporate more flexibility in allotment management. This includes the Drought Management strategy developed for Region 3 and the Coconino National Forest (EA, p 10).

	SC7	The EA implies that a different burn regime would be implemented under 4FRI due solely to the presence of cattle than what would otherwise be undertaken. It states that burns would be conducted “to limit impacts to Allotment grazing management” (p. 55). Restoring forests and then managing them with a preference for cattle grazing seems to contradict the spirit of 4FRI.	The treatment activities identified under the 4FRI FEIS overlap with the A-1 Mountain project area. As such we reviewed the potential effects (40 CFR 1508.7; FSH 1909.15 10 15.1) from the two projects in our cumulative effects analysis section (EA, pp. 54-56). 4FRI has designed project specific mitigation measures to reduce the potential effects of those treatments. Project specific mitigation refers to considering timing of treatments and not a "different burn regime." Coordination between livestock grazing activities and fuels and/or restoration treatments is done to better coordinate project activities across resource areas, and ultimately to reduce effects to multiple resources, and not to favor any one resource over another. By coordinating burn plans with the timing of grazing we can ensure that sufficient forage exists for permitted livestock, that an area will have suitable fuels to help carry fire and achieve the desired conditions while also allowing other resources to continue to operate.
	SC8	[o]n the issue of climate change, more greenhouse gas emissions come from the raising of livestock (51% of global emissions) than from any other source (including the entire transportation sector – 13%). Given that the Forest Service has made it a priority to mitigate the effects of climate change (including in this EA), the policy of continuing to allow livestock to be grazed on public Forest Service land seems contradictory.	It is not clear the source of your information, but in reviewing the EPA's *Inventory of the U.S. Greenhouse Gas Emissions and Sinks: 1990- 2014 (https://www.epa.gov/sites/production/files/2016-04/documents/us-ghg-inventory-2016-main-text.pdf)* report we found that agricultural sector as a whole is responsible for 8.3 percent of the total U.S. greenhouse gas emissions (p. 5-1).This is significantly lower than any other sector including transportation which accounts for 26 percent of the total. We would be interested to review your sources for comparison with what the EPA has documented.
	SC9	Allowing livestock grazing is (with respect to the issue of climate change) going to do nothing but add to an already growing problem that the Forest Service is trying to address.	Climate change is specifically discussed on pages 37- 38 in the EA, and throughout the document's effects analysis section also see response to SC6
	SC10	Continuing to allow grazing will undermine these efforts and it makes no sense to spend money to address a problem while at the same time exacerbate that problem.	The No Action alternative responds to this concern, also see response to SC6
	SC11	Livestock grazing promotes the spread of invasive non-native species that also play a role in unnatural fire conditions.	The IDT has identified effects to resources, such as the effects of grazing on the establishment and spread of invasive species, through the effects analysis done in the Environmental Impacts of the Proposed Action and Alternatives section of the EA. The invasive species specialist report provides an in-depth analyzes grazing effects on invasive species populations. Mitigation measures for these effects are part of the Proposed Action (page ____ of the EA).
	SC12	The Invasive Plants Specialist Report underestimates the impact of livestock grazing and the spread of non-native invasive plant species.	See response to SC12.

	SC13	Livestock promote the spread and colonization of alien plants, which can increase fire frequencies (Billings 1990, Billings 1994, Rosentreter 1994, Belsky and Gelbard 2000). Disturbance is a reliable indicator of alien dominance in vegetation composition, and livestock grazing is a significant disturbance (Brooks and Berry 2006).	See response to SC12.
	SC14	Further, weed invasions are strongly associated with livestock watering sites (Brooks et al 2006).	The article referenced *Effects of livestock watering sites on alien and native plants in the Mojave Desert, USA, i*s specific to arid and semi-arid plant communities like those of the Mojave Desert. The findings of this study cannot be directly compared to the vegetation conditions within the A-1 Mountain Allotment. As stated by the authors on page 140, "The variable responses that have been reported for alien plant species within piospheres may be due to the influences of environmental and land-use factors other than disturbance from livestock grazing. For example, interspecific interactions among the unique combinations of species present at each study site may produce differing responses, especially between sites with and without certain highly competitive plant species. Unique combinations of environmental conditions, land use histories, and different types of livestock may also produce differing responses among study regions. The life history characteristics of the invasive species and the recentness of their invasion may influence their spatial distributions within piospheres. Since these factors will always vary, it may be difficult to reliably predict the distributions of alien plants within piosphere gradients". Furthermore, the proposed action includes resource protection measures to monitor, identify, and treat invasive species populations to minimize the establishment and spread of invasive species that could occur near watering areas as a result of livestock grazing.
	SC15	The EA should include additional discussion of this impact on the vegetation communities, subsequent effects to wildlife, or the changes in fire regimes that this can create. While the land included in the A-1 Grazing Allotment is not desert, catastrophic wildfires in Arizona and California's desert have been linked to weed invasions. Altered fire regimes and weed invasions have deleterious effects on wildlife habitat. When weeds dominate biomass production in both wet and dry years, it can be assumed that weeds will more successfully colonize new areas over time (Brooks and Berry 2006). The dominance of weeds during even exceptionally dry years indicates that drought disproportionately increases competition between wildlife and livestock for native annuals in these seasons.	The IDT provided an analysis of effects starting on page 48 of the EA, under the Environmental Impacts of the Proposed Action heading. This includes analysis and disclosure of effects to vegetation, wildlife, and fire risk. Existing conditions for weeds are discussed on page 42, which notes that most weed populations are primarily located along roads. Weed monitoring and treatment are an ongoing practice on the Forest. Brooks and Berry (2006) will be reviewed in the Literature Cited Reviewed docx. in the project record.

	SC17	The Specialist Report indicates, “Wild ungulate grazing on the A-1 Mountain Allotment would be expected to have similar effects as described for livestock” (Specialist Report, page 2). There is no research or citation to back up this statement relative to the spread of invasive plant species. Nor does this account for the behavior of ungulates in the presence of predators, which may keep them from staying in one location and therefore creating more disturbance for a longer period of time.	Both the Wildlife and Rare Plant and the Range Specialist reports discuss effects of wildlife grazing, and provide greater analysis for each instance when used in their individual reports. These statements are based on professional judgement and monitoring data.
	SC18	The assertion that the impacts of livestock grazing are less because it is managed, while wild ungulates are not is also not cited or based on any data that we can ascertain. Livestock are frequently left to wander for days or weeks or at a time. Wild ungulates actually are managed via hunting and more naturally via predator prey relationships.	Livestock grazing is managed through the use of a term grazing permit, Annual Operating Instructions, Allotment Management Plans and an environmental analysis. Livestock management includes authorizing the number of livestock that will graze, where they graze and for how long they will graze. Wildlife numbers may be managed through hunting and predators, however their distribution is not managed nor is the length of time they graze an area or how many times within a growing season they graze the same area. Also see response to SC17.
	SC19	Although Alternative 2 lists adaptive management as part of this range management plan, this EA states that there are limitations to the list of actions that can be taken. Therefore the process does not seem viable as described in Alternative 2. *Under existing conditions, we are limited in how we can implement adaptive management. For example, current management allows the grazing season to be shortened, but does not allow it to be extended or shifted. For example, shifting the season of use to allow livestock to come on earlier or later depending on resource conditions. Or a pasture’s use period could be extended while reducing the head of adult cattle, keeping in-line with AUMS, to meet resource needs*. EA Page 4	The limitations are under Alternative 3- Current Management as discussed on page 4 under the *Enhance Flexibility in Allotment Management* heading. The proposed alternative, Alternative 2 would allow for great flexibility as discussed on page 4 and 11 in the EA. However, the sentence you identify is simply explaining that adaptive management allows a flexible management approach within clear boundaries. The statement is a recognition that the use of adaptive management does not allow for any and all changes to management, but only specific changes to management within a range of potential management options based on monitoring of resource conditions.
	SC20	It is not clear what Forest Plan is being referred to – the current one or the one with the revisions in process? This allotment should be on hold, at a minimum, until the new revisions and new plan is adopted and implemented.	Page 3 of the draft EA states that "[T]his analysis is required in order to ensure that livestock grazing is consistent with goals, objectives and the standards and guidelines of the Coconino National Forest Plan (Forest Plan), as amended (1987)". The Coconino National Forest has been working to develop a new Forest Plan since 2006. It would not be prudent to place the A-1 Mountain project on hold while waiting for our new plan to be finalized as this would not allow us to meet our obligations under the Rescissions Act. As also stated on page 3 of the EA, "These actions are being proposed at this time to meet direction set forth in the Rescissions Act of 1995, which directs the Forest Service to establish and adhere to a schedule to complete environmental analyses and decisions on all allotments."

	SC21	Allowing livestock grazing on this allotment is not economically feasible. The Forest Service staff time for range monitoring looks to cost more than the grazing fees it will generate from 498 AMU.	An economic analysis has been completed and is included as part of the project record and in the EA on pages 92- 93. Forest Service direction provides that "[W]here consistent with other multiple use goals and objectives, there is congressional intent to allow grazing on suitable lands" (2203.1; 36 CFR 222.2(c)). There is no requirements regarding the economic feasibility of grazing need to be "economically feasible" to reauthorize a permit for livestock grazing.
		Plan for the City of Flagstaff owned adjacent sections should be included in the planning process. This will then provide a more complete watershed plan and will help meet Forest Plan management objectives.	We are not clear on what you are asking us to include. The cumulative effects sections discuss past, present and reasonably foreseeable future actions not only on Forest Service lands but also on adjacent lands. This EA brings into discussion the City's continuing fuels reduction work on Observatory Mesa as part of the greater FWPP project as this is the only reasonably foreseeable activity planned that would alter the natural environment. The areas adjacent to the A-1 Mountain Allotment are currently being planned for Open Space, however no specific activities that would alter the natural environment have been shared with us. Therefore we only included activities that had been identified at the time. Furthermore, specific comments from the City of Flagstaff on this proposal were considered and addressed to the extent possible in this planning process.
	SC22	A cost analysis would be beneficial in all grazing allotment EAs that includes USFS staff time for implementation, monitoring, administrative oversight, etc.	See response to B9.
	SC23	Given the crush of recreational use on the Coconino National Forest and Flagstaff Rangers District in particular, we suggest that this area be developed for year round recreation use. Here is short list of recreation benefits from the Outbound Collective: • Multiple views of the San Francisco Peaks • Scenic • Solitude • Easily accessible hiking • Great trail running • Camping • No fees • Close driving distance to downtown Flagstaff Taking some of the recreation pressure off the Peaks/Mt Elden area would benefit our high elevation wildlife. The benefit to the community (both intangibly, and also to tourism and the economy) is likely to be significantly greater than those that accrue directly to the community from grazing.	Outside the scope of the analysis which is to determine whether or not to reauthorize livestock grazing and to what degree. The presence of livestock within an area does not preclude other types of recreational pursuits.

	SC25	This would have the added benefit of being in the interest of many Flagstaff residents (as evidenced by the 2004 voter-approved Open Space bond – see below) rather than just in the interests of a small minority.	See response to SC23.
	SC26	Low-impact forms of recreation could be emphasized to align with Forest Service land management goals.	See response to SC23.
	SC27	The raising of cattle on A1 Mountain will very likely have a negative impact on wildlife (as the EA mentions), and cattle and seem to be clearly prioritized over wildlife in the EA. The EA mentions that continuous, regular wildlife use and cattle grazing are not compatible with optimal vegetation production and quality (p. 57).	The effects of grazing on wildlife is discussed in the effects analysis section in the EA, starting on page 57. The statement referenced here is taken out of context. The EA discusses wildlife use within the Allotment and states that if heavy wildlife use were to occur continuously throughout the year in combination with managed livestock grazing, then vegetation production and quality will not be maintained in these focused areas (EA, p. 57).The key is the difference in wildlife use from seasonal and transitory verses heavy focused use throughout the year.
	SC28	Further, it is stated that activities associated with grazing on A1 Mountain "can directly affect wildlife species when ranch employees, vehicles, livestock and dogs disturb individuals that are present in the allotment." It goes on to say, "Most bird, mammal, reptile and aerial invertebrate species are mobile and are capable of dispersing from disturbance" (p. 58). The proposed corral would introduce an especially significant disturbance. Why exactly is it that cattle are prioritized to such a degree over wildlife, to the extent that they should be expected to "disperse from disturbance"?	Effects to wildlife from the proposed corral are discussed starting on page 57 of the EA. When we discuss wildlife's ability to disburse from disturbance we are trying to show the difference between resources. Effects are different based on a resources ability to deal with the activity in question, i.e. the effects from grazing on a plant that can't move will be different than on something that can, like wildlife. We are not providing a preference just describing effects.
	SC29	In conclusion we do not support grazing on newly thinned or "restored" forests. Recently, Bradley, Hansen and Della Sala (2016) reported that restored forests during the past 30 years were not as healthy as managers assumed in regard to wildfire. Since the A1 allotment has had several treatments, FWPP and 4FRI, it seems reasonable that grazing will not improve the landscape and its vital watershed ecosystem services.	The No Action alternative responds to this concern.

	SC30	If it is the case that Alternative 1 – No Action is not selected, we recommend that Alternative 4 – Removal of South Flag Pasture be adopted. This area is currently surrounded by City of Flagstaff lands, and nearly completely by the Observatory Mesa Natural Area in particular. This was funded in part by the 2004 voter-approved Open Space bond. If grazing were to continue on the South Flag Pasture, this would undermine both the ecological connectivity of these city lands, as well as the spirit of an "open space" "natural area." The current fencing in the area makes it far from "open," and the cattle far from "natural." Eliminating grazing on the South Flag pasture would be a step towards restoring the ecological connectivity of this area, particularly since these city lands only border each other on a corner, at best. The elimination of grazing would bring the management practices of these two sets of land closer together. This would be an improvement over the current checkerboard management strategy that hinders ecological connectivity.	The EPA's Report on the Environment provides this description of ecological connectivity: the ability of an ecological system to remove particulate matter and carbon dioxide from the air, purify surface and ground water, reduce flooding, and maintain biological diversity as based on the systems ecological "framework" of high-quality land consisting of central hubs interconnected by corridors that provide for the movement of energy, matter, and species across the landscape (cfpub.epa.gov/roe/indicator_pdf.cfm?i=80). The EPA lists agricultural and silvicultural practices, road development, and urban sprawl to be the leading causes of fragmentation. Each of these activities are currently occurring within the City's designated Observatory Mesa Open Space Natural Area and on Forest Service lands and have created the baseline conditions which made this area so desirable as an open space. As stated on the *Why is Observatory Mesa specia*l? fact sheet, "Observatory Mesa exhibits one of the most desired qualities of open space, natural conditions with little evidence of current human activities" (http://flagstaff.az.gov/DocumentCenter/View/41405). Another important use for this area is to preserve historic resources and provide educational opportunities. As stated in the fact sheet, "Observatory Mesa played an important part in pioneer history ..... A-1 Mountain took the name from the A-1 Bar brand of the Arizona Cattle Company". This statement shows that grazing has been a key function of this landscape for generations and that continued grazing on the South Flag Pasture would not result in changes to ecological connectivity.
	SC32	In addition, the adoption of Alternative 4 would honor the spirit of an open space natural area to which Flagstaff citizens pledged their support.	This is a personal opinion. We cannot equate support for bond initiatives to fund open space acquisition efforts on City lands to that of removal of livestock grazing on National Forest System lands.
	SC33	In addition, if Alternative 1 – No Action is not selected, we recommend that grazing be eliminated from the northeast corner of the Fort Valley Pasture that overlaps the Rio de Flag. As mentioned in the EA, the Upper Rio de Flag is rated as "functioning at risk" in the Coconino Watershed Assessment (p. 39). It is difficult to see how allowing cattle to graze on and over a portion of the Rio de Flag would in any way mitigate that risk. As important of a watershed as it is for the city and citizens of Flagstaff, it seems prudent to eliminate grazing in this section. The transport of feces in run-off is of particular concern to those downstream, as well as to those concerned about ecological integrity more generally.	In regards to the watershed condition rating of "functioning at risk" assigned to the Rio de Flag watershed, the Soils and Hydrologic specialist report offered the following reasons for this rating, none of which related to livestock grazing in the watershed: "The City of Flagstaff is almost entirely located within the Upper Rio De Flag sub-watershed. Urbanization of this watershed has altered the precipitation/runoff response with most of the discharge in the Rio De Flag attributed to runoff from urbanized areas (Hill, 1988). This increase in runoff attributable to urbanization has led to incision and widening of stream channels within the sub-watershed down stream of urbanized areas (Hill, 1988). In addition to impacts to the sub-watershed from urbanization, forested areas of the sub-watershed have become overstocked with trees compared to pre-settlement conditions leading to an increased threat of uncharacteristic wildfire and a reduction in herbaceous ground cover (Bakker and Moore, 2007)." Also found in the EA starting on page 81. On the second issue raised regarding transport of feces in run-off- the Soils and Hydrology report provides this: "Livestock grazing can impact water quality directly when livestock access water sources and cause disturbance to stream banks or shorelines or defecate in or adjacent to surface water. Stream courses within the allotment are ephemeral and, therefore, do not typically serve as a source of drinking water. Cattle, therefore, are unlikely to congregate adjacent to these stream channels where water quality degradation attributable to livestock grazing is most likely to occur (Buckhouse and Gifford, 1976). During the 2012/2014 period, ADEQ (2015) assessed water quality for the Rio De Flag, to which stream courses in the allotment are tributary. No exceedances of state water quality standards were detected for the reach of the Rio de Flag extending from its headwaters, located north of the allotment, 34.5 miles downstream to its confluence with the outfall of the City of Flagstaff's wastewater treatment facility. These results are consistent with observations that contamination of streams by livestock generally occurs only when livestock congregate within or adjacent to streams that

			serve as a source of drinking water for livestock (Buckhouse and Gifford, 1976)", also found starting on page 84 of the EA.
Mackin	MK1	On behalf of the Coconino Sportsmen, I'm writing in support of the proposed actions on the A-1 Allotment, to include continued livestock grazing. After speaking with you and with Gary Hase, Rangeland Management Specialist, I'm comfortable with the planned activities.	Thank you for your comments and support of the A-1 Mountain project.
	MK2	Regarding the proposed new fence in the Ft. Valley Pasture, I would encourage the fence to be built to the latest wildlife friendly standards, including minimum height of a smooth lowest wire as well as suitable maximum height.	Page 31 of the Range Specialist report states: Any construction of new or replacement fencing would be constructed in accordance with specifications developed to facilitate wildlife passage. Following direction provided in the Region 3 supplement to FSM 2200, Chapter 2240 (Supp #2200-2014.2), the proposed structural range improvements will be constructed to specifications identified in the following approved sources: 1. "Fences" – USDI Bureau of Land Management, USDA Forest Service Technology and Development Program – July 1988, 2400 – Range, 8824 2803, 5E42D31 – Range Structural Equipment (210 pages). 2. "Facilities for Watering Livestock and Wildlife" – Missoula Technology and Development Center – July 1989, 2400 – Range, MTDC 89 – 1, 5E42D31 – Range Structural Equipment Handbook (71 pages).

			3. “Facilities for Handling, Sheltering and Trailing Livestock” – USDA, USDI, Forest Service, Equipment development Center, Missoula, Montana – September 1987, 2400 – Range, 8724 2809, 5E42D31 – Range Structural Equipment Handbook (52 pages). Also, as stated on page 71 the use of severely acute angles will be limited where possible.
	MK3	In addition, when this fence is to be built, the remaining fences in that pasture should also be brought up to those wildlife guidelines to facilitate wildlife movement in the safest possible manner.	As existing fences reach the end of their functional lifespan they will be reconstructed to current wildlife specifications further reducing potential for entanglement. As new fences are constructed, they will also follow wildlife specifications to facilitate safe passage (page 53 of the EA, under the Environmental Impacts of the Proposed Action section- Alternative 2).
	MK4	I fully support the removal of up to 2 miles of unneeded fencing within the allotment, an action that would complement work that was done in conjunction with the AZGFD and their Woody Ridge Wildlife Corridor activities several years ago. I would encourage the use of volunteer groups who also support these actions, such as the Arizona Antelope Foundation, Arizona Elk Society, Friends of Northern Arizona Forests and other individuals as well.	The Flagstaff District is always looking for volunteers interested in working on the National Forest. We will ensure that this information is passed along to facilitate a partnership.
	MK5	Side by side involvement with the permittee of this activity would also be highly beneficial and advised.	The permittee has been and will continue to be an important partner on this project.
	MK6	Regarding the construction of a livestock handling facility adjacent to Fuller tank, my only comment would be to develop this facility in such a[s] way as to maintain visibility for wildlife, especially pronghorn, when they utilize Fuller tank. I understand that a temporary loading chute is proposed and that would aid in this desired condition.	As stated by Mr. Mackin, visual concerns for Fuller Tank will be reduced through the use of a portable loading chute. By making the loading chute portable, the permittee will be able to take it down while not in use, which will be the majority of the time as this facility is only anticipated to be used 3 to 4 times a year.

	MK7	My final comment is in regard to this area in general and that is the proliferation of long term and in some cases prohibited camping in this area, especially during the summer months. Not only are these folks exceeding the 14 day limit on the Forest but they increase littering, fire hazards, off road parking and vehicle use and a variety of other offences.	Recreation use is an important function of this area. However, this analysis is specifically looking at whether or not to reauthorize livestock grazing on the A-1 Mountain Allotment and recreation concerns are outside of the scope. The area does have some motorized designated dispersed camping allowed. In September 2011, the Coconino National Forest completed analysis of motorized use designations required by the Travel Management Rule (TMR; 36 CFR 212) and has since made available a Motor Vehicle Use Map to show designated routes and areas open to motor vehicle use. Changes have been made over the years to the designations based on helpful feedback from the public. If you would like more information on the proposed changes or would like to provide feedback, please visit the project website: http://www.fs.usda.gov/project/?project=47435 In addition to becoming involved in the MVUM process, you are also encouraged to report your concerns in real time to the Coconino National Forest Dispatch Office- law enforcement.