Environmental Assessment for the Peaks Allotment

United States Department of Agriculture

Forest Service

Southwestern Region

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Coconino National Forest

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Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. Federal actions such as the authorization of grazing must be analyzed to determine potential environmental consequences pursuant to the National Environmental Policy Act of 1969 (NEPA) and the Rescission Act (P.L 104-19, 1995). The Council on Environmental Quality regulations define an environmental assessment as a "concise public document" that "shall include brief discussions" of the need for the proposal, alternatives to the proposal, discussion of environmental effects based on the substantive issues, and a listing of agencies and persons consulted (40 Code of Federal Regulations [CFR] 1508.9). In order to meet the intent of the regulations with respect to "concise" and "brief", the text of this environmental assessment will contain references to the contents of the analysis record whenever possible. Supporting documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Peaks Ranger Station in Flagstaff, Arizona. The document is organized into the following chapters:

- Purpose and Need: The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public and the permittee of the proposal and how the public responded.
- Alternatives: This section provides a more detailed description of the agency's proposed action for achieving the stated purpose, and any possible mitigation measures. This section also provides a summary table of the environmental consequences associated with each alternative.
- Affected Environment and Environmental Consequences: This section describes the environmental effects of implementing the proposed action. This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the proposed action that follows.
- Consultation and Coordination: This section provides a list of agencies consulted and/or contacted during the development of the environmental assessment.
- References: This section provides the references for citations used throughout this document.
- Glossary: This section provides definitions of terms used throughout this document
- List of Preparers: This section lists those persons who assisted in the preparation of this document.
- Appendices: The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Project Location

The Peaks Allotment is located on the Peaks/Mormon Lake Ranger Districts of Coconino National Forest. The allotment is located north of Flagstaff and is roughly bounded by Highway 180 on the west, the Coconino National Forest boundary on the north, the Cinder Hills area/Sunset Crater National Monument on the east, and the City of Flagstaff on the south; Highway 89 bisects the northern portion of the

allotment (see Figure 1). Nearly half of the Kachina Peaks Wilderness and most of the Inner Basin are not part of the allotment. The boundary comprises approximately 157,500 acres, however only approximately 153,000 acres within the boundary are National Forest System land and are part of the allotment; the remainder is state and private land. Elevations run from approximately 4,800 feet to 9,500 feet and vegetation adheres to typical elevation regimes: mixed conifer forests are present at the highest elevations; ponderosa pine, aspen, and mountain grasslands dominate the mid-elevations; and pinyon/juniper woodlands and grasslands are typical at the lower elevations.

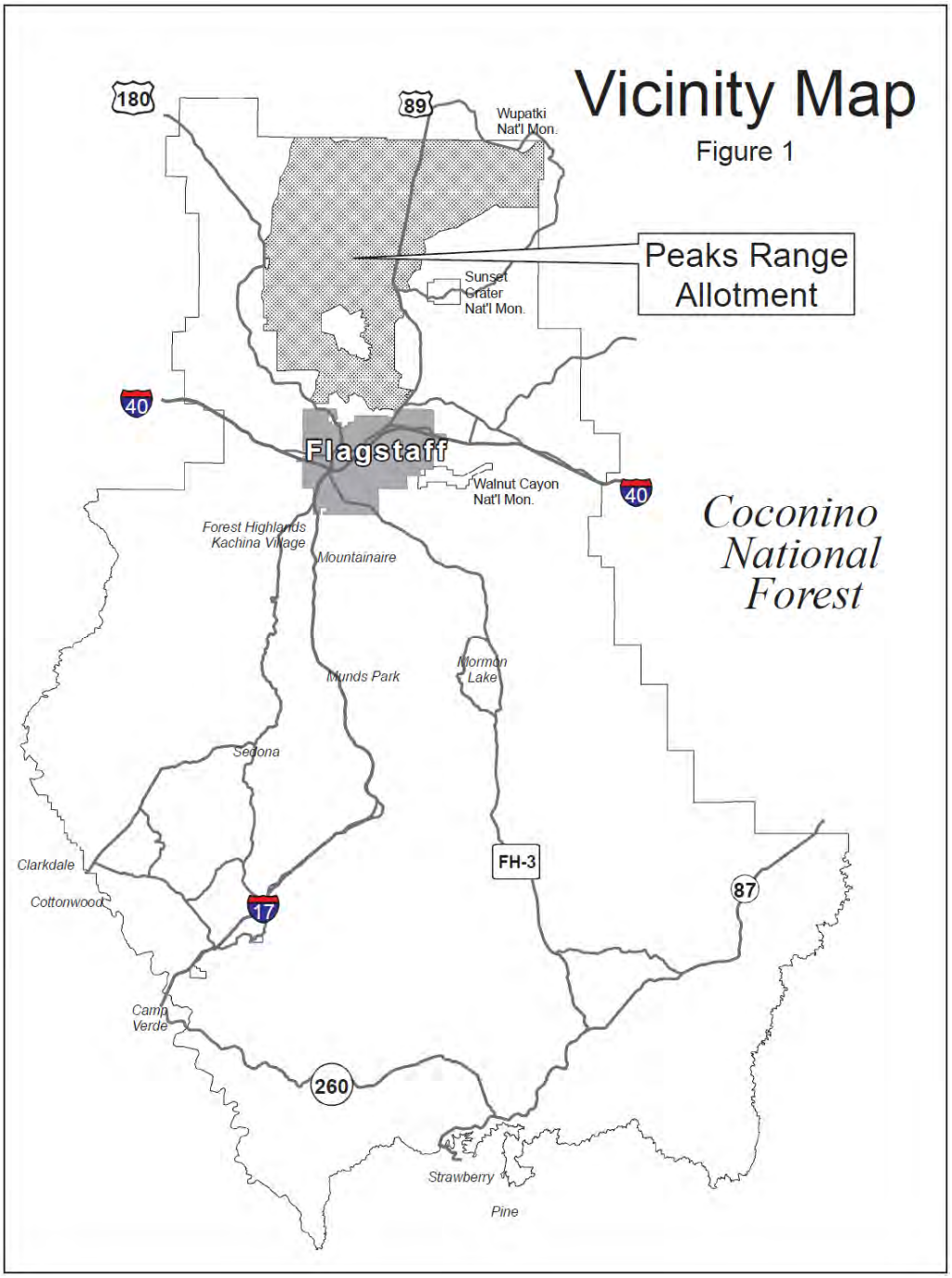


Figure 1. Vicinity map and boundary for the Peaks Allotment

Background

Livestock grazing has occurred in the area since the late 1870's. Permitting began around 1908 with the establishment of the National Forests.

The allotment is approximately 153,000 acres in size and is divided into 16 main grazing pastures and 8 small livestock management pastures that are each less than 250 acres in size. The current season of use is from May 22 to October 15 and the current permitted livestock numbers are 1,200 head of adult cattle or 5,799 Animal Unit Months (AUMs).

Over the past 15 years, livestock use has only occurred in 9 of the 16 main grazing pastures. These pastures are located in the northwest portion of the allotment and include: #13, #18, Badger, Headquarters, Holding, Kelly, Kendrick, Missouri Bill, and Saddle Mountain (see Figure 2 for pasture locations). These pastures represent approximately 32% of the Peaks Allotment area (approximately 48,900 acres). Livestock grazing has not occurred in the other 7 main grazing pastures due to the lack of infrastructure to manage grazing (i.e., fencing and water). Deadman's, Dove Tanks, Freidlein Prairie, Frisco Mountain, Gyler, Sandy Seep, and Schultz pastures are located in the southern and northeastern portions of the allotment) and account for approximately 68% of the Peaks Allotment area (approximately 104,250 acres). The permittee has stocked the allotment 10 of the past 15 years; during the period when the allotment was stocked, livestock use averaged 307 head of adult cattle and the average period of use was 130 days (average 1,310 AUM's/year). This represents only 23% of what is permitted. Permitees for different allotments were allowed to use the Peaks allotment during the years of 1995-2003 because the Peaks permittee was operating well below their permitted use. This resulted in a higher total actual use (sum of permittee use and the use by permittees from different allotments).Total permitted livestock, actual livestock use, and permittee actual livestock use for the analysis area of the Peaks allotment from 1995 to 2009 are graphically represented in Figure 3. The highest amount of livestock use occurred in 1996 when the actual use was 2,462 AUMs for a 107 day grazing period. The lowest amount of livestock use occurred in 1997 when the actual use was 498 AUMs for a 46 day grazing period. The longest grazing period was 164 days (May 20 to October 30) during the 2002 grazing season.

Structural range improvements are necessary to manage livestock grazing on any allotment. The structural range improvements of primary importance are: fences; livestock handling facilities (corrals); and livestock watering facilities (earthen stocktanks, pipelines, storage tanks, and drinkers/troughs). Without the necessary structural range improvements, or if the existing structural range improvements are not maintained, managed livestock grazing is not possible.

An inventory and condition assessment of the structural range improvements on the Peaks Allotment was conducted during the 2009 field season. It was found that the majority of structural range improvements within the nine pastures grazed by livestock have been maintained and are in satisfactory condition. Those improvements that are in poor condition are mostly earthen stock tanks and are not critical for livestock watering due to the extensive pipeline system that is in place. Only 12 % of the improvements in these pastures are in critical condition and require repairs to be functional.

However, 93% of the structural range improvements in the seven pastures outside the area grazed by livestock are in either critical or poor condition. These pastures will not support managed livestock grazing due to the lack of functioning infrastructure.

Forest Service records indicate that forage utilization was approximately 13% for the nine pastures grazed by livestock between 2002 and 2009 (no records exist for 2007). The highest documented utilization was 35%, and the lowest documented utilization was 0%. For 91% of the grazing periods, or length of time each pasture is actively grazed during a season, that occurred during this time period, utilization was documented at less than 30%; and 82% of the grazing periods had documented utilization of 20% or less.

Of the 35 grazing periods that constitute these records, 12 grazing periods resulted in documented utilization of 0-10%; 17 grazing periods resulted in documented utilization of 11-20%; 3 grazing periods resulted in documented utilization of 21-29%; and 3 grazing periods resulted in documented utilization of 30-35%.

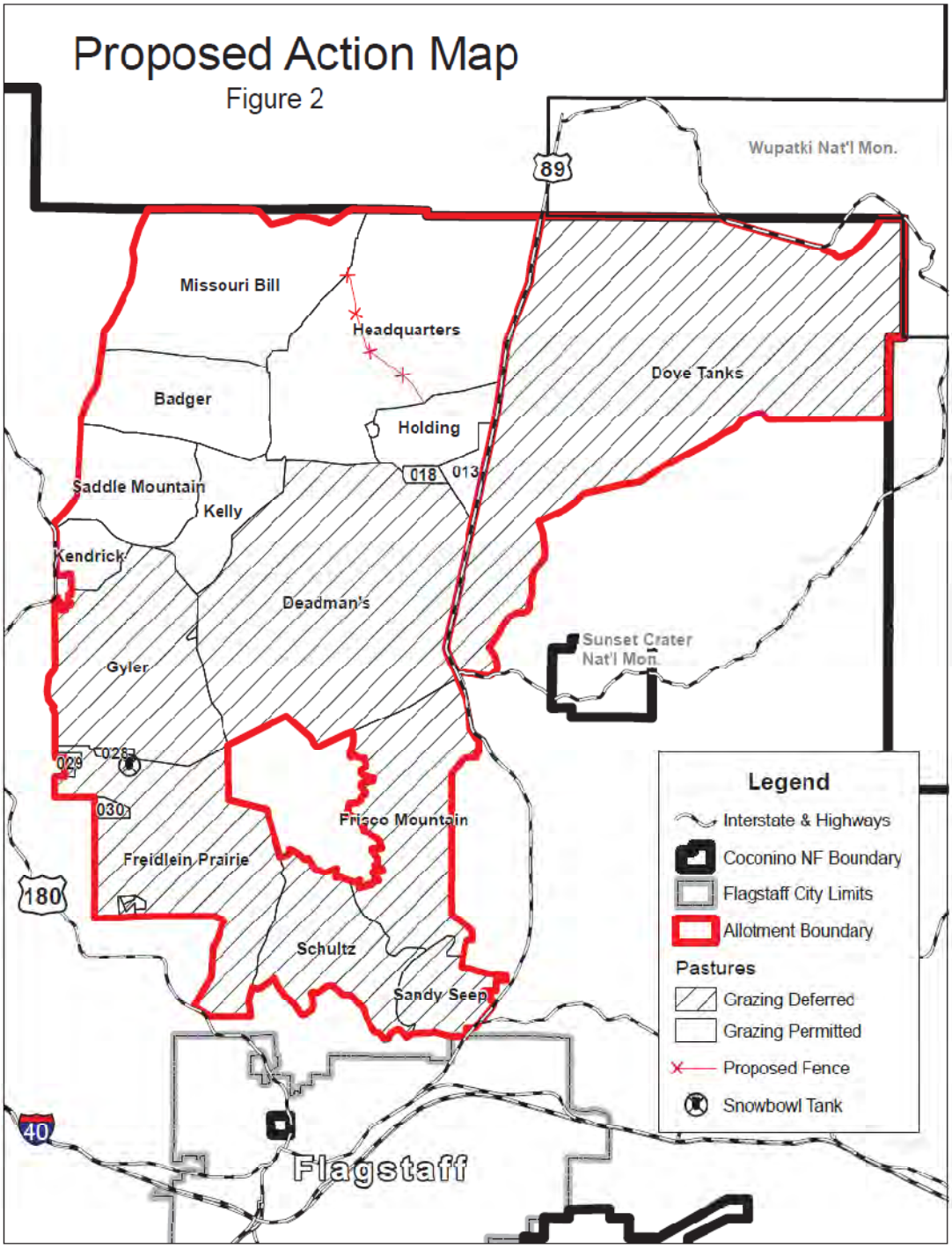
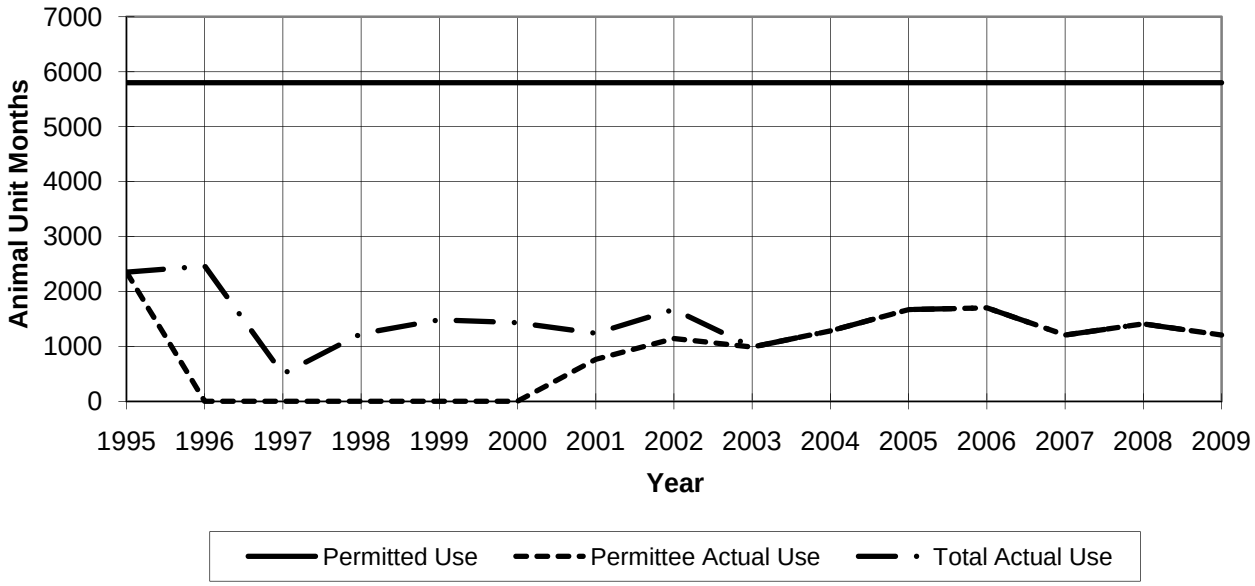


Figure 2. Map of the Allotment Area and Proposed Action

Figure 3. Actual Use and Permitted Use within the Peaks Allotment from 1995 to 2009



Purpose and Need

The Peaks Allotment is scheduled for an environmental analysis of grazing use on the Coconino National Forest, as required by the Rescission Act (Burns Amendment 1995). This analysis is required in order to ensure livestock grazing is consistent with goals, objectives, and the standards and guidelines of the Coconino National Forest Plan (1987, as amended). The purpose of this project is to authorize the continuation of livestock grazing in a manner that maintains and/or moves the area toward Coconino National Forest Plan objectives and desired conditions.

There is a need to maintain and/or improve vegetation and soil conditions. Current permitted use is well below the estimated Grazing Capacity (Appendix A).

Proposed Action

To best meet the purpose and need, the Peaks/Mormon Lake District is proposing to authorize grazing on approximately 48,900 acres of the Peaks Allotment (permitted grazing area) and continue livestock grazing deferment on approximately 104,100 acres. Within the permitted grazing area, the District is proposing to authorize seasonal grazing with a maximum of 1,900 AUMs which is the equivalent of 375 Animal Units (AUs) for approximately five months. The permitted season of use would generally be from May 15 to October 15. 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 may occur during the grazing season, based on conditions and/or range inspections; however, they would not exceed the permitted livestock numbers of 1,900 AUMs. Livestock grazing would continue to occur through a rotational management system which would allow for plant growth and recovery. A management guideline of conservative use (30-40% forage utilization as measured at the end of the growing season) would be employed to maintain or improve rangeland vegetation and long-term soil productivity. The five components of the Proposed Action: authorization, improvements, monitoring, adaptive management, and resource protection measures, are described in detail in Chapter 2.

Applicable Laws and Regulations

The planning and decision-making process for this project was conducted in accordance with applicable laws, regulations, policies, and plans. Listed below are Federal laws and Executive Orders pertaining to this project-specific planning and environmental analysis. This project is consistent with the following:

Clean Water Act of 1948, as amended: This project complies with Arizona State laws regarding natural resource protection, including but not limited to water quality.

Multiple Use-Sustained Yield Act of 1960: This project is consistent with applicable Coconino National Forest Plan standards and guidelines.

National Historic Preservation Act (NHPA) of 1966, as amended: A cultural resources clearance report was finalized for the proposed activities. Management of livestock under the proposed action would result in no adverse effect, as it continues the status quo. In order to ensure this, management practices which tend to concentrate livestock (and most likely wild ungulates) such as placement of salt, haying, placement of water troughs, etc. would be located away from cultural resources. In turn, a finding of no effect to historic properties is determined for the continued grazing of the Peaks Allotment. The clearance report is consistent with previous Arizona State Historic Preservation Office (SHPO) consultation and the existing Region 3 Programmatic Agreement with the Arizona SHPO dated December 24, 2003. Thirteen Native American tribes were consulted. Given that grazing in the Peaks Allotment is currently authorized to the Navajo Nation, a meeting was held between Forest Service Range Management and Heritage Staff members, and members of the Navajo Nation Agriculture program on August 11, 2009. Recommendations were provided by the Navajo Nation representatives and considered in the development of the Proposed Action. No concerns have been received by any Native American group regarding this undertaking. In a letter dated October 7, 2009, the Navajo Nation Historic Preservation Office concluded that the Proposed Action would not impact any Navajo traditional cultural properties.

National Environmental Policy Act (NEPA) of 1969, as amended: The effects of the Proposed Action and alternatives have been analyzed and are disclosed in this EA.

Endangered Species Act (ESA) of 1973, as amended: The Endangered Species Act (ESA, PL 93-205), Forest Service Manual (FSM) 2670.11, 2670.21 and 2670.31 direction, and the Coconino National Forest Plan standards and guidelines all require that National Forest System lands are not only managed for endangered, threatened and proposed (TEP) species, but also to recover TEP species. The ESA states that all Federal departments and agencies shall seek to conserve TEP species. FSM 2670 directs forests to manage National Forest System habitats to achieve recovery of TEP species and to avoid the need to implement special protection measures under the ESA.

The analysis and disclosure of effects to endangered, threatened, and proposed species is complete (see Wildlife-Threatened and Endangered Species analysis in Chapter 3). Section 7(a)(2) of the Endangered Species Act requires that Federal agencies consult with the U.S. Fish and Wildlife Service (USFWS), as appropriate, to ensure that our actions do not jeopardize the continued existence of species listed as threatened or endangered under the ESA, or destroy or adversely modify designated critical habitat. There would be no effects to species listed under the ESA because none of the species would be impacted by the proposed action: where these species occur is within the deferred area of the allotment and therefore grazing would not occur in their habitats.

Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended: This project is consistent with applicable Coconino National Forest Plan standards and guidelines.

National Forest Management Act (NFMA) of 1976, as amended: This project complies with the Coconino National Forest Plan and associated amendments. This project addresses all applicable Forest Plan forest-wide standards and guidelines and management area direction as they apply to the project area. This project is also in compliance with Forest Plan goals and objectives. All required interagency review and coordination has been accomplished.

American Indian Religious Freedom Act of 1978: This project would not deny American Indians access to land within the project area for traditional and cultural purposes nor would it infringe upon the rights of Native Americans to worship through ceremonies or traditional rights within the project area. The tribes have been consulted on this project.

Executive Order 13007 (Indian sacred sites): Access to and ceremonial use of sacred sites by Indian religious practitioners would be accommodated with this project, and activities associated with this project would avoid adversely affecting the physical integrity of such places.

Executive Order 12898 (Environmental Justice): Implementation of this project is not anticipated to cause disproportionate adverse human health or environmental effects to minority or low-income populations.

Executive Order 13186 (Migratory Birds): On January 10, 2001, President Clinton signed Executive Order 13186 for the "Responsibilities of Federal Agencies to Protect Migratory Birds" which directed Federal agencies to develop a memorandum of understanding with the U.S. Fish and Wildlife Service to promote conservation of migratory birds. Agencies shall identify potential impacts to migratory birds and their habitats, avoid or minimize adverse impacts, restore and enhance habitats, and evaluate the effects of actions on migratory birds. This project is consistent with the Migratory Bird Treaty Act of 1918, as well as Agency guidelines for conformance with the act.

Forest Service Sensitive Species: FSM 2621.2 directs managers to display findings under the various management alternatives considered for individual projects. This assessment is based on the current geographic range of sensitive species on the Coconino National Forest and the area affected by the project. This assessment considers, as appropriate for the species and area, factors that may affect the current trend for the species' population.

Sensitive species are defined as "those plant and animal species identified by a regional forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution (FSM 2670.5(19))."

It is the policy of the Forest Service regarding sensitive species to:

- assist states in achieving their goals for conservation of endemic species;
- as part of the National Environmental Policy Act process, review programs and activities through a biological evaluation to determine their potential effect on sensitive species;
- avoid or minimize impacts to species whose viability has been identified as a concern;
- if impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole (the line officer, with project approval authority, makes the decision to allow or disallow impacts, but the decision must not result in loss of species viability or create significant trends toward Federal listing); and

- establish management objectives in cooperation with the State when projects on National Forest System lands may have a significant effect on sensitive species population numbers or distributions.

Effects to Forest Service sensitive species were considered and a wildlife specialist report has been completed for the sensitive plant and wildlife species found within the Peaks Allotment. Effects to sensitive species were considered for this project and are summarized in this EA.

Management Indicator Species: The Forest Service is required to address MIS in compliance with various regulations and Agency policy (36 CFR 219, FSM 2621 and 1920), which are, themselves, tiered to the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the NFMA. The Coconino National Forest Plan was prepared under planning regulations issued in 1982. Effects to MIS were considered for this project and are summarized in this EA.

Decision Framework

This EA documents the environmental analysis of the Proposed Action and the No Action Alternative. The Peaks/Mormon Lake District Ranger is the Responsible Official for this project. The decision to be made is whether or not to authorize livestock grazing and if so, in what manner. Elements of this decision include: number of livestock, utilization level, season of use, grazing management system, structural improvements, monitoring, adaptive management, and resource protection measures. The decision is based on a consideration of the area's existing resource conditions, desired conditions, environmental issues, and the environmental effects of implementing the various alternatives. The District Ranger may select any of the alternatives analyzed in detail, or may modify an alternative, as long as the resulting effects are within the range of effects disclosed in the EA.

This document is not a decision document. Rather, it discloses the environmental consequences which may occur if the Proposed Action or the No Action Alternative is implemented. If a finding of no significant impact can be reached based on this analysis, a decision notice (DN) and finding of no significant impact (FONSI), signed by the Peaks/Mormon Lake District Ranger, will document the decision made as a result of this analysis. If the decision is to authorize livestock grazing, any and all grazing practices adopted and within the scope of this analysis would be further detailed in the terms and conditions of a new term grazing permit and a new Allotment Management Plan (AMP).

The Peaks/Mormon Lake District Ranger expects to issue a decision by late summer 2010. Implementation of the AMP would immediately follow the decision and close of the appeal period (if applicable). Authorization of cattle grazing would be for a minimum of ten years. However, future decisions for additional projects within the allotment, changing rangeland condition, or violations of the term grazing permit could change the length of this decision.

Public Involvement

The project was listed in the Schedule of Proposed Actions from January 2008 through July 2010. On August 14, 2009, the proposal was mailed to members of the public and other agencies for comment via letters and email. This officially marked the beginning of the 30-day scoping period. Scoping comments were accepted until September 18, 2009. A mailing list was compiled of local agencies, businesses, individuals, and organizations interested in or determined to be potentially impacted by the project. Emphasis was placed on contacting people affected or concerned about the project because of ownership or land-use interests, such as permittees and neighboring permittees. Scoping documents including a discussion of the proposed action and a map were sent to 57 individuals, organizations, agencies, and

tribes on the mailing list. Announcements soliciting public input on the Proposed Action were posted on the Forest Service's website. Thirteen tribes were notified of the project.

Additionally, on August 11, 2009, the Forest Service hosted a meeting with the permittee of the Peaks Allotment. The meeting focused on the Proposed Action.

A total of three comment submittals were received by the Forest Service as a result of mailing and posting the scoping documents. Specific comments within the three submissions were identified and coded by document and comment number. Twenty-one comments were identified within the three submissions. Although not considered a comment, all three submissions included statements of support for the project. Most of the comments were requests for information and studies to be included in the EA, specifically for soil, hydrology, vegetation, wildlife, in addition to providing more specifics on range management actions such as annual livestock numbers, range inspections, rotational management strategies, monitoring and adaptive management. One comment brought forward from the Friends of Anderson Mesa requested the development of an action alternative that would reduce utilization to below 30%; more information on this can be found in Chapter 2. The Arizona Game and Fish Department also indicated interest in collaboration on administrative actions such as retrofitting fences. On the basis of the comments received from the public, the interdisciplinary team developed a list of issues to address.

Issues

Issues serve to highlight effects or unintended consequences that may occur from the Proposed Action and alternatives, giving opportunities during the analysis to reduce adverse effects and compare trade-offs for the decision maker and public to understand. Three submissions from the public were received containing a total of twenty-one comments. Concerns about the Proposed Action include annual livestock numbers, range inspections, rotational management strategies, monitoring and adaptive management have been noted and will result in further clarification and additional information presented in Chapter 2 of the EA. Comments in regards to collaboration on administrative actions such as retrofitting fences are noted and will be handled administratively. Based on the scope of the project the following issues were retained for a detailed analysis.

Soil and Hydrology Issue: Livestock grazing can result in the disturbance of soil through trampling and loss of vegetation from herbivory, which can result in subsequent hydrological impacts. A comment requested an analysis be included on mulch/litter. Impacts of implementing the Proposed Action and the No Action on soil and hydrology are included in the EA.

Vegetation Issue: Livestock grazing can result in disturbance to vegetation through herbivory and trampling. Impacts of implementing the Proposed Action and the No Action on trees, shrubs, grasses, forbs, and special status plant species are included in the EA.

Wildlife Issue: The only Threatened and/or Endangered Species found in the project area is the Mexican Spotted Owl; however the MSO Critical Habitat occurs in the deferred portion of the allotment and therefore would not experience livestock grazing. Livestock grazing can result in disturbance to wildlife species through the presence of cattle, trampling of soil and vegetation, fences that inhibit movement, and competition for resources (e.g., water, food, shelter). The Proposed Action would also naturalize an unmaintained livestock tank. The impacts of implementing the Proposed Action (including continuation of grazing and naturalization of a livestock tank) and the No Action on wildlife species are included in the EA.

Chapter 2 – Alternatives

This chapter describes and compares the alternatives considered for the Peaks Allotment. This section also presents the mitigation measures associated with the Proposed Action. In addition, it provides a summary of the issues and environmental consequences of both alternatives and allows the public and the decision-maker to easily compare the two options.

Alternatives

Alternative 1: No Action

Under the No Action alternative, the Forest Service would not authorize grazing on the Peaks Allotment. Forest Service Handbook (FSH) 2209.13 Chapter 90 provides guidance for livestock grazing projects, and establishes that the No Action alternative should be analyzed as a "no grazing" alternative. This alternative does not preclude cattle grazing or cattle management on this allotment in the future if a decision is made through another comprehensive analysis to resume these actions. Under this alternative, all livestock would be removed from the allotment and a term grazing permit would not be issued. Since no grazing would occur there would be no livestock capacity determinations, no utilization or grazing intensity guidelines, no grazing management system, and no implementation or effectiveness monitoring. Under this alternative, no new structural improvements would be built. Existing structural range improvements would require a separate analysis and coordination with other agencies to determine whether or not to maintain or remove these improvements.

Alternative 2: Proposed Action

The Proposed Action consists of five components: authorization, structural improvements, monitoring, adaptive management, and resource protection measures. The Proposed Action follows current guidance from Forest Service Handbook 2209.13, Chapter 90 (Grazing Permit Administration; Rangeland Management Decision making).

Authorization

Under the Proposed Action, the Forest Service would authorize the continuation of livestock grazing for the Peaks Allotment under the following terms:

Permitted Grazing Area/Deferred Pastures

The permitted grazing area would include the following pastures: #13, #18, Badger, Headquarters, Holding, Kelly, Kendrick, Missouri Bill, and Saddle Mountain. These pastures total approximately 48,900 acres and represent approximately 32% of the entire Peaks Allotment area. They also represent the portion of the Peaks Allotment that has been grazed by the permittee for the past 15 years. The following pastures would continue to be deferred from livestock grazing due to the lack of infrastructure to manage livestock grazing (primarily fencing and water): Deadman's, Dove Tanks, Freidlein Prairie, Frisco Mountain, Gyler, Sandy Seep, and Schultz (see Figure 2). Should the permittee decide to invest in the needed infrastructure to support livestock grazing in the deferred pastures, an environmental analysis would need to be completed prior to authorizing livestock grazing.

Permitted Livestock

Permitted livestock numbers for the permitted grazing area would be a maximum of 1,900 AUMs, which is the equivalent of 375 head of adult cattle for approximately five months, (Appendix A describes the estimated grazing capacity in more detail). 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 may occur during the grazing season, based on conditions and/or range inspections; however, they would not exceed the permitted livestock numbers of 1,900 AUMs.

Season of Use

The permitted season of use would be from May 15 to October 15. The season of use may be extended by allowing livestock to enter the allotment as early as May 1 and/or remain on the allotment until October 31. 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 the season of use is extended, the maximum permitted Animal Unit Months (1,900) would not be exceeded.

Management

Livestock grazing would continue to occur through a rotational management system which would allow for plant growth and recovery. The early and mid-season grazing that occurs in Kelly, Kendrick, and Saddle Mountain pastures would continue to be managed using a deferred rotation management system. The mid to late season grazing of Badger, Missouri Bill, and Headquarters pastures would continue to be managed using a rest-rotation management system. If the pasture fence identified in the Structural Improvements Section is constructed in the Headquarters pasture, the resulting North and South Headquarters pastures would be managed using a rest-rotation management system (see Figure 2). Livestock use of the pastures #13 and #18 occur in the late fall and management of these pastures is planned primarily based on time control and the permittee's operational needs (i.e. shipping).

Grazing Utilization

A management guideline of conservative use (30-40% forage utilization as measured at the end of the growing season) would be employed to maintain or improve rangeland vegetation and long-term soil productivity.

Grazing Intensity

Grazing intensity is defined as the amount of herbage removed through grazing or trampling during the grazing period. Grazing intensity would be managed to allow for the physiological needs of plants. Generally, grazing intensity would be managed at moderate levels (40-50%) in the late spring and early summer months when sufficient opportunity exists for plant regrowth. During the late summer and fall, grazing intensity would be managed at conservative levels (30-40%) when the potential for plant regrowth is limited.

Pasture Grazing Period

The grazing period within each pasture would be based upon weather/climate conditions, current growing conditions, and the need to provide for plant regrowth following grazing. The length of the grazing period within each pasture would also consider and manage for the desired grazing intensity and utilization guidelines. The grazing period per pasture would generally not exceed 30 days during the early

to mid season use period (May - July), and 45 days during the mid to late season use period (August - October). Pastures would be grazed only once during the grazing season.

Structural Improvements

To improve grazing management, approximately 4 miles of new 3-strand barbwire and smooth wire fence would be constructed in the Headquarters pasture (see Figure 2). This fence would divide the pasture, creating the North and South Headquarters pastures, and would improve grazing management by improving the timing, intensity, frequency and duration of livestock grazing. This fence would be constructed in accordance with specifications developed to facilitate wildlife passage.

Snowbowl Tank would be naturalized. This tank is located in the Freidlein Prairie pasture which is one of the pastures that is proposed for continued deferment from livestock grazing (see Figure 2). This tank is located near a population of Bebb willow, a Forest Service Sensitive plant, which is currently receiving heavy browsing from elk. Removing this water source should help reduce elk concentration in the area and as a result, reduce the browsing pressure on the Bebb willow. Naturalization would be accomplished by filling in the pit of the tank with material from the existing dam, re-contouring the impacted area and seeding with native vegetation.

Monitoring

Two types of monitoring would be used, implementation and effectiveness monitoring. Implementation monitoring would be conducted on an annual basis and would include: livestock actual use data, grazing intensity evaluations during the grazing season (within key areas), utilization at the end of the growing season (within key areas), and visual observation of vegetation and ground cover.

Effectiveness monitoring to evaluate the success of management in achieving the desired objectives would occur within key areas on permanent transects at an interval of 10 years or less. Effectiveness monitoring may also be conducted if data and observations from implementation monitoring (annual monitoring) indicate a need. A baseline for monitoring has been established from previous years of gathering monitoring data in accordance with prior permit requirements.

Both qualitative and quantitative monitoring methods would be used in accordance with the Interagency Technical References (USDA/USDI 1996), Forest Service Region 3 Rangeland Analysis and Management Training Guide, and the Forest Service Region 3 Allotment Analysis Handbook.

Adaptive Management

The Proposed Action includes adaptive management, which provides a menu of management options that may be needed to adjust management decisions and actions to meet desired conditions as determined through monitoring. If monitoring indicates that desired conditions are not being achieved, management would be modified in cooperation with the permittee. Adaptive management allows the Forest Service to adjust the timing, intensity, frequency, and duration of livestock grazing, the grazing management system, and livestock numbers. If adaptive management adjustments are needed for these factors, they would be limited to the terms identified in this Proposed Action and they would be implemented through Annual Operating Instructions. Adaptive management would also allow for the construction of structural range improvements that have been identified and analyzed in an applicable NEPA document and are determined, through monitoring, to be necessary for achieving desired conditions. An example of a situation that could call for adaptive management adjustments is drought conditions.

Resource Protection Measures

The Proposed Action is designed to comply with Coconino National Forest Plan standards and guidelines, as amended. Design features are incorporated into the project to protect forest resources of soil, water, scenery values, wildlife and aquatic habitat, and rare plants. Mitigation measures and Best Management Practices would be implemented to prevent the introduction and spread of invasive plants, to protect heritage resources, and to protect public health and safety during project implementation.

Mitigation Measures

In response to public comments on the proposal, mitigation measures were developed to ease some of the potential impacts the proposed action may cause. Applicable Forest Plan standards and guidelines, Best Management Practices, and Forest Service Manual and Handbook direction will be incorporated in project design and implementation. The following features are design elements that further detail management actions, mitigate environmental consequences, and establish priorities for implementation.

The Forest Service would apply the following mitigation measures to any action alternative to minimize and reduce potential impacts from proposed activities.

Noxious and Invasive Exotic Weeds:
A weeds assessment/inventory was completed for this analysis. Noxious and invasive weeds located in this allotment would be treated as necessary. The permittee and Forest Service would coordinate the weed inventory and treatment with responsibilities identified through the AOI. Weed monitoring is carried out at the same time allotment inspections are conducted. As noxious and invasive exotic weed populations are found they are mapped, monitored and, in some areas, manually removed. Other treatment methods would follow guidelines established in the "Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds" (USDA Forest Service 2005).
The design features, Best Management Practices (BMPs), and mitigation measures in Appendix B of the Three Forest Integrated Treatment of Noxious or Invasive Weeds Environmental Impact Statement would be implemented (USDA Forest Service 2005). Allotment management plans and annual operating instructions for active grazing allotments would include weed prevention practices, inspection and reporting direction, and provisions for inspection of livestock concentration areas.
The focus would be on preventing weed spread through prevention practices which may include, but are not limited to:

1. Minimizing the transportation of weed seed into and within allotments
2. Maintaining healthy vegetation
3. Minimize potential ground disturbance (by altering season of use or exclusion)
4. Education

1. Minimizing Transportation:

- If livestock are potentially a contributing factor to seed spread, schedule units with existing weed infestations to be treated prior to seed set before allowing livestock on those units. Schedule these infested units to be the last in the rotation.

- If livestock were transported from a weed-infested area, corral livestock with weed-free feed, and annually inspect and treat allotment entry units for new weed infestations.

- Designated pastures as unsuitable range to livestock grazing when infested to the degree that livestock grazing would continue to either exacerbate the condition on site or contribute to weed seed spread.

- Remove mud, dirt, and plant parts from project equipment before moving it into a project area. Determine the need for and –when appropriate—identify sites where equipment can be cleaned.

Clean all equipment before entering National Forest System lands; a forest officer, in coordination with the unit invasive species coordinator, needs to approve use of on-forest cleaning sites in advance. Seeds and plant parts need to be collected when practical and incinerated.

- If operating in areas infested with weeds, clean all equipment before leaving project site. To minimize time spent cleaning, time all work in infested areas last and concurrently designate a "contaminated" parking lot where such project vehicles may be parked for the duration of the project. This area should be monitored in follow up mitigation, and another site for cleaning vehicles/equipment prior to leaving area should be identified.

- Workers need to inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment after being trained to recognize the priority species in the area. Proper disposal means bagging the seeds and plant parts and incinerating them.

2. Maintain Healthy Vegetation:
- Manage the timing, intensity, utilization, duration and frequency of livestock activities associated with forage harvest and browse resources to maintain the vigor of desirable plant species and retain live plant cover and litter.
- Manage livestock grazing on restoration areas to ensure that vegetation is well established; this may involve exclusion for a period of time consistent with site objectives and conditions. Consider practices to minimize wildlife grazing on the areas if needed.

3. Minimize Ground Disturbances:
- Include weed prevention practices such as: changes in the timing, intensity, duration, or frequency of livestock use; location and changes in salt grounds; restoration or protection of watering sites; and restoration of yarding/loafing areas, corrals, and other areas of concentrated livestock use.
- Inspect known areas of concentrated livestock use for weed invasion. Inventory and manage new infestations.

4. Education:
- Promote weed awareness and prevention efforts among range permittees through education programs or annual operating instructions.
- Encourage permittees to become certified pesticide use applicators to aid in their participation in allotment weed control programs.

Soil and Watershed Best Management Practices:
- The District Range Staff would monitor permittee compliance with the Term Grazing Permit, Allotment Management Plan and Annual Operating Instructions to achieve the objective of improving and/or maintaining long-term diversity, density and production of upland vegetation. Compliance with the terms and conditions of the permit would be strictly enforced.

- Manage livestock grazing at an intensity and utilization that would improve vegetative ground cover (primarily the litter component) to enhance soil function (i.e. minimize soil erosion, promote water infiltration and enhance nutrient recycling), and to improve the quality and quantity of desirable vegetation.

- Design and implement a planned grazing system that would provide adequate rest during the plants' growing season. Key grazing areas would be monitored for grazing intensity, utilization,

production and vegetation condition and trend, and adaptive management would be used to modify the grazing system to account for the continually changing effects of resource conditions and climate.

- Utilize salt to improve livestock distribution. Salt a reasonable distance from waters or natural congregation areas such as swales, drainages, riparian areas and meadows. Move salt when livestock distribution objectives are not being achieved or to correct localized overuse by livestock grazing.

- Existing structural improvements are to be maintained and new structural improvement are to be constructed to standard and maintained as necessary to allow for the implementation of proper livestock control and distribution, shorter graze periods and longer rest periods. Structural improvements would not be located in areas such as swales, drainages, riparian areas and meadows.

- To minimize the effects of drought on plant production and corresponding above ground plant production available for litter, implement the Forest Drought policy during and immediately after drought. Times of drought are indicated through PSI and PDSI. During drought conditions, adjust grazing timing, intensity, frequency, numbers and the management system as necessary to protect the upland vegetation resource.

Wildlife Species:

- The deferral of 68% of the allotment would greatly reduce potential negative impacts from livestock grazing to area wildlife, habitat and prey species. Though grazing on the remaining 32% could impact the density and abundance of a number of prey species that some bird species hunt, including ground nesting birds and most rodents, the use of a rotational grazing system, Best Management Practices and adaptive management would help mitigate negative effects.

- To mitigate effects to wildlife through structural improvements, all fences would be built according to wildlife-friendly standards, allowing for movement above and/or below the fence. Barbed wire fence is generally considered wildlife friendly with bottom and top wire heights that allow for easier animal passage below or above the fence. Yoakum, in O'Gara and Yoakum 2004, recommends a smooth bottom wire 16-inches off the ground to help alleviate access problems for wildlife without compromising control of cattle. For new or reconstructed fence the Coconino Forest Plan Amendment 11 (1996) specifies an 18-inch smooth bottom wire height, which exceeds the recommended 16-inch bottom wire height of Yoakum and the Pronghorn Management Guides (Lee et al. 1998) and a 42-inch top wire height, which is intended to accommodate wildlife that jump over fences.

Sensitive Plant Species:

Sensitive plant surveys would be completed in suitable habitat before constructing structural improvements. Surveys would not be necessary if the construction would occur in an area that is already disturbed, i.e. an existing fence line. If sensitive plant species are located, coordination with a wildlife biologist or botanist would occur to mitigate impacts as needed (i.e. flagging specific plants and adjusting the location of the improvement).

Alternatives Considered but Eliminated from Further Analysis

Federal agencies are required by NEPA to explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action sometimes provide suggestions for alternative methods of achieving the purpose and need.

Current Grazing Management

Per FSH 2209.13 92.31 – "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." For this project, the Proposed Action is equivalent to Current Management in terms of actual use, monitoring, adaptive management, and resource protection measures, thus no additional alternative will be analyzed.

Utilization Guideline below 30%

One comment brought forward from the Friends of Anderson Mesa requested the development of an action alternative that would reduce utilization to below 30%. An alternative was considered that would reduce utilization from 30-40% to below 30% utilization. An alternative with a lower utilization guideline has been brought forward as a full alternative in several recent Environmental Impact Statements (EIS) range projects on the Peaks/Mormon Lake Ranger District. These projects include: Anderson Spring and Bar T Bar EIS (2005), Pickett Lake and Padre Canyon EIS (2005), and Deep Lake EIS (2006). The analysis of reducing utilization in these range projects has not shown a large difference from the effects of allowing cattle grazing at 35% or at 20% utilization. There were no important differences in effects to soils, vegetation, wetlands, wildlife, or other resources.

Case law has established that consideration of alternatives which lead to similar results is not sufficient to meet the intent of NEPA [Citizens for Environmental Quality v. United States, 731 F. Supp. 970, 989, (D. Colo. 1989); State of California v. Block, 690 F.2d 753 (9th Cir. 1982)]. Because a reduced utilization guideline alternative would result in similar environmental effects as that of the Proposed Action, it was eliminated from further analysis.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the following tables focuses on activities where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 1. Livestock Grazing Activities by Alternative

Grazing Statistic	No Action	Proposed Action
Permitted Grazing Area (Pastures)	None	Badger, Headquarters, Holding, Kelly, Kendrick, Missouri Bill, Saddle Mountain, #13, #18
Deferred Grazing Area (Pastures)	All pastures within the allotment	Deadman's, Dove Tanks, Freidlein Prairie, Frisco Mountain, Gyler, Sandy Seep, Schultz
Season of Use	None	May 15 to October 15
Maximum Animal Unit Months Permitted	None	1,900
Permitted Animal Units (AUs)	None	375
Grazing Utilization Guideline	None	30-40%
Grazing Intensity Guideline	None	Late Spring/Early Summer: 40-50% Late Summer/Fall: 30-40%
Pasture Graze Period	None	May – July: Generally not to exceed 30 days August – October: Generally not to exceed 45 days
Grazing Management System	None	Deferred Rotation or Deferred, Rest-Rotation
Structural Range Improvements – Alterations	None	• New pasture division fence in Headquarters pasture • Naturalize Snowbowl Tank
Structural Range Improvements – Maintenance of existing improvements	None	Structural Range Improvements within the allotment will be maintained by the permittee
Monitoring	None	Implementation and Effectiveness Monitoring
Adaptive Management Strategy	No	Yes

Table 2. Alternative Comparison by Purpose and Need

Purpose and Need	No Action	Proposed Action
Alternative meets or moves the area towards Forest Plan objectives	May not meet multiple-use objectives	Yes
Alternative meets or moves the area towards desired conditions	Yes	Yes
Alternative maintains or improves upland vegetation conditions	Yes	Yes

Table 3. Summary of environmental consequences by alternative

Resource		Alternative 1: No Action	Alternative 2: Proposed Action
Soil	Biomass/ Litter	Less biomass removal, standing crop should increase with grazing only by wildlife.	Light to moderate grazing stimulates plant production, which could produce more above-ground biomass that would be available for litter.
	Compaction	No compaction from livestock would occur. Snowbowl Tank would remain: compaction around the tank from wild ungulates would continue.	Some compaction would occur where livestock congregate near water sources. Removing Snowbowl Tank would reduce the compaction effects from wild ungulates.
	Soil Condition	Current satisfactory watershed soil condition would be maintained.	Soil classification would be maintained and/or improved congruently with improved soil conditions through the use of Adaptive Management principles.
Watershed	Quantity	No effect	Snowbowl Tank would be removed and the area would be restored to a more natural state. Snowbowl Tank is outside the area proposed for livestock grazing, but prevents water from accessing Bebb willow downstream.
	Quality	No effect	No live streams occur within the area proposed for continued livestock grazing: so there would be no effect.
Upland Vegetation Condition and Trend	Vegetation Diversity and Density	Vegetation condition and trend is expected to remain static or move upward, except in areas where overstory species limit improvement potential. The ability for improvement in vegetation condition and trend would be most affected by climatic conditions. Measurable differences in vegetation condition and trend between the alternatives is not expected.	
	Vegetation Height and Canopy Cover	Short term reductions in the height and canopy cover of herbaceous vegetation from livestock grazing would not occur. A long-term measurable difference between the alternatives is not expected.	Short term reductions in the height and canopy cover of herbaceous vegetation from livestock grazing would occur. The reduction in plant height and cover, as a result of grazing, does recover with favorable climatic conditions. A long-term measurable difference between the alternatives is not expected.
	Vegetation Production	Forage production and quality are expected to have a short-term increase (1-3 years), followed by a period	Forage production and forage quality is expected to be maintained and enhanced by light to moderate grazing.

Resource		Alternative 1: No Action	Alternative 2: Proposed Action
		of stabilization and then declining (years 5+).	
Structural Improve-ments	Improvements would not be constructed and Snowbowl Tank would not be naturalized. Existing improvements would not be maintained or removed: a loss of water available for wildlife would be realized as stocktanks fill with sediment and the pipeline/drinker system degrades.		The removal of Snowbowl tank would help reduce the elk concentration in the area and thus reduce browsing pressure on nearby Bebb willow. Construction of a pasture fence in the Headquarters pasture would have short-term effects to upland vegetation; however plant height and canopy cover would recover with favorable climate conditions.
Wildlife	**Threatened, Endangered, Forest Service Sensitive Species**		
	Mexican Spotted Owl	No effect	No livestock would be present in the Mexican Spotted Owl PACs (protected habitats) and restricted habitat if this alternative was implemented, so no effect on Mexican spotted owls would occur.
	Mogollon Voles & Merriam's Shrew	No effect	The Proposed Action may impact Mogollon vole and Merriam's shrew individuals, but is unlikely to result in a trend toward federal listing or loss of viability: although 68% of the allotment would be deferred, it is possible that livestock grazing in the remaining 32% could result in a loss of cover and food.
	Western Red Bat, Allen's Lappet-browed Bat, & Townsend's Big-eared Bat	The western red bat, Allen's lappet-browed bat, and the Townsend's big-eared bat would benefit from the absence of direct and indirect effects from livestock grazing on them and their habitat, as the absence of livestock grazing can cause: an increase in the quality and quantity of wildlife food, cover and shelter; increased animal abundance; and increased abundance of prey species.	Due to the potential for livestock grazing and livestock management activities to disturb roosting western red bats, Allen's lappet-browed bats, and Townsend's big-eared bats, the determination is that the Proposed Action may impact these species, but it unlikely to result in a trend toward federal listing or loss of viability.

Resource		Alternative 1: No Action	Alternative 2: Proposed Action
	Wintering Bald Eagles	No impact	Wintering eagles usually arrive in late October or early November, and leave in early to mid-April. As the season of use for livestock grazing would be May 15 to October 15, livestock would be absent from the allotment for the majority of the wintering eagle's stay. Grazing would also not occur near bald eagle winter roosts or in areas where they forage. Because of this, the Proposed Action would have no impact on wintering bald eagles.
	Northern Goshawk, Ferruginous Hawk & Burrowing Owl	No impact	Grazing can impact the density and abundance of a number of prey species hunted by northern goshawks, ferruginous hawks, and burrowing owls, however the use of a rotational grazing system and adaptive management would help mitigate the effects of grazing on these species. The Proposed Action may impact individuals, but is unlikely to result in a trend toward federal listing or loss of viability.
	Mountain Silverspot Butterfly, Blue-black Silverspot Butterfly, and Four-spotted Skipperling	No impact	Livestock grazing may affect host plants, but the Proposed Action is unlikely to result in a trend toward federal listing or loss of viability.
	Management Indicator Species		
	Pronghorn Antelope	No effect	One new fence is proposed and would be built to pronghorn standards if the area is deemed to be important to pronghorn movement. Livestock grazing could potentially reduce fawn hiding cover and create more competition for early spring forage. However, when compared to the total amount of grassland habitat on the forest and considering the marginal habitat available to pronghorn on the allotment

Resource		Alternative 1: No Action	Alternative 2: Proposed Action
			(due to fragmentation from roadways, community development, fencing and grassland encroachment), the Proposed Action alternative is not likely to result in a change in the forest-wide trend for pronghorn.
	Red-naped Sapsucker	No effect	The area to be grazed contains minimal aspen and so grazing would nd red-naped sapsucker habitat.
	Mule Deer	No effect	The proposed fence would be built to pronghorn standards, which would also allow for the same continuation of movement for mule deer.
	Migratory Birds		
	No effect		Disturbance from livestock grazing activities may cause short-term direct adverse effects; however the continued deferrment of 68% of the allotment would reduce impacts.
	General Wildlife		
	No effect		The deferment of 68% of the allotment from livestock grazing would greatly reduce any effects.
Special Status Plants	No direct effect The absence of cattle grazing in potential habitats of TES plants within the allotment would have minor indirect effects on all TES plants, including slight reductions in factors such as soil compaction that may be occurring in the area.		The removal of Snowbowl Tank would be beneficial to the plant community—especially the Bebb Willow—by contributing to the restoration of the water regime. An additional effect would be the reduction of ungulate grazing in the area, including fewer wild ungulates at the localized site. The removal of Snowbowl Tank and associated disturbances could result in the short-term loss of individual plants or population groups of Rusby milkvetch during the removal process. The construction of a fence in the Headquarters pasture may have minimal effects on individuals of Sunset Crater

Resource		Alternative 1: No Action	Alternative 2: Proposed Action
			beardtongue; effects from grazing would also be minor and incidental.
Noxious Weeds	The no action alternative would remove effects from grazing such as noxious weed seed distribution and livestock management-related ground disturbance. Cumulative effects would otherwise remain much the same as in the proposed action, including the realignment and expansion of US Highway 89N, motorized use of forest roads and wildfire suppression activities. Ground-disturbing activities on non-forest lands, such as the maintenance of public and private roadways, would also continue.		Livestock may transport invasive weed seeds as they move from one area to another when the seeds attach to the animal and are dropped in another area, or when livestock eat the plant/seed and leave the seeds in other places in their waste. Additionally, mechanical equipment used in conjunction with management of the allotment can transfer seeds or plant parts. Ground disturbance caused by livestock or equipment used in the management of the allotment could also create new seed beds, thereby potentially aiding in the establishment of invasive species. Ongoing range management would include monitoring and treating noxious weeds, as well as following Best Management Practices for mitigating the spread and introduction of such plants.

Chapter 3 – Affected Environment and Environmental Consequences

This chapter provides information concerning the affected environment of the Peaks Allotment project area, and potential consequences to that environment from the two alternatives. It also presents the scientific and analytical basis for the comparison of alternatives presented in the previous chapter linked to references and specialist reports. The following analysis of environmental consequences is organized by resource area and discloses the direct, indirect, and cumulative effects of the proposed action and alternative on those resources. *Direct effects* are those caused by the action and occur at the same time and place. *Indirect effects* are caused by the action and are later in time or farther removed in distance. *Cumulative effects* are the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. To analyze cumulative effects, activities and natural events that overlap in time and space with the proposed activities and project area were considered. This area is referred to as the *cumulative effects area* in this EA. The cumulative effects area varies by resource type and is defined under each resource area analyzed in this chapter.

Effects are quantified where possible, and qualitative discussions are also included. The means by which potential adverse effects would be reduced or mitigated are described (see also Chapter 2). The project record for the Peaks Allotment EA (accessible at the Peaks/Mormon Lake Ranger Districts) includes all project-specific information, including resource reports, watershed analyses, and other results of field investigations.

Soil and Water

This section assesses soil condition, water quality, water quantity and riparian condition in the Peaks Allotment planning area. The existing condition for soil and water is described only on the area within the allotment proposed for livestock grazing; approximately 48,900 Forest Service acres[1].

Soil condition is a combination of dynamic factors including vegetation type and litter production, the level of infiltration and compaction, and resistance to erosion. The unit of measure for soils focuses on change to vegetation resources (plants and litter) that provide nutrient cycling and erosion control through litter development. No quantitative measure will be used to discuss effects; rather, the effects will be discussed in narrative fashion using research as a guide for effects. Watershed condition is based on evaluation of the soil, aquatic and riparian systems as prescribed by the watershed classes defined in Forest Service Manual 2520 (USDA 2004).

Soil Condition

Soil condition ratings are based on the three primary soil functions: soil hydrologic function, soil stability and nutrient cycling. Soil condition ratings fall into three categories: satisfactory, impaired and

[1] Note about acreage: All acreage figures shown in this report are approximate and were determined using GIS software (ArcMap 9.3). Minor differences in the acreage displayed may occur due to “floating point rounding errors” in Excel spreadsheets and/or the data accuracy of the various GIS databases accessed.

unsatisfactory. A rating of *satisfactory* indicates that soil function is being sustained, and that the soil is maintaining resource values and sustaining outputs. A rating of *impaired* indicates that the ability of soil to function properly and normally has been reduced, and/or there is an increased vulnerability to degradation. A rating of *unsatisfactory* signifies that a loss of soil function has occurred, resulting in the inability of the soil to maintain resource values, sustain outputs or recover from impacts.

The assessment used in this analysis is based primarily on the ability of the soil to resist erosion. 97% of the soils are in satisfactory condition, while 2% are considered impaired, and 1% is considered satisfactory, but inherently unstable. This 1% of satisfactory, but inherently unstable soils is located in the Headquarter pasture. There are no unsatisfactory soils within the area grazed by livestock.

Litter

Litter in the form of vegetation matter on-site can be broken down into three types, or mulch components: cured herbage, ground litter; and humus. Each of the three mulch components contributes in a vital way to soil, plant, and watershed health: cured herbage slows the flow of rainfall and dislodged soil from the site; ground litter provides a cushion between rain drops and the soil, preventing "splash effect" or the dislodgement of soil particles from rain drops; humus provides nutrients for plant growth and binds soil particles together (Molinar, et al. 2001).

Litter on-site was sampled in eight areas in August and September of 2009, and was found to be mostly in above natural conditions as defined in the Coconino National Forest Terrestrial Ecosystem Survey (TES) (Miller et al. 1995), with the only impaired soil containing deficit litter below natural levels on Map Unit 41 (which occurs in pastures 13, 18, Headquarters and Missouri Bill pastures). Litter levels were below natural levels in some areas of Badger, Kelly, Kendrick Park and Saddle Mountain pastures, but overall contained satisfactory soil condition. Field review displayed very little evidence of ungulate grazing. The current grazing scheme appears to be grazing at a level that more than adequately maintains litter on-site, as evidenced by the litter above natural conditions over a majority of the site.

Grazing and above ground biomass

Grazing can stimulate plant production and increase Annual Net Primary Production (ANPP), which can produce more above-ground biomass that would be available for litter and thus improve soil conditions (Loeser et al. 2004 and Eneboe 2002). Drought does have an effect on ANPP and above-ground standing crops, which would also affect litter available for nutrient cycling (Enoboe et al. and Heinshmidt et al. 1999). However, according to Holecheck et al (2003) light grazing (30% utilization) does leave a higher amount of vegetation standing crop than moderate grazing (50% utilization), and perennial grass survival is higher in a lightly grazed scenario than a moderately grazed one. In further studies between heavy, moderate and light grazing intensities, Holocheck et al (1999) noted that when averaging forage production reports,

…heavy stocking overall resulted in a 20% decline in forage production, moderate stocking had no change, and light stocking resulted in an 8% increase. In drought years moderately stocked pastures produced 20% more forage than those heavily stocked. Forage production was 49% higher under light than heavy grazing and 24% higher under light than moderate grazing. These studies consistently showed that the greatest benefit of light or conservative stocking in terms of forage production occurred in the dry years (p13).

Loeser et al. (2004) also noted that grazing on Northern Arizona grassland can increase the annual net primary production (ANPP) of plants over non-grazed situations. This increase was mainly due to the increased production of squirreltail. Loeser et al. noted that this increased from 31-45% for a single defoliation event and 17% to 26% on sites that had a history of defoliation through grazing or clipping. This increase suggests that there is a plant compensation response that occurs from grazing. However, the study noted that the ANPP of western wheatgrass did not exhibit a statistically large difference between grazed and ungrazed plots: the change in ANPP for the entire site was driven by the squirreltail. So increases in productivity may be more the result of an increase in grazing-tolerant species rather than all species. Thus, while short term effects of grazing include increased productivity, the long term effects may be a loss of plant diversity (Loeser et al 2004, p446).

A variety of studies show that the greater the intensity of the graze, the greater the detrimental effect to soil physical properties (Gifford and Hawkins 1978, Wood and Blackburn 1981, Warren et al. 1986, Belsky et al 1999). For example, compacted soils decrease infiltration rates, which in turn increase runoff and overland flow, and reduce plant productivity and vegetative ground cover as less moisture is available to plants (Dormaar et al 1989; Abdul-Magid et al 1987; Van Haveren 1983; Warren et al 1986; Clary and Medin 1990; Clary 1995; Belsky et al 1999). The greater the compaction, the less infiltration, and the harder it is for plants to grow (Belsky et al 1999). Warren et al (1986) note that low and moderate intensity grazing had a minimal effect on infiltration, and that high intensity grazing had a high negative effect on infiltration.

Savory and Parsons (1980) and Savory (1988) note that grazing can have a positive impact to soils by cattle hoof action that removes compaction and prepares the site for seed and plants the seed. Key to their argument is that the animals break up the surface crust and incorporates organic material into the soil surface. The organic material appears to be the key ingredient in the break-up of the compaction, as well as the subsequent root mass from seeds that are planted by grazing animals.

Others disagree with the assertions above and state that grazing can cause a decrease in infiltration rates (Gifford and Hawkins 1978; Wood and Blackburn 1981; Warren et al. 1986; and Belsky et al. 1999). Belsky et al. 1999 note that the effects of grazing on infiltration occur in areas where cattle tend to congregate. They further note that decreased infiltration causes soil compaction from hoof action and reduced plant cover, litter, and organic matter. This change in soil physical structure can increase overland flow and erosion reduced soil water content and plant growth (Belsky et al. 1999). The studies note that the greater the intensity of the graze, the greater the detrimental effect on infiltration. Low and moderate intensity grazing have similar effects to infiltration (minimal), with high intensity grazing having the highest effect on infiltration (Warren et al. 1986). Soils trampled under high intensity grazing did show some recovery of infiltration rate after non-use, but they did not approach the pre-trampled condition (Warren et al. 1986). Note that the research is targeting grazing intensity and not grazing utilization. Therefore, early season grazes that are allowed at a higher grazing intensity because there is recovery and re-growth on plants actually have the potential to cause soil damage (compaction and the subsequent loss of infiltration) over late season grazes that are at a lower grazing intensity.

Water Quality

No live streams occur within the area proposed for livestock grazing in the Peaks Allotment. Therefore, there will be no discussion of effects to water quality within this analysis.

Water Quantity

There are approximately 38 stock tanks within the area proposed for livestock grazing totaling approximately 11 acres. Snowbowl Tank is outside the area grazed by livestock, and currently prevents water from accessing the population of Bebb willow downstream. Field review of Snowbowl Tank during the summer of 2009 showed that there was little evidence of soil compaction and litter loss around the tank, with approximately ¼ acre in unsatisfactory soil condition (compacted).

Riparian Condition

There are approximately 20 miles of stream courses within and adjacent to the area grazed by livestock within the Peaks Allotment. Of these, there are no identified riparian stream courses. The non-riparian streams flow only in response to moisture events. Therefore, there will be no discussion of effects to riparian streams in this analysis.

Watershed Area

An important component of watershed condition is soil condition. The project occurs within portions of seven watersheds (Table 4) for a total cumulative effects boundary of approximately 199,000 acres.

Table 4. Sixth code watershed acres that the grazed project area occurs within. Acres are gross acres and include private land.

HUC_NAME	acres	acres in grazed area	% of 6th code
Campbell Francis Wash	28,005	4,143	15%
Citadel Wash	34,386	10,941	32%
Jackrabbit Wash	39,424	2,870	7%
Klostermeyer Lake	28,109	14,392	51%
Middle Deadman Wash	22,888	8,208	36%
Upper Cedar Wash (Local Drainage)	23,476	2,943	13%
Upper Deadman Wash	22,752	6,153	27%
	199,038	**49,651**	**25%**

Alternative 1: No Action

Direct and Indirect Effects

The No Action Alternative would remove all livestock from the allotment, resulting in no removal of biomass, an increase in standing crop, and no compaction from livestock. Indirect effects of increased canopy cover would be the same as those discussed in the following Proposed Action analysis, with the exception that there would be no re-graze on succulent re-growth in the No Action Alternative.

Cumulative Effects

The cumulative effects boundary for soil and watershed are the seven watersheds that overlap with the project area, totaling approximately 199,000 acres. Past, present and reasonably foreseeable projects include grazing, wildfire, permitted hunting, dispersed recreation, road maintenance, fuels reduction,

forest health restoration projects, and private land development. There are approximately 150,000 acres of grazing over the entire cumulative effects boundary.

Under the No Action Alternative, there would be approximately 49,000 less acres of grazing that could potentially increase the standing crop available for litter production left on-site. This represents a 25% reduction of direct grazing impacts (loss of biomass and compaction) within the cumulative effects boundary, as there would be approximately 110,000 acres still left in grazing. The amount and timing of precipitation dictates how much that affects the soil condition. Stock tanks would still be in place, but there would be a reduction in the amount of animal impact with use only by wild animals. Salting would not take place within the allotment which would also reduce the acres of disturbance, though not considerably.

The Travel Management Rule (TMR) implementation would improve soil and watershed conditions by reducing open road density. The proposed thinning and burning under the Hart Prairie Fuels Reduction and Forest Health Restoration Project (Hart Prairie Project) is expected to reduce the risk of a high intensity, stand replacing wildfire on over 2,600 acres, or about 1% of the cumulative effects boundary.

Geothermal leasing activities may occur within the cumulative effects boundary for this project and have the potential to increase the impact to the upland vegetation within portions of the analysis area of the Peaks Allotment. However exact locations or timelines for geothermal leasing activities have not been identified at this time.

In summary, the No Action Alternative would maintain current soil conditions. Less biomass removal from impaired soils would increase biomass and would trend those sites toward satisfactory. Overall, the current watershed soil condition would also be classified as satisfactory.

Alternative 2: Proposed Action

The following summary of research discusses the effects of grazing on plant production, which in turn affects the amount of potential biomass produced, and the effects of grazing on soil infiltration and compaction. Also discussed are the effects of tank naturalization on surrounding soil conditions.

Direct and Indirect Effects

The Proposed Action would not add any additional acres of grazing treatments over the current condition. Livestock grazing would reduce biomass on site, but not to the point of bare soil. There would be ground disturbance to mineral soil near watering sites and where salt is used to distribute animals across the pasture. The use of Adaptive Management principles, especially varying utilization and stocking numbers during and immediately after drought, and Best Management Practices (BMPs), would maintain and improve vegetative conditions. Soil conditions within the area proposed for livestock grazing would also be improved concurrently with improved vegetative conditions, and would see greater improvement in wet cycles as litter creation increases in wetter conditions. Under an adaptive management scenario, utilization could actually be managed from 0% utilization (cattle removal) up to the 40% maximum level. The effect to soil resources, and in particularly litter production, is the lower the utilization level, the greater the amount of standing crop available for litter for nutrient cycling, and, according to Holocheck et al. (1999), the greater the forage production.

Compaction is expected to occur where cattle congregate within the area proposed for livestock grazing, primarily near water and salt sources. However this is a small percentage of the allotment. No compaction is expected in the ungrazed portion of the allotment. Adaptive management would minimize compaction in the grazed area by modifying utilization and cattle numbers.

If precipitation occurs and maximum utilization of 35% is not exceeded, litter would increase over time, improving soil structure, and minimizing the compaction effects of cattle. The lower the utilization level, the more standing crop there would be for litter incorporation into the soil.

The current grazing scheme appears to be grazing at a level that more than adequately maintains litter on-site, as evidenced by the litter above natural conditions over a majority of the area, and this is anticipated to continue with the Proposed Action.

If utilization levels are adjusted for drought and wet cycles, then the net effect would move impaired soils to satisfactory over time under the Proposed Action. Improved soil condition equates to improved watershed condition, and thus this alternative would move towards the Forest Plan standard and guideline for improving watershed condition by the year 2020, although it may not be fully attained by this time if drought conditions persists.

There would be minimal impact to soil structure from the construction of four miles of fence in the Headquarters pasture.

The naturalization of Snowbowl Tank would occur on less than one acre of ground, and is outside of the area proposed for livestock grazing. The removal of the tank and contouring of the area back to a natural gradient would remove the compacted portion of the tank, and restore the soil condition to a satisfactory condition over time. This would allow water upstream to reach the Bebb willow community below Snowbowl Tank. Without the presence of Snowbowl Tank to attract grazing ungulates, the surrounding vegetation would receive less impact from direct grazing.

Cumulative Effects

The cumulative effect boundary and duration of the effects are the same as in the No Action Alternative. The Proposed Action would continue with the approximately 150,000 acres of grazing over the entire cumulative effects boundary. The Proposed Action represents approximately 25% of the area grazed in the cumulative effects area.

There are approximately 130 known watering sites (stock tanks, metal tanks, springs and wells) within the cumulative effects boundary. Assuming an acre of disturbance with each site, there are approximately 130 acres of ground disturbance within the cumulative effects boundary from water sites. For the nature of this analysis, we will assume an equal acreage of ground disturbance for salting sites, though this is likely greatly overstated. Fence construction would disturb at most one acre of ground from t-post installation. Therefore, direct ground disturbance to mineral soil from this action would be about 260 acres, which represents less than 1% of the cumulative effects area. The less than one acre of ground disturbance at the tank naturalization site would improve over time due to the reduced impact from animals watering at the site.

Indirect effects include grazing by other wild animals following the succulent re-growth after each livestock grazing cycle. This can have a negative effect to soil condition through a reduction in biomass if it drops below acceptable levels. Therefore, wild ungulate grazing would be an indirect, and cumulative, effect from livestock grazing.

The Travel Management Rule (TMR) implementation would improve soil and watershed conditions by reducing open road density. The proposed thinning and burning under the Hart Prairie Project are expected to reduce the risk of high intensity/stand replacing wildfire on about 1% of the total cumulative effects area for this project, or just over 2,600 acres. The ground disturbance from the Hart Prairie Project is expected to be approximately 300 acres, which is less than 1% of the total cumulative effects area. The Hart Prairie Project does not overlap with the area proposed for grazing under the Proposed Action.

Geothermal leasing activities may occur within the cumulative effects boundary for this project and have the potential to increase the impact to the upland vegetation within portions of the analysis area of the Peaks Allotment. However exact locations or timelines for geothermal leasing activities have not been identified at this time.

The Proposed Action is expected to maintain current satisfactory soil conditions, and—with proper management during drought and wet cycles—may improve the impaired soils. Improved soil condition equates to improved watershed condition; thus, this alternative would move toward the Forest Plan standard and guideline for improving watershed condition by the year 2020, albeit dependent on persisting drought conditions.

Vegetation

This section describes the environmental consequences to vegetation found in the uplands, woodlands, and grasslands. Also described are the vegetative communities found in the area grazed by livestock (i.e., analysis area), the grazing capability, vegetative condition and trend, forage utilization and seasonal grazing intensity/use, forage production, and estimated grazing capacity. The following information is summarized from the Range Specialist Report located in the project record.

The analysis area in the Peaks Allotment primarily contains five vegetative communities, See Table 5.

Table 5. Vegetation Communities Within Area Grazed by Livestock

Vegetation Community Type	acres	percent of area
Ponderosa Pine	13,565	28%
Mountain Grasslands	893	2%
Pinyon-Juniper Woodland	25,881	53%
Pinyon-Juniper Grasslands	5,268	11%
Semi-Desert Grassland/Desertscrub	3,302	7%

Ponderosa Pine

The ponderosa pine community occupies approximately 28% of the analysis area. The overstory is dominated by ponderosa pine and gambel oak; other overstory species that occur include aspen, pinyon pine, and juniper. The primary herbaceous species present include Arizona fescue, mountain muhly, mutton grass, pine dropseed, squirreltail, and blue grama.

Mountain Grasslands

Mountain grasslands represent approximately 2% of the analysis area and are interspersed within the ponderosa pine type. Arizona fescue, mountain muhly, western wheatgrass, squirreltail, and a variety of perennial forbs represent the dominant vegetation on these sites. Mountain grassland boundaries are often indiscrete due to encroachment of ponderosa pine. Previous fire exclusion and suppression, climate change, and decreased grass competition due to heavy grazing may have encouraged encroachment of ponderosa pine into these grasslands (Jameson, 1987; Tausch and West, 1994). As tree encroachment continues, overstory cover would increase, resulting in a corresponding decrease in grass and forb production.

Pinyon-Juniper Woodland

The analysis area is dominated by the pinyon-juniper woodland vegetation type (53%). The overstory is dominated by pinyon pine, Utah juniper, one-seed juniper, and alligator juniper. Small inclusions of ponderosa pine occur within the higher elevation sites. Primary herbaceous species include: blue grama, sideoats grama, western wheatgrass, and squirreltail.

Pinyon-Juniper Grasslands

The pinyon-juniper grassland sites occur on approximately 11% of the analysis area. This vegetation type is interspersed within the pinyon-juniper woodland type. Blue grama and western wheatgrass dominate these grasslands with squirreltail, sideoats grama, and mutton grass occurring throughout. Stand boundaries are often indiscrete due to encroachment of pinyon and juniper. Previous fire exclusion and suppression, climate change, and decreased grass competition due to heavy grazing may have encouraged encroachment of pinyon pine and juniper into these grasslands (Jameson, 1987; Tausch and West, 1994). As tree encroachment continues, overstory cover would increase, resulting in a corresponding decrease in grass and forb production. In an effort to reverse this trend, various vegetation treatments (mechanical pushes, chaining, and prescribed fire) have been conducted in the past. Some of these sites are currently being re-occupied with primarily juniper trees.

Semi-Desert Grassland/Desertscrub

The semi-desert grassland/desertscrub vegetation type is present on approximately 7% of the analysis area. This vegetation type is located on the lowest elevation sites and is dominated by shrub and herbaceous species. Major shrub species present include rabbitbrush, four-wing saltbush, and winterfat. Primary herbaceous species include: black grama, galleta, blue grama, sideoats grama, needle-and-thread, and squirreltail.

Grazing Capacity

Grazing capacity is dependent upon the interrelationship of soils, topography, plants and animals. Grazing capacity is expressed as one of three capability classes: Full Capacity (FC), Potential Capacity (PC) and No Capacity (NC) (Region 3 Rangeland Analysis and Management Training Guide; June, 1997; 2.8-2.10). *Full Capacity* includes areas that can be used by grazing animals under proper management without long-term damage to the soil or vegetative resource. They must also produce a minimum of 100 pounds per acre of forage and are on slopes less than 40 percent. *Potential Capacity* includes areas that could be used by grazing animals under proper management but where soil stability is impaired, or range improvements are not adequate under existing conditions to obtain necessary grazing animal distribution. Grazing capacity may be assigned to these areas, but conservative allowable use assignments must be made. *No Capacity* includes areas that cannot be used by grazing animals without long-term damage to the soil resource or plant community, or are barren or unproductive naturally. In addition, it includes areas that produce less than 100 pounds per acre of forage and/or are on slopes greater than 40 percent. Grazing capacity is not assigned to sites with a “no capacity” classification.

Livestock use patterns on the allotment indicate that livestock make full use of relatively flat areas (0-10% slope), moderate to light use of areas with 11 to 40 % slope, and typically avoid areas with slopes greater than 40%. The initial classification resulted in areas with a slope of 0-40% being classified as Full Capacity and areas of steep slopes (greater than 40% slope) being classified as No Capacity. The analysis of livestock use patterns did not indicate the need for additional changes to the initial grazing capability classification.

Within the area grazed by livestock on the Peaks Allotment, approximately 46,060 acres (94%) is given a rating of full capacity. Areas given a potential capacity include approximately 877 acres (2%), which include the impaired soils discussed in the soil section. And a no capacity rating is given to approximately 1,880 acres (4%), which includes all slopes >40% and those acres classified as "satisfactory, but inherently unstable" (which are located on slopes greater than 40%).

Vegetation Condition and Trend

Vegetation condition and trend are assessed at six permanent monitoring locations within the analysis area. Table 6 provides a summary of the condition and trend data for the six permanent monitoring locations based on data collected in 2007.

Table 6. Summary of Vegetation Condition and Trend

Plot #	Location	Dominant Species	Range Capability Rating	Condition	Trend
C1	Headquarters Pasture; 1 mile N of Grand Canyon Tank	juniper, pinyon pine, blue grama, hairy grama, squirreltail	Full Capacity	Satisfactory	Static
C3	Headquarters Pasture; 1 mile E of Antelope Tub	winterfat, rabbitbrush, black grama, galleta, blue grama	Full Capacity	Satisfactory	Static
C4	Headquarters Pasture; 1.5 miles SW of Antelope Tub	winterfat, rabbitbrush, black grama, galleta, blue grama	Full Capacity	Satisfactory	Improving
C2	Missouri Bill Pasture; 0.75 miles SW of Cienega Tank	juniper, pinyon pine, blue grama, sideoats grama, squirreltail	Full Capacity	Satisfactory	Improving
C1	Badger Pasture; 0.5 miles SW of Bonita Tank	ponderosa pine, juniper, blue grama, squirreltail, muttongrass	Full Capacity	Satisfactory	Improving
C4	Kelly Pasture; 1.25 miles NE of Kelly Tank	ponderosa pine, Gambel oak, Az. fescue, mountain muhly, muttongrass	Full Capacity	Satisfactory	Static

Forage Utilization and Seasonal Grazing Intensity/Use

Utilization is the amount of current year's herbaceous material removed through grazing or trampling compared with the total amount of herbaceous material produced during the year. Utilization is measured

at the end of the growing season when the total annual herbaceous production can be determined. Seasonal intensity/use is the amount of herbaceous material removed through grazing or trampling during the grazing period.

Forage utilization and seasonal intensity/use records exist for the analysis area of the Peaks Allotment for grazing seasons from 2002 to 2006, 2008, and 2009. These records represent 35 grazing periods with varying numbers of authorized livestock and across a wide variety of annual climatological and vegetative growth conditions. For these records, utilization averaged approximately 13%; the highest documented utilization was 35%, and the lowest documented utilization was 0%. For 91% of the grazing periods that occurred during this time period, utilization was documented at less than 30%, and 82% of the grazing periods had documented utilization of 20% or less. Twelve grazing periods resulted in documented utilization of 0-10%. Seventeen grazing periods resulted in documented utilization of 11-20%. Three grazing periods resulted in documented utilization of 21-29%. Three grazing periods resulted in documented utilization of 30-35%. These records indicate that under favorable climatological and vegetative growth conditions, additional grazing capacity is available within the analysis area for the Peaks Allotment.

Forage Production

The major components of forage production within the analysis area of the Peaks Allotment are warm season grasses. Forage production varies widely on an annual basis dependant primarily on precipitation. Estimates of forage production were made within the analysis area of the Peaks Allotment from August 2009 to October 2009, and were found to have an average annual forage production of approximately 150 pounds/acre. The 2009 growing year resulted in below average forage production due to the amount and timing of precipitation. Thus, the average forage production figure of approximately 150 pounds/acre most likely represents the lower end of the annual forage production variability. However, using this forage production rate would result in a conservative estimated grazing capacity; one which would most likely result in a more consistent, sustainable livestock operation while allowing for improvement in the vegetation and soil resources.

Alternative 1: No Action

Direct and Indirect Effects

Under this alternative, livestock grazing would not occur and as a result, there would be no direct effects from cattle grazing on upland vegetation. Wildlife would continue to graze on the allotment, creating localized impacts and potentially areas of excessive utilization.

Short-term changes in vegetation density and diversity may be observed under this alternative. These changes would be most noticeable and occur most rapidly in the moist sites within the analysis area (less than 5% of the analysis area). Within the drier sites (greater than 95% of the analysis area), these changes would likely occur much more slowly. However, a long-term increase in vegetation density and diversity is not expected due to livestock removal. Courtois et al (2004) found few differences in species composition, cover, density, and production in comparing 16 long-term livestock exclosures (65 years) with adjacent areas that had been moderately grazed. Similar results have been found locally on the Coconino National Forest at exclosures on the Pickett Lake and Anderson Springs allotments. Under this alternative, vegetation density and diversity is expected to remain static or move upward, except in areas where overstory species limit improvement potential.

Forage production and forage quality, mainly warm season grasses, are expected to have a short-term increase (1-3 years), followed by a period of stabilization and then decline (years 5+). Holechek (1981) reported that forage production and quality is maintained and enhanced by light to moderate grazing. Under this alternative, wildlife would continue to graze within the analysis area and maintain forage production and forage quality on small areas. However, with no livestock grazing, maintenance of forage production and forage quality over large areas would not occur.

Under this alternative, structural range improvements would not be constructed and Snowbowl Tank would not be naturalized; as a result there would be no direct or indirect effects relating to those activities. An additional direct effect would be that the existing improvements would not be maintained or removed. Indirect effects would be realized through a loss of water available for wildlife as stocktanks fill with sediment and as the pipeline/drinker system degrades.

Cumulative Effects

The cumulative effects analysis for upland vegetation is confined to the analysis area of the Peaks Allotment. The past, present, and reasonably foreseeable future activities considered in the cumulative effects analysis for vegetation include: dispersed recreation, firewood gathering, hunting, roads, OHV use, wildlife grazing, the Coconino National Forest Travel Management Plan, and potential geothermal leasing activities.

The absence of livestock grazing, in combination with dispersed recreation, firewood gathering, hunting, roads, OHV use, wildlife grazing, and potential geothermal leasing activities, are not expected to cumulatively affect the vegetation density, vegetation diversity, plant height, and canopy cover of understory plants. Cool-season grasses would continue to receive a disproportionate share of the grazing by wildlife. If wild ungulate numbers across the landscape fluctuate up or down (which could be the result of weather or hunt numbers or a combination of these two main factors), this would also affect vegetative resources on the allotment as plants are either allowed to recover from grazing effects or are continually grazed. Wildlife would continue to graze within the analysis area and maintain forage production and forage quality of warm season grasses on small areas, however there could be a small decline in this forage production as there would be no managed grazing across large areas.

Wildlife would continue to graze within the analysis area, creating localized impacts and potentially areas of excessive utilization. The other activities identified would also continue, creating localized impacts to upland vegetation. Changes in road management and OHV use through the Travel Management Rule would lessen the impact to the upland vegetation across the Peaks Allotment. Exact locations for geothermal leasing activities have not been identified at this time, but this activity does have the potential to increase the impact to the upland vegetation within portions of the analysis area of the Peaks Allotment.

Alternative 2: Proposed Action

Direct and Indirect Effects

Under this alternative, livestock grazing would occur and as a result, there would be direct and indirect effects from cattle grazing on upland vegetation. Adaptive management and monitoring would mitigate any adverse direct and indirect effects. Wildlife would also graze on the allotment, creating localized impacts and potentially areas of excessive utilization.

Livestock grazing would reduce plant height and canopy cover. This reduction could lead to a decrease in grass, forb and shrub plant species composition, plant canopy cover, plant abundance, plant production and ground cover. However, these impacts would be managed through forage utilization and grazing intensity and the effects to vegetation from livestock grazing would be negligible. Adaptive management and monitoring would provide the ability to reduce management guidelines if needed to maintain or improve vegetation conditions. In Galt et al. (2000), a 25% utilization guideline is recommended for livestock, with 25% allocated for wildlife and natural disturbance, and the remaining 50% left for site protection. Under this alternative, wildlife use is included within the proposed forage utilization guideline of 30-40%. As a result, this alternative leaves 60 to 70% of forage production available for site protection, which is above what Galt et al. recommend. If the findings in Galt et al. are transferred to grazing intensity rather than utilization, the grazing intensity guidelines established for this alternative would result in 50 to 70% of the forage production remaining on site after livestock grazing occurs to reproduce, grow to maturity, build necessary root mass, produce seed heads, produce litter important for nutrient cycling, and propagate and move into new areas. This would meet or exceed the recommendations proposed by Galt et al.

Furthermore, findings in Courtois et al (2004), Loeser (2004), and data available from the Coconino National Forest, Peaks Ranger District, indicate that there is not an increase in grass, forb, and shrub abundance, diversity, and production when the areas are rested or excluded from cattle grazing. Under this alternative, through effective implementation of monitoring and adaptive management, upland vegetation condition and trend is expected to remain static or move upward, except in areas where overstory species limit improvement potential. The ability for improvement in range condition and trend would be most affected by climatic conditions.

Livestock grazing can either improve or decrease plant species composition depending on the timing of grazing. For instance, spring and early summer grazing occurs mainly on cool season species. After the monsoon season, grazing occurs mainly on warm season species. As the weather cools in the fall, use changes back to cool season species. Under this alternative, the grazing use period within a pasture would be seasonally rotated so that forage is grazed and rested at different times each year. Loeser et al. (2004) showed evidence of increased above ground productivity in response to defoliation from cattle grazing. Additionally, Holechek (1981) reported that forage production and quality is maintained and enhanced by light to moderate grazing. By alternating the livestock use and rest periods on cool and warm season species, forage production, forage quality, and plant species composition would be maintained or improved. Additionally, adaptive management and monitoring 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.

The construction of the pasture fence in the Headquarters pasture would have short-term direct effects to upland vegetation. Plant height and canopy cover would be reduced in the immediate area due to construction activities; however, plant height and canopy cover would recover with favorable climate conditions. The proposed pasture fence is designed to have long-term beneficial effects to upland vegetation in the affected pastures, as the fence would allow for improved control in the timing, intensity, and frequency of livestock grazing, which would result in improved upland vegetation condition.

Snowbowl tank is located within the area that would be deferred from livestock use. The naturalization of the tank would help reduce elk concentration in the area and as a result, reduce the browsing pressure on the nearby population of Bebb willow. The naturalization of Snowbowl tank would have short-term direct effects to upland vegetation. Plant height and canopy cover would be reduced in the immediate area due to construction activities; however, plant height and canopy cover would recover with favorable climate conditions. Removal of this water source may result in long-term improvements to upland vegetation condition in the immediate area.

Cumulative Effects

The geographical extent, and past, present, and reasonably foreseeable future activities are the same as described in the No Action Alternative. Livestock grazing, in combination with dispersed recreation, firewood gathering, hunting, roads, OHV use, wildlife grazing, and potential geothermal leasing activities could cumulatively affect the vegetation density, vegetation diversity, plant height, and canopy cover of understory plants.

Under this alternative, livestock grazing would have direct effects to understory plants by reducing plant height and canopy cover. Changes in road management and OHV use through the Travel Management Rule would lessen the impact to the upland vegetation across the analysis area of the Peaks Allotment. The possibility of future geothermal leasing activities within the analysis area has the potential to increase the impact to the upland vegetation across the analysis area of the Peaks Allotment.

When the incremental effects from cattle grazing under the Proposed Action are added to the effects from the other activities, the overall cumulative effect of cattle grazing on upland plant height and canopy cover is more than the No Action Alternative; however, it is expected to remain static or move upward with cattle grazing additive to other activities and natural events. This alternative would not result in a cumulative decline of vegetation condition or trend. In fact, there would be no measurable differences in vegetation condition and trend between either of the alternatives.

Sensitive Plant Species

The following information is summarized from the Botany Specialist Report located in the project record. Sensitive species are defined as “those plant and animal species identified by a regional forester for which population viability is a concern, as evidenced by: (a) significant current or predicted downward trends in population numbers or density, or (b) significant current or predicted downward trends in habitat capability that would reduce a species’ existing distribution” (FSM 2670.5 (19)).

TES Plant Species

Table 7 shows the potential habitat for TES plant species that may occur on the allotment. Several species occur within the boundary of the allotment; however, none occur within the area currently proposed to be grazed by livestock.

Table 7. Threatened, Endangered and Sensitive Plants on the Peaks Range Allotment.

Name	Status	Suitable Habitat Present	Justification
San Francisco Peaks groundsel (*Senecio franciscanus*)	Threatened	Yes	Occurs within the boundary of the allotment but not in the area proposed for livestock grazing.
Rusby’s Milkvetch *(Astragalus rusbyi)*	Region 3 Sensitive	Yes	Rusby milkvetch has been documented in numerous locations within the allotment, including the Hart Prairie area and on the slopes of the San Francisco Peaks, which are not proposed to be grazed by

			livestock.
Crenulate moonwort (*Botrychium crenulatum*)	Region 3 Sensitive	Yes	Occurs within the boundary of the allotment but not in the area proposed for livestock grazing.
Sunset Crater beardtongue (*Penstemon clutei)*	Region 3 Sensitive	Yes	Potential habitat occurs in the northeastern portion of the allotment, though no individuals have been documented.
Blumers' Dock (*Rumex orthoneurus)*	Region 3 Sensitive	Yes	Blumer's dock occurs at Hart Prairie Preserve and in the Fern Mountain Botanical Area, which is not proposed to be grazed by livestock, but may be affected by the removal of Snowbowl Tank.
Bebb Willow (Salix bebbiana)	Region 3 Sensitive	Yes	Occurs at Hart Prairie Preserve and in the Fern Mountain Botanical Area, which is not proposed to be grazed by livestock, but may be affected by the removal of Snowbowl Tank.

Alternative 1: No Action

Direct, Indirect, and Cumulative Effects

There would be no direct effects to TES plants from the No Action Alternative as none of the management actions outline in the Proposed Action would occur. There would be no livestock grazing and no construction of structural improvements in the allotment. Maintenance of the existing structural improvements would require a separate NEPA analysis. The absence of cattle grazing in potential habitats of TES plants within the allotment would have minor indirect effects on all TES plants, as there would be slight reductions in soil compaction that may be occurring in the area, however, these effects would be negligible.

Alternative 2: Proposed Action

Direct and Indirect Effects

Under the Proposed Action, there would be no effect to San Francisco Peaks groundsel or crenulate moonwort. These species occur within the boundary of the allotment but are not in areas affected by the proposed action. Therefore, there are no direct, indirect or cumulative effects from management actions associated with livestock grazing on the allotment.

<u>Rusby milkvetch</u>

There are numerous occurrences of Rusby milkvetch within the allotment; these locations are not in the areas proposed for livestock grazing, but the species may be present in the area affected by the removal of Snowbowl Tank. The removal of Snowbowl Tank and associated disturbances could result in the loss of individual plants or population groups; however, mitigation measures would minimize adverse impacts. An indirect effect includes an increased risk of invasion by noxious or invasive weeds within the potential

habitat for Rusby milkvetch. Incorporating BMPs would mitigate the spread and introduction of weeds within the potential habitat for Rusby milkvetch.

Sunset Crater beardtongue

The construction of a fence in the Headquarters pasture may affect individual Sunset Crater beardtongue plants. The pasture contains potential habitat for this plant. Although no individuals have been documented, some may be present in the area. Effects to potential habitat or individuals would be minimized by implementing mitigation measures outlined in Chapter 2, such as surveying the fence-line before construction. Under this alternative, there may be impacts to individuals of Sunset Crater beardtongue, but any effects are not likely to result in a trend toward federal listing or loss of viability.

Blumer's Dock

There are two documented locations in the Hart Prairie area (south of Fern Mountain); there may be additional undetected populations in the area. Blumer's dock is very palatable to livestock and wildlife, so animals would likely eat plants on unprotected sites. The removal of Snowbowl Tank would be beneficial to the plant community by contributing to the restoration of the water regime. An additional effect would be the possible reduction of ungulate grazing in the area, including fewer wild ungulates at the localized site. However, as Blumer's dock is frequently eaten by grazing wildlife these effects would be minimal and would not likely directly benefit unless the area is fenced.

Bebb willow

Removal of Snowbowl Tank may benefit Bebb willow. As mentioned above, the removal of Snowbowl Tank would contribute to restoring the water regime, and could reduce the amount of ungulate grazing in the area. Removal of Snowbowl Tank would be complimentary to those goals for the Fern Mountain Botanical Area.

Cumulative Effects

Rusby milkvetch

Cumulative effects to Rusby milkvetch may include past and ongoing management actions such as grazing, timber sales and prescribed burning within the project area and throughout its range. Many management actions were initiated before the species was added to the Sensitive Species list in 1999, so the effects of these actions are largely unknown.

Fire suppression and past alteration of the fire regime through suppression have affected vegetation through changes in tree density and understory species composition. Elimination of fire throughout most of its range has allowed tree canopy and stand density to increase in some areas, reducing the abundance or eliminating most understory species, including Rusby milkvetch. The elimination of fire has also resulted in the increase in litter in some areas which has negatively affected understory plant species by eliminating plants and by contributing to the increase in fire spread, and fire severity.

The allotment contains all or portions of several large wildfires. Severe wildfires often result in deaths of plants including TES plant species, loss of seed banks (Korb et al. 2004) and removal of nutrients (Ballard 2000, Choromanska and DeLuca 2002). This usually has long term effects on the plant community.

Three fuels reduction projects have occurred or are planned in the habitat of Rusby milkvetch. Crews found several populations of Rusby milkvetch during implementation and monitoring of the Fort Valley Ecosystem Restoration Project (2000). The Jack Smith- Schultz Project (2008) has been analyzed and is currently being implemented. The Hart Prairie Project (2010) has been analyzed but not implemented. These projects may have affected individual plants, but did not likely affect the population. Cumulatively, these projects may affect localized population groups but are not likely to contribute to a decline in the species as a whole.

Grazing within the allotment includes grazing by domestic ungulates and wild grazers. The cumulative effects of grazing include past and present loss of individual plants to grazing animals and alteration of habitat through animal impacts such as trampling and compaction. According to Springer (2004), deer and elk may preferentially select legumes when they find them. However, palatability and use of Rusby milkvetch by grazers is unknown. Small animals such as rodents may also eat Rusby milkvetch. Cattle grazing has not occurred on the portion of the Peaks Allotment that contains the documented locations of Rusby milkvetch in recent years.

Rusby milkvetch has been observed along the Schultz Trail, which is adjacent to the project area. Several of the locations detected by survey crews are along the trail. Trail users may impact individual plants at these locations through trampling and compaction of soil, especially in areas where trail users leave established routes.

The reasonably foreseeable future actions proposed within the allotment area include the Travel Management Rule, potential Geothermal Leasing activities, and Integrated Treatment of Noxious or Invasive Weeds. Many of the management actions undertaken would have an anticipated indirect, beneficial effect to the potential habitats for TES plants within the allotment. These include restriction of cross-country travel by motor vehicles and control of noxious or invasive weeds, either through direct control actions or by reducing the potential of weed dispersal by off-road travel. Control of noxious or invasive weeds would have a small, indirect effect. Geothermal leasing activities have the potential to result in impacts to the upland vegetation within portions of the analysis area of the Peaks Allotment; however exact locations or timelines for geothermal leasing activities have not been identified at this time.

Sunset Crater beardtongue

Historically, several large wildfires have occurred within the habitat of Sunset Crater beardtongue, but the effects of these fires on occurrences of Sunset Crater beardtongue are unknown. Other activities in the habitat area include dispersed recreation, fuel wood removal, utility corridors and grazing. Sunset Crater beardtongue has been collected as an ornamental on a limited basis, but this practice is strongly discouraged and has not affected the viability of the species.

In 1992 a tornado occurred in the area near Sunset Crater, within the habitat of Sunset Crater beardtongue, and damaged a large number of trees. The Forest Service conducted a salvage sale and removed damaged trees. A monitoring project found no adverse effects from the storm or the salvage sale (Crisp 1996). Most of the habitat for Sunset Crater beardtongue is found in the cinder hills area, which is heavily used for recreation.

Grazing by wild animals also occurs in the area. Other actions currently occurring in the allotment include road maintenance, fire suppression, permitted hunting and special uses. The effects of these activities on the potential habitat and occurrences of Sunset Crater beardtongue are unknown, but likely insignificant.

Non-forest actions include a rapidly growing population and habitat loss due to private development within the range of Sunset Crater beardtongue.

The reasonably foreseeable future and actions proposed within the allotment area include the Travel Management Rule, and Integrated Treatment of Noxious or Invasive Weeds. Many of the management actions undertaken would have an anticipated indirect, beneficial effect to the potential habitats for TES plants within the allotment. These include restriction of cross-country travel by motor vehicles and control of noxious or invasive weeds, either through direct control actions or by reducing the potential of weed dispersal by off-road travel. Control of noxious or invasive weeds would have a small, indirect effect.

Geothermal leasing activities may occur within the cumulative effects boundary for this project and have the potential to result in impacts to the upland vegetation and habitat within portions of the analysis area of the Peaks Allotment. However exact locations or timelines for geothermal leasing activities have not been identified at this time.

Blumer's dock

Management actions affecting Blumer's dock on the Coconino National Forest have been limited. This is due in part to the limited distribution of the plant on the forest, which consists of known populations in a few canyons in the Mogollon Rim and Hart Prairie areas. Other populations may exist but are not documented. Blumer's dock requires wet areas such as seeps and springs, and is frequently eaten by herbivores in some unprotected areas. Exclosure fences for Bebb willow regeneration at Hart Prairie have directly benefitted Blumer's dock. Several large plants are present in one of those exclosures.

Bebb willow

Approximately 1300 Bebb willow plants occur in the Fern Mountain Botanical Area; there may be undocumented occurrences of Bebb willow elsewhere on the allotment. The Fern Mountain Botanical Area is focused on the conservation of Bebb willow, and it is a species of major interest on the adjacent Nature Conservancy Hart Prairie Preserve. Much of the work on the Preserve focuses on conservation of the globally-rare Bebb willow community. Forest Service botanists have collaborated with the Nature Conservancy to study and monitor Bebb willow in the area for several years. Activities include the construction of two enclosures—one on Conservancy property and one on the Forest—to facilitate and monitor regeneration of Bebb willow; the inventorying and mapping of mature trees and the removal of a metal stock tank. The Conservancy reconstructed roadways on their property to improve drainage and restore a more natural water flow to prairie habitat. Actions include but are not limited to: bridge construction, removal of culverts and installation of French drains in the roadway leading to buildings on the Hart Prairie Preserve property. Additionally, the Peaks Ranger District conducted the Hart Prairie Restoration Project in 2001 that focused on restoration of habitat in the area near the Preserve, and included thinning and burning. Several management actions in the Hart Prairie Fuels Reduction and

Forest Health Restoration Project would benefit Bebb willow, including fencing springs and planting Bebb willow.

Noxious or Invasive Weeds

Several noxious or invasive weed species have been detected within the allotment (see Table 8). Infestations range from a few scattered plants to localized but severe infestations. Many concentrations of noxious or invasive weeds have been found along roadways and utility corridors, as these areas are potential dispersal corridors for weed infestations dispersed by human activities. Treatments and best management practices (BMPs) for noxious or invasive weeds on the Coconino, Kaibab and Prescott National Forests are listed in Appendix B of the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds on the Coconino, Kaibab and Prescott National Forests within Coconino, Gila, Mojave and Yavapai Counties, Arizona* (FEIS). The BMPs and other preventative measures outlined in the FEIS are incorporated into the designs of this project (see Chapter 2, Mitigation Measures).

Table 8. Noxious or invasive weed species occurring within the allotment

Common Name	Comments
Camelthorn *(Alhaghi pseudoalhagi)*	Reported locations within the Dove Tanks Pasture and along US 89N
Diffuse knapweed *(Centaurea diffusa)*	Occurs within allotment in scattered populations along US Highway 89N
Houndstongue *(Cynoglossum officinale)*	Occurs in Snowbowl Area, which is within the allotment but not in an area proposed to be grazed.
Dalmatian toadflax *(Linaria dalmatica)*	Scattered locations throughout allotment
Bull thistle *(Cirsium vulgare)*	Scattered locations throughout allotment
Cheatgrass *(Bromus tectorum)*	Scattered locations throughout allotment

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

There would be no direct effect to noxious or invasive weeds from the No Action Alternative because none of the management actions outlined in the Proposed Action would occur. There would be no livestock grazing and no construction or modification of structural improvements in the allotment. Maintenance of existing structural improvements would require separate NEPA analysis. Direct and indirect effects to noxious or invasive weeds such as dispersal of weed seed by livestock and mechanical equipment or ground disturbance resulting from cattle grazing would not occur.

Alternative 2: Proposed Action

Direct and Indirect Effects

Direct effects on invasive plants from livestock can come from the transportation of weed seeds by livestock as they move from one area to another. Transportation can occur when the seeds attach to the animal and are dropped in another area, or when livestock eat the plant/seed and leave the seeds in other places in their waste. Additionally, mechanical equipment used in conjunction with management of the allotment can transfer seeds or plant parts. However, mitigation measures and BMPs outlined in Chapter 2 would help reduce these direct effects. Indirect effects arise from ground disturbance caused by livestock or equipment used in the management of the allotment creating new seed beds.

Cumulative Effects

Past actions include livestock grazing for the past 100 to 125 years, thinning, burning, wildfires, recreation, fire suppression, and pinyon-juniper clearing. Cattle numbers were very high at the turn of the 20th century. Cumulative effects to noxious or invasive weeds include many past activities that contributed to the introduction and spread of these species within the allotment area and onto the Coconino National Forest as a whole. Frequently, the source of each introduction into a specific area is unknown. However, activities such as vehicle travel and contaminated seed and feed products deliver propagules to specific areas. Examples of such past ground-disturbing activities include realignment and expansion of US Highway 89N and associated forest roads and numerous large wildfires. These actions may have all contributed to disturbance in the allotment area and increased the risk of noxious weed invasions.

Geothermal leasing activities may occur within the cumulative effects boundary for this project and have the potential to result in impacts to the upland vegetation and infestation and distribution of noxious weeds within portions of the analysis area of the Peaks Allotment. However exact locations or timelines for geothermal leasing activities have not been identified at this time.

Other recent activities that may affect noxious or invasive weed populations include control efforts undertaken by various agencies. These include herbicide treatments, manual control, and biological control. Arizona Department of Transportation may execute herbicide treatments on federally controlled highways in Northern Arizona, including the US Highway 89 corridor immediately adjacent to the

project. Since 2005, the Coconino National Forest has released biological control insects on diffuse knapweed populations in or near the allotment area.

There have been many ground-disturbing activities on non-National Forest System lands that cannot be managed through Forest Service actions. Examples of this include the establishment and management of public and private roadways, activities such as grazing, timber harvest and prescribed burning on non-forest lands, and private land use. Uncontrolled noxious or invasive weed populations on non-National Forest System lands may negatively affect control efforts for noxious or invasive weeds on National Forest System lands.

Wildlife

The affected environment and environmental consequences of each alternative to wildlife are organized by species status: threatened and endangered, Forest Service sensitive species, management indicator species, and migratory birds. The information has been summarized from the Wildlife Specialist's Report located in the project record.

Threatened and Endangered Species

Mexican Spotted Owl

Known location of the Mexican spotted owl *(Strix occidentalis lucida)* and its critical habitat occur on the Peaks Allotment; however these known locations occur outside of the area proposed for continued livestock grazing (i.e., occur only within areas proposed to be deferred from livestock grazing). According to the Forest Service Southwest Region's "Framework for Streamlining Informal Consultation for Livestock Grazing Activities", a determination of *No Effect* is given if:

1. Mexican spotted owls are not present within the action area.
2. In the action area, no livestock grazing or livestock management activities would occur within protected and restricted habitats as defined by the species' recovery plan (USDA FS 2005).

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no livestock grazing and associated management activities anywhere within the allotment. Therefore, there would be no direct or indirect effects on Mexican spotted owls or their designated critical habitat. A determination is made of *no effect* on Mexican spotted owl or its critical habitat under the No Action Alternative. This determination is consistent with the USDA FS No Effect guidelines.

Alternative 2: Proposed Action

Direct, Indirect and Cumulative Effects

Under the Proposed Action, there would be no livestock grazing, livestock present, or associated management activities within the Mexican spotted owl designated critical habitat, protected habitat, and restricted habitat if this alternative was implemented. Therefore, there would be no direct or indirect effects on Mexican spotted owls or its critical habitat. A determination is made of *no effect* on Mexican spotted owl or its critical habitat under the Proposed Action Alternative. This determination is consistent with the USDA FS No Effect guidelines.

Forest Service Sensitive Species

Of the 30 Regional Forester Sensitive Species that occur on the Coconino National Forest, 12 are present or have potential habitat within the analysis area; each has been evaluated. Table 9 lists all Forest Service sensitive species that occur within the area proposed to be grazed by livestock. Because the other 18 species are either not present, do not have potential habitat within the analysis area, or the proposed action would have no effect on them, they are not analyzed further in this document.

Table 9. List of Sensitive species or habitat on the Peaks Grazing Allotment

Common Name	Scientific Name	Determination of Effect for the Proposed Action
Sensitive Mammals (5)		
Navajo Mogollon Vole	*Microtus mogollonensis navaho*	May impact individuals*
Merriam's Shrew	*Sorex merriami leucogenys*	May impact individuals
Western Red Bat	*Lasiurus blossevillii*	May impact individuals
Allen's Lappet-browed Bat	*Idionycteris phyllotis*	May impact individuals
Pale Townsend's big eared Bat	*Corynorhinus townsendii pallescens*	May impact individuals
Sensitive Birds (4)		
Wintering Bald Eagle	*Haliaeetus leucocephalus*	No Impact
Northern Goshawk	*Accipiter gentiles*	May impact individuals
Ferruginous Hawk	*Buteo regalis*	May impact individuals
Burrowing owl	*Athene cunicularia hypugaea*	May impact individuals
Sensitive Invertebrates (3)		
Blue-black Silverspot Butterfly/ Nokomis Fritillary	*Speyeria nokomis nokomis*	May impact individuals
Mountain Silverspot Butterfly/ Nitrocris Fritillary	*Speyeria nokomis nitocris*	May impact individuals
Four Spotted Skipperling	*Piruna polingii*	May impact individuals

*This means that the proposed action may impact individuals, but is not likely to result in a trend toward federal listing of the species.

Navajo Mogollon Vole

There are no documented populations or sightings of voles in the project area; however suitable habitat exists within the allotment. In Northern Arizona this vole is commonly found in grassy meadows within ponderosa pine, it can also be found in more mesic habitat including montane riparian areas and marshes. Mogollon voles rely on grasses and other herbaceous vegetation for food and cover, and are usually more abundant where grass biomass is high—such as in dense bunch grasses. Cattle and other grazing ungulates tend to concentrate in this species' habitat and forage on its main food and cover. Grazing may disturb reproduction, foraging or other life requirements of this species, especially since it is active year-round.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no livestock grazing or associated management activities in any Mogollon vole habitat. It is likely that voles would benefit from the absence of livestock grazing and associated management activities. Compared to the Proposed Action, effects to voles under

the No Action Alternative would be beneficial to neutral in nature. The absence of livestock can result in: an increase in the quality and quantity of vole food, cover and shelter; increased animal abundance; increased abundance of prey species. There is some evidence that light to moderate grazing can help stimulate plant production, which is a necessary part of an ecosystem that historically had herbivory. Some plants might not reach their full potential in the absence of such stimulus, and as such would become decadent. This effect would be undesirable for voles. However, wild ungulates in the area would continue to graze, and as a result, plant stimulus would occur at least to some degree.

Determination: The No Action Alternative would have no impact on the Mogollon vole because no cattle grazing or management would occur on the allotment.

Alternative 2: Proposed Action

Direct and Indirect Effects

Since livestock can compete directly with Mogollon voles for forage, grazing by cattle on 32% of the Allotment would directly result in a loss of cover and food, and may make voles more susceptible to predation. Voles have limited ability for movement, therefore, certain individuals may be impacted, but only during years that their home ranges are grazed since regrowth is expected between grazing periods. Furthermore, studies have suggested that light grazing may aid in plant stimulus and longevity when conducted at the right time of year and in the right conditions.

Cumulative Effects

Past and present actions within the Peaks allotment area, as well as those that may occur within the reasonably foreseeable future, include fire suppression, logging, thinning, burning, wildfires, developed and dispersed recreation, road maintenance, special uses, potential Geothermal Leasing activities, and the future implementation of the Travel Management Rule (TMR), which would prohibit off-road driving and decrease road densities on the National Forest.

Grazing actions are currently taking place on most of the areas adjacent to the Peaks Allotment; these actions have been ongoing for decades and would most likely continue at some level. These cumulative actions would also contribute to the potential loss or degradation of small mammals within the area. Grazing by wildlife—especially elk—contributes to the loss of small mammal habitat in the allotment and watershed as a whole. Drought and insect mortality have affected habitat within the project area.

Determination: The Proposed Action may impact individuals, but is unlikely to result in a trend toward federal listing or loss of viability of the Mogollon vole.

Merriam's Shrew

The Merriam's shrew prefer dry habitats, and include various grasslands (including grasses in sagebrush scrub and pinyon-juniper woodland), mountain mahogany shrublands and mixed woodlands (Clark and Stromberg 1987, Benedict et al 1999). In Arizona, specimens have been found in or near open ponderosa pine woodlands, spruce-fir stands, and grasslands with patches of aspen and spruce (BISON 2005).

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no livestock grazing or associated management activities in any shrew habitat. In general, the effects to Merriam's shrew would be beneficial to neutral in

nature. Additionally, the shrew would likely benefit from the absence of livestock grazing and associated management activities. This absence would cause: an increase in the quality and quantity of wildlife food, cover, and shelter; an increase in animal abundance; and an increase in the abundance of prey species. However, there is some evidence that light to moderate grazing can help stimulate plant production. Some plants might not reach their full potential in the absence of such stimulus, and as such would become decadent. This effect would be undesirable for shrews. Wild ungulates in the area are likely to have some utilization and plant stimulus would occur at least to some degree.

Determination: The No Action Alternative would have no impact on the Merriam's shrew because no cattle grazing or management would occur on the allotment.

Alternative 2: Proposed Action

Direct and Indirect Effects

Merriam's shrew populations may be sensitive to grazing based on documented effects of soil compaction, litter reduction, and habitat alteration (Dobkin and Sauder 2004). Livestock may compress soils and trample burrows and runways of Mogollon voles, which are thought to be important to the Merriam's shrew's foraging patters. Livestock grazing may also introduce exotic plants, which could potentially influence structural or floristic shifts in the plant community. How such introductions or shifts might affect the Merriam's shrew is unknown.

Structural range improvements may result in disturbances to shrews, and would result in a slight loss or modification of their habitat. However such disturbances are not expected to have direct effects on this species or its habitat due to the short duration and limited habitat modification. Some studies suggest that light grazing may aid in plant stimulus and longevity when done at the right time of year and in the right conditions.

Most of the allotment, (68%) would be deferred, the remaining 32% would have livestock grazing that could result in a some loss of cover and food for Merriam's shrew. However, this loss would be reduced by the utilization and intensity standards being proposed, as well as the use of a rotational grazing system and adaptive management.

Cumulative Effects

Past and present actions within the Peaks allotment area, as well as those that may occur within the reasonably foreseeable future, include fire suppression, logging, thinning, burning, wildfires, developed and dispersed recreation, road maintenance, special uses, potential Geothermal Leasing activities, and the future implementation of the Travel Management Rule (TMR), which would prohibit off-road driving and decrease road densities on the National Forest.

Grazing actions are currently taking place on most of the areas adjacent to the Peaks Allotment; these actions have been ongoing for decades and would most likely continue at some level. These cumulative actions would also contribute to the potential loss or degradation of small mammals within the area. Grazing by wildlife—especially elk—contributes to the loss of small mammal habitat in the allotment and watershed as a whole. Drought and insect mortality have affected habitat within the project area.

Determination: The Proposed Action may impact individuals, but is unlikely to result in a trend toward federal listing or loss of viability for the Merriam's shrew.

Western Red Bat

Western red bats roost in deciduous trees along intermittent and perennial streams. This species occurs on the forest, and utilizes mostly aspen and oak.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no livestock grazing or associated management activities. The western red bat would benefit from the absence of livestock grazing, as the absence of livestock grazing can cause an increase in the quality and quantity of wildlife food, cover and shelter; increased animal abundance, and increased abundance of prey species. The No Action Alternative may beneficially impact the western red bat.

Alternative 2: Proposed Action

Direct and Indirect Effects

Disturbances to bat species may occur when noise from livestock management activities are present within close proximity to roost locations (i.e., personnel, vehicles, dogs, etc). Noise disturbances at certain intensities can disturb bats in their roosts and result in premature exiting or unnecessary arousal from roosts. However, any disturbance is anticipated to be of short duration.

Livestock grazing on 32% of the allotment may occur in areas where oak and aspen are present. In these cases, bats may be disturbed by the trampling of leaf litter (although the likelihood is lower due to livestock moving out when leaves are falling by October 15).

Cumulative Effects

Other activities occurring in the cumulative effects area that may affect western red bats include recreation, livestock grazing on other allotments, and any burning activities where smoke may disturb roosting bats. The activities could also affect habitat important to red bats for roosting and foraging.

Determination: Due to the potential for livestock grazing and livestock management activities to disturb roosting western red bats, the Proposed Action may impact individuals, but is unlikely to result in a trend toward federal listing or loss of viability for the western red bat.

Allen's Lappet-browed Bat

The Allen's lappet-browed bat is known to occur over a wide range of elevations and vegetation types, and is found in ponderosa pine forests, where they roost underneath exfoliating bark on standing ponderosa pine snags. Ponderosa pine forests provide suitable snags for roosting. In a study conducted by Northern Arizona University, Allen's lappet-browed bats were found roosting approximately 20 miles from the Peaks Allotment. Although no Allen's lappet-browed bats have been detected on the Peaks Allotment, suitable habitat exists in the allotment.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

As there would be no livestock grazing or associated management activities under the No Action Alternative, no measurable effects on Allen's lappet-browed bat would be anticipated. As with the western red bat, Allen's lappet-browed bat would benefit from the absence of livestock grazing in that such an absence could: increase the quality and quantity of wildlife food, cover and shelter; increase animal abundance; and increase the abundance of prey species. The No Action Alternative may beneficially impact the Allen's lappet-browed bat.

Other activities occurring in allotment area that may affect the Allen's lappet-browed bat include watershed health improvement projects, wildfires, and prescribed burning. Noise and smoke may disturb roosting bats and alter habitat. In addition, drought and insects can contribute to tree mortality, which can create important roosting habitat.

Alternative 2: Proposed Action

Direct and Indirect Effects

Livestock grazing is not anticipated to have direct effects to the Allen's lappet-browed bat. However, sporadic noise from livestock management activities (i.e., people, equipment and vehicles) could disturb roosting bats in the 32% of the allotment that is not deferred. Livestock use of tanks may decrease the available foraging habitat for bats by decreasing available water and degrading the habitat for invertebrate prey species.

Cumulative Effects

Other activities occurring in the area that may affect the Allen's lappet-browed bat are the same as in the No Action Alternative discussion.

Determination: Due to the localized and sporadic nature of grazing noise disturbance, and the deferral of 68% of the allotment, the Proposed Action may impact individuals, but is not likely to result in a trend toward federal listing or loss of viability for Allen's lappet-browed bat.

Pale Townsend's Big-eared Bat

The Pale Townsend's big-eared bat roosts in caves, mines and other man-made structures including cliff dwellings and abandoned shacks. On the Peaks and Mormon Lake District, they are known to inhabit sinkholes, caveats and cliff dwellings, and could roost on the Peaks Allotment in similar structures. However, Pale Townsend's big-ear bat roosts have not been located in the project area.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

As there would be no livestock grazing or associated management activities under this alternative, it is likely that no measurable effects would be seen on roosting bats. Like the previously listed bats in this analysis, Pale Townsend's big-eared bat would benefit from the absence of livestock grazing in that such an absence could: increase the quality and quantity of wildlife food, cover and shelter; increase animal

abundance; and increase the abundance of prey species. The No Action alternative may beneficially impact Townsend's big-eared bat.

Other activities occurring in the watershed which may affect the Pale Townsend's big-eared bat include watershed health improvement projects, wildfire, prescribed burning, recreation and other activities where humans may enter occupied roosts. Smoke from wildfire, prescribed burning or fire use could disturb roosting bats.

Alternative 2: Proposed Action

Direct and Indirect Effects

Livestock grazing is not anticipated to impact bats, but management activities may disturb roosting bats when such activities occur near occupied roosts. There could also be some localized impacts to forage availability within areas containing tanks used by livestock, as livestock use of tanks would decrease water quality and quantity for bat prey species. As there are numerous tanks on public and private land within the area deferred from livestock, the naturalization of Snowbowl Tank is not anticipated to impact prey species abundance.

Cumulative Effects

Other activities which may affect the Pale Townsend's big-eared bat include watershed health improvement projects, wildfire, prescribed burning, recreation and other activities where humans may enter occupied roosts. Smoke from wildfire, prescribed burning, or fire use may disturb roosting bats.

Determination: Due to the localized and sporadic nature of grazing noise disturbance, and the deferral of 68% of the allotment, the Proposed Action may impact, but is not likely to result in a trend toward federal listing or loss of viability of the Pale Townsend's big-eared bat.

Wintering Bald Eagles

Wintering bald eagle populations tend to be scattered and highly mobile, usually foraging and roosting in small groups. Wintering eagles tend to concentrate in areas of plentiful food resources, usually near water. Wintering bald eagles can be found foraging throughout the Coconino National Forest, including the Peaks Allotment, particularly along roadways where they feed opportunistically on road kill, and along riparian zones where they forage on fish and waterfowl. Wintering bald eagles will also forage opportunistically throughout the uplands on elk carcasses.

On the Peaks Allotment, communal roosting may potentially occur in mixed conifer, ponderosa pine and pine/oak vegetation types where suitable conditions such as steep slopes, wind protection, open canopy and larger trees occur. No roost data is available for the Peaks Allotment despite various bald eagle roost surveys and reports (Grubb et al 1989, Grubb 1996b, Grubb and Kennedy 1978).

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

No livestock grazing or associated management activities would occur under this alternative, so no direct, indirect, or cumulative effects on wintering bald eagles would occur. The No Action alternative would have no impact on the wintering bald eagle or its habitat.

Alternative 2: Proposed Action

Direct and Indirect Effects

Wintering eagles arrive in the fall, usually late October or early November, and leave in early to mid-April. As the season of use for livestock grazing would be May 15 to October 15, livestock would be absent from the allotment for the majority of the wintering eagle's stay. Additionally, livestock grazing would not occur in potential bald eagle winter roost habitat or in areas where they forage. Though the presence of livestock should not disturb bald eagles, livestock graze the same forage upon which upland prey species depend and therefore may compete with bald eagles for resources. Although noise disturbance would be created from the naturalization of Snowbowl Tank and the construction of fences in Headquarters Pasture, the disturbance would be of short duration and would occur outside of the wintering roost season. Because livestock operations would occur outside of wintering bald eagle seasons, it is the determination that the Proposed Action would have no impact on wintering bald eagles.

Cumulative Effects

Past and present actions, as well as those which may occur within the reasonably foreseeable future, within the cumulative effects area include livestock grazing on other allotments, wildlife grazing, thinning, burning, wildfires, watershed treatments, developed and dispersed recreation, road maintenance, special uses, and the future implementation of TMR, which would prohibit off-road driving and decrease road densities on the national forest. Frequent disturbances, disturbances of high intensity or long duration can have negative effects on eagles, resulting in loss of foraging opportunity and also in increased mortality by vehicles and by eating carcasses contaminated by lead (lead shot from hunters).

Northern Goshawk

Goshawks are relatively abundant and widespread, and although population trends are difficult to determine, there is no hard evidence of a considerable decline overall, but populations could be declining in some areas (NatureServe 2007). In 2001 there were 66 known goshawk territories on the Coconino National Forest. There are a few known northern goshawk territories within the Peaks Allotment all of which are in the deferred area. However, larger less optimal potential foraging areas may be present outside of the deferral area and are therefore discussed.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no livestock grazing or associated management activities in any northern goshawk habitat, and therefore there would be no direct, indirect or cumulative impacts to northern goshawks or their habitat.

Alternative 2: Proposed Action

Direct and Indirect Effects

There are a few known northern goshawk territories within the Peaks Allotment; however none occur within the area proposed for livestock grazing. Potential (but less optimal) foraging areas may be present outside of the deferral area and are therefore discussed. Livestock grazing can impact the density and abundance of a number of prey species hunted by northern goshawks, including ground nesting birds and

most rodents. The use of a rotational grazing system and adaptive management would help mitigate any effects of livestock grazing on goshawk prey species. No change to small mammal and ground nesting bird habitat is expected in areas proposed for continual deferment from livestock grazing.

Cumulative Effects

Past, present and reasonably foreseeable future actions occurring within the cumulative effects area include fire suppression, logging, thinning, burning, wildfire, watershed treatments, riparian protections efforts, developed and dispersed recreation, road maintenance, special uses and the future implementation of TMR. Previous years of complete fire suppression has resulted in much denser vegetation, and the threat of high-severity wildfires. Fire suppression activities are of concern when they occur near activity centers during the northern goshawk breeding season.

Livestock grazing currently occurs on most of the areas adjacent to the Peaks Allotment; they have been ongoing for decades and would foreseeably continue on some level. These cumulative actions would also contribute to potential loss or degradation of small mammal and ground nesting bird habitat within the cumulative effects area, which northern goshawks depend on for prey. Grazing by wildlife, especially elk, also contributes to the loss of prey habitat in the allotment and within the cumulative effects area.

Tree mortality due to drought and insects are also factors, because of the resulting mortality of large ponderosa pines within goshawk habitat. The rate and extent of future tree mortality is unknown. Even if precipitation increases, tree mortality may continue to a small degree as host trees would still be present. In drought years, the extent of tree mortality may increase, which could negatively affect nest trees and/or foraging habitat for goshawks. Conversely, drought and insect infestations can to some degree be beneficial to northern goshawks as they create snags, which are important habitat features.

Determination: Since livestock grazing can result in a loss of habitat or habitat quality for ground dwelling prey species, the Proposed Action may impact individuals, but is unlikely to result in a trend toward federal listing or loss of viability of northern goshawk.

Ferruginous Hawk

Ferruginous hawks prefer grasslands, but will also utilize open shrub-grassland, open pinyon-juniper woodland, and open shrublands as breeding habitat. Prairie dogs, rabbits, ground squirrels, and pocket gophers are the hawk's main food source. Ferruginous hawks are known to nest on the Coconino National Forest, but they are more commonly present during winter. They prefer scattered, isolated junipers for nesting on elevated sites. They also build their large nests on ledges, knolls, rock outcrops or pillars, and cliff faces. Nests are typically situated in the open with a broad view.

The ferruginous hawk may occur in sparsely vegetated grassland and open woodlands on the allotment.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no livestock grazing or associated management activities in any hawk habitat. Therefore, it is the determination that this alternative would have no impact on the ferruginous hawk.

Alternative 2: Proposed Action

Direct and Indirect Effects

Ferruginous hawks are highly sensitive to human disturbance around their nest sites. Livestock grazing and management activities near nest sites could result in visual and aural disturbances to nesting hawks. Frequent disturbances or those of high intensity or long duration can result in increased predation of young and eggs, abandonment of eggs or young, decreased success during foraging, and premature fledging of young.

Raptors such as the ferruginous hawk are dependent on small mammal prey. When rodent prey populations decrease in response to reduced vegetation cover, there is a corresponding decrease in the population of avian predators (Saab et al 1995). In a review of studies measuring the relative abundance of birds in grazed habitats compared to either ungrazed or lightly grazed areas, Saab et al. summarized that the ground-nesting ferruginous hawk shows a negative response to grazing in areas where nesting cover is limited, but a positive response in areas where they hunt, i.e. open grasslands. Although 68% of the allotment would be deferred, livestock grazing and associated management activities on the remaining 32% has the potential to reduce the forage available for ferruginous hawk prey and may disturb individuals.

Cumulative Effects

Cumulative effects to ferruginous hawks include fire suppression, high severity fire, past logging, past and future watershed/grassland improvement projects, and recreation. Livestock grazing, thinning, burning, riparian protection efforts, road maintenance, special uses and the future implementation of TMR are also activities occurring in the area. Grazing by ungulates such as elk has the potential to impact ferruginous hawks as well.

Determination: The Proposed Action may impact individuals, but is unlikely to result in a trend toward federal listing or loss of viability of ferruginous hawk.

Burrowing Owl

The burrowing owl is found in grasslands, open range areas and desert habitats that support burrowing mammals. They either dig their own burrows or nest in the burrows of other animals, such as kangaroo rats, coyotes, foxes, ground squirrels, prairie dogs and badgers. In addition to burrows, this species also requires unobstructed perching locations such as dirt mounds, fences, rock outcrops or other elevated objects (Corman and Wise-Gervais 2005). They opportunistically feed on insects (mainly grasshoppers and beetles), small mammals (mice, rates, gophers and ground squirrels), and reptiles, young cottontail rabbits, bats and birds.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no livestock grazing or associated management activities in any owl habitat and therefore there would be no impact to burrowing owls or their habitat.

Alternative 2: Proposed Action

Direct and Indirect Effects

A certain amount of grazing can provide adequate habitat for burrowing owls, since they prefer flat, open, low-stature grasslands, sparsely-vegetated desert scrub and edges of human disturbed lands. However the Arizona Partners in Flight Plan (1999) specifically mentions livestock grazing as a threat to the burrowing owl, particularly when overgrazing results in a change from grassland to woodland, destruction of burrows, and reduction of prey. Grazing and associated management activities could disturb individual birds as well as impact their habitat and that of their prey. However, it is not anticipated that the proposed grazing would cause a conversion of grasslands to woodlands, nor result in a reduction of prey, and grasslands are only a small percentage of the allotment.

In the 32% of the allotment proposed for livestock grazing, there is potential for livestock grazing to reduce forage upon which burrowing owl prey species depend, and to potentially disturb individual burrowing owls.

Cumulative Effects

Large scale extirpation of burrowing mammals has had a severe impact on burrowing owl populations in the west, especially the poisoning of prairie dogs in Arizona (Corman and Wise-Gervais 2005). Many other activities occurring in the uplands of the allotment may contribute cumulatively on burrowing owls and their habitat. These include livestock grazing, wildlife grazing, thinning, burning, wildfires, watershed treatments, developed and dispersed recreation, road maintenance, special uses, and the future implementation of TMR, which would prohibit off-road driving and decrease road densities on the National Forest. Most activities have the potential to visually and aurally affect this species, as well as cause destruction or modification to their habitat.

Determination: The Proposed Action may impact individuals but is not likely to result in federal listing or the loss of viability of the burrowing owl.

Mountain Silverspot Butterfly and Blue-black Silverspot Butterfly

Both of these butterfly species are riparian-dependent. Scattered populations of these species occur throughout the Southwest in wet meadows, grassy springs in mountainous woody area, seeps or riparian canyons. No surveys for these species have been conducted within the planning area and the population status is unknown. With the grassy openings containing various species of grasses throughout the pinyon-juniper, ponderosa pine, and mixed conifer vegetation types, there appears to be an abundance of potential habitat for both butterfly species on the allotment.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

Since there would be no livestock grazing or management activities under the No Action Alternative, there are no direct, indirect or cumulative effects to sensitive silverspot butterflies.

Alternative 2: Proposed Action

Direct and Indirect Effects

Terrestrial special status invertebrates such as the mountain and blue-black silverspot butterflies can be affected by livestock grazing and management activities when these activities affect habitats on which these species depend, such as wet meadows, springs, and riparian areas, as well as upland areas where host plant species occur on which these species also depend. Although 68% of the allotment would be deferred from livestock grazing, activities may affect host plants in the remaining 32%.

Cumulative Effects

Past, present and reasonably foreseeable future actions occurring within the Peaks cumulative effects area include livestock grazing, wildlife grazing, thinning, burning, wildfires, watershed treatments, riparian protection efforts, developed and dispersed recreation, road maintenance, special uses and the future implementation of TMR which would prohibit off-road driving and decrease road densities on the National Forest.

Other activities in the project area include watershed/grassland improvement projects, personal use (collecting of forest products), and potentially in the future, fires managed for resource benefit. Since these silverspot butterflies are tied to specific host plant species, impacts to *Viola* and thistles could affect these butterflies. Concurrent grazing by wildlife (i.e., elk and antelope) would have a contributing impact to vegetation important to these butterflies. Cumulatively, the Proposed Action may impact the mountain and blue-black silverspot butterflies, but is not likely to result in a trend toward federal listing or loss of viability.

Determination: The Proposed Action may impact individuals, but is not likely to result in a trend toward federal listing or loss of viability for the mountain and blue-black silverspot butterflies,.

Four-spotted Skipperling

The habitat of the four-spotted skipperling consists of moist meadows and streamsides in low to mid elevation mountains. Grassy openings with various species of grasses are present throughout the pinyon-juniper, ponderosa pine, and mixed conifer vegetation types in the allotment. Therefore, there is potential habitat for this species on the allotment.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

Since neither livestock grazing nor livestock management activities would occur under the No Action Alternative, there would be no direct, indirect or cumulative effects to the four-spotted skipperling. Therefore there would be no impact on the four-spotted skipperling and its habitat under this alternative.

Alternative 2: Proposed Action

Direct and Indirect Effects

Terrestrial special status invertebrates such as the four-spotted skipperling can be affected by livestock grazing and management activities when these activities affect upland vegetation, especially the host plant

species upon which these invertebrates depend. Although 68% of the allotment would be deferred, the remaining 32% may affect host plants.

Cumulative Effects

Past, present, and reasonably foreseeable future actions occurring within the Peaks cumulative effects area include livestock grazing, wildlife grazing, thinning, burning, wildfires, watershed treatments, riparian protection efforts, developed and dispersed recreation, road maintenance, special uses, and the future implementation of TMR, which would prohibit off-road driving and decrease road densities on the National Forest. Activities in the uplands include recreational activities, watershed/grassland improvement projects, personal use (collecting of forest products), occasionally wildfire, and potentially in the future wildfires managed for resource benefit. These activities can impact skipperlings particularly when host plants upon which they depend are disturbed. Cumulatively, the Proposed Action may impact the four-spotted skipperling, but is unlikely to result in a trend toward federal listing or loss of viability.

Determination: The Proposed Action may impact individuals, but is unlikely to result in a trend toward federal listing or loss of viability of four-spotted skipperling.

Management Indicator Species (MIS)

Management indicator species (MIS) for this project are evaluated based on indicator habitat occurring within the allotment. Table 10 lists those MIS that have associated habitat present within the allotment and summarizes population and habitat trends from the forest-wide report (USDA 2002). The following MIS species were excluded from analysis due to either lack of indicator habitat, or because the habitat features for which these species are indicators for would not be affected by the authorization of grazing or associated management activities: red squirrel, Abert squirrel, Mexican spotted owl, Northern goshawk, pygmy nuthatch, turkey, elk, hairy woodpecker, juniper (plain) titmouse, Lincoln's sparrow, Lucy's warbler, yellow-breasted chat, macroinvertebrates, cinnamon teal. Since livestock grazing can affect grasslands and aspen, pronghorn, mule deer and red-naped sapsucker will be fully analyzed in this document. This equates to Management Area 5, 9 and 10. Table 11 summarizes the habitat for these species.

Table 10. Management Indicator Species within the allotment with their indicator habitats and forest trends.

MIS	Indicator Habitat	Forest-wide population trend	Forest-wide habitat trend
Mule deer	Early seral aspen and pinyon-juniper	Declining	Stable to Declining
Pronghorn antelope	Early and late seral grasslands	Declining	Stable to Declining
Red-naped sapsucker	Aspen	Stable	Declining

Pronghorn

Pronghorn antelope are indicator species of early and late seral grasslands. Pronghorn are grassland and opening dependent species. Throughout their range, Pronghorns use areas where slopes are less than 30%, precipitation of about 10 to 15 inches per year, and water every one to four miles. Pronghorn appear to

prefer areas recovering from wildfire. Low vegetative structure—averaging 10 to 15 inches in height—is preferred. Vegetation greater than 30 inches in height is not often used (Lee et al. 1998).

Pronghorn diet consists of forbs, grasses and shrubs, and varies seasonally depending on availability, palatability and succulence. Pronghorn diet is generally higher in forbs and shrubs when compared to other ungulates. Pronghorn diet also overlaps with elk and less so with cattle since both cattle and elk have relatively higher proportion of grasses in their diet. Ockenfels et al. (1996) found that plant species richness in many grassland and shrubsteppe habitats in Arizona is greatest in spring. Forb abundance and diversity is strongly influenced by precipitation and they are especially important during the fawning period. Pronghorn choose fawning areas within around ½ mile of water due to increased nutritional and water needs during pregnancy and lactation.

Antelope are shy and do not respond well to disturbance. Adults have been known to leave fawns when disturbed by humans. Disturbance is a concern due to the potential for disruption during breeding or fawning (Neff 1986).

Fences can be complete or partial barriers to pronghorn movements depending on location, size of area fenced, design and snowfall depth. (Neff 1986, Lee et al. 1998). “Pronghorn have not learned to go through most fences (as do bison) or vault them (as do elk and deer). Instead, many have learned to negotiate certain fences by crawling underneath. But, if the bottom wires of fences are too low, by virtue of design or buildup of vegetation or snow, pronghorn mobility can be impeded,” (O’Gara and Yoakum 2004).

Barbed wire fence is generally considered wildlife friendly with bottom and top wire heights that allow for easier animal passage below or above the fence. Yoakum, in O’Gara and Yoakum 2004, recommends a smooth bottom wire 16-inches off the ground to help alleviate access problems for pronghorn without compromising control of cattle. For new or reconstructed fence the Coconino Forest Plan Amendment 11 (1996) specifies an 18-inch smooth bottom wire height, which exceeds the recommended 16-inch bottom wire height of Yoakum and the Pronghorn Management Guides (Lee et al. 1998) and a 42-inch top wire height, which is intended to accommodate wildlife that jump over fences.

Pronghorn antelope populations have declined, although not evenly throughout the Forest (USDA FS 2002d). The Peaks Allotment occurs within Game Management Unit (GMU) 6B, for which Arizona Game and Fish Department survey data suggest declining trends.

Pronghorn do occur on the Peaks Allotment, however, the allotment is not the major area of Pronghorn use on the Forest. The major area occurs south of the analysis area in the Anderson Mesa area. Approximately 11,795 acres of grassland type habitat does occur on the allotment, however the heavy fragmentation of I-40, other highways, and areas of dense timber has greatly prohibited pronghorn from using the area.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

If the no action alternative were selected, no cattle grazing or improvements would be implemented, so there would be no direct, indirect or cumulative effects associated with the project. Therefore, the no action alternative would not result in a change in the forest-wide trend for pronghorn.

Alternative 2: Proposed Action

Direct and Indirect Effects

One new fence is proposed and would be built to wildlife standards . Therefore, the fence will not affect pronghorn populations or habitat.

Early season grazing by cattle or wildlife has the potential to reduce pronghorn fawn hiding cover provided by new growth and residual growth from the prior year, and therefore may facilitate predation of pronghorn fawns. Grazing effects on hiding cover is variable and dependent on: the amount of growth that occurs between cattle removal in the fall and fawn use the following spring; the density and height of the residual vegetation following cattle grazing; the amount and timing of wildlife grazing; and the timing and amount of precipitation. The proposed action would allow for some fall grazing, which could potentially impact residual vegetation that would otherwise be available as fawn habitat in the spring. The magnitude of the effects varies by the number of animals, the timing and the duration of grazing during the fawning season as directed in the Annual Operation Instructions (AOIs).

Diet overlap between cattle and antelope is usually minimal, but competition for early spring forage may occur (Lee et al 1998). Over time, cattle grazing can alter plant composition, species diversity, vegetative ground cover, plant community structure, and plant vigor over large areas. These changes are largely dependent on the grazing intensity, number of cattle grazed, season of use, climatic conditions, and amount of rest an area receives. The effects of grazing from this project would not change the overall habitat trend for grasslands, meadows, open pinyon-juniper, or the population trends for pronghorn on the forest.

Though the proposed action does include cattle grazing in pronghorn habitat, it is a small area compared to the total amount of grassland habitat on the forest and is marginal habitat due to fragmentation, the presence of major interstates and dense forests that reduce connectivity to other areas of the Forest. Therefore, the proposed action alternative is not likely to result in a change in the forest-wide trend for pronghorn.

Cumulative Effects

Cumulative effects include those associated with wild ungulate grazing, recreational use, hunting, wildfires, highways and right-of-way fencing, and vegetation treatments within the allotment area.

Wildlife grazing within the cumulative effects area for pronghorn could remove fawning cover, influence vegetation around waters, and result in some forage competition and diet overlap. This can fall within a range of effects that pronghorn successfully live with under good conditions, or may stress adults or young if predators, forage, nutrition, climate or other factors have an undue influence on populations or habitat.

Pronghorn may be disturbed at critical time periods like fawning, breeding or wintering, or when human uses (hunting, hiking, other recreation) increase above a certain level. This could result in increased stress to animals, fawning spread over a long time period, or less time spent with young. Human use in this area is expected to increase over the life of the permit.

Hunting activities may result in, gut piles, animals wounded and not recovered, and other human related impacts, which could provide increase food sources for predators. This could result in increased population of predators. Hunting or scouting during the pronghorn breeding season may result in

disturbance that could extend the breeding and parturition dates to the point that predators may have a longer advantage period when fawns are small and unable to outrun them. Hunting is not expected to affect the pronghorn population through over-harvest as only a very small portion of males are harvested.

Past wildfires have created or improved grassland within the cumulative effects boundary. The results of these fires for pronghorn are greater visibility, fewer obstructions between winter and summer habitats, and more nutritious plants.

Tree encroachment is a concern within the project area because it reduces the amount and quality of pronghorn habitat. Pinyon-juniper woodland and young ponderosa pine have become established in areas that were historically grassland, savannah-like grassland interspersed with trees, and areas where pronghorn were historically more common. Many areas have been treated to remove or limit this encroachment and to increase grass and forb production. However, the regrowth of shrub and tree species since the treatments has reduced the quality of habitat for pronghorn in these areas. As tree density and canopy cover increase, predator hiding cover may increase; herbaceous understory may decline in vigor, abundance and diversity; and erosion may increase.

Red-naped Sapsucker

The red-naped sapsucker is a management indicator species for the late seral stage and snag component of aspen (USDA Forest Service 1987a). The red-naped sapsucker (previously yellow-bellied sapsucker) is considered a “double keystone” species for its role in excavating cavities and drilling sap wells, which are both used by a variety of other species for nesting and feeding (Natureserve 2002).

The red-naped sapsucker is found in coniferous forest that include aspen and other hardwoods, as well as in riparian areas. This sapsucker generally nests in aspen trees or snags, which have a shelf fungus that speeds the rate of heart rot. They tend to excavate cavities on the lower portion of the tree and move their way up the tree in subsequent years, creating a new cavity every year. Tree species commonly associated with the red-naped sapsucker include aspen, cottonwood, willow, alder, sycamore, spruce, white fur and Douglas-fir.

Available population data indicates that red-naped sapsucker populations fluctuate over time, but are showing a stable trend overall on the Coconino National Forest. Most aspen providing habitat for the sapsuckers on the forest are in the older age classes; future trends are of concern as aspen treatments have not yet occurred on a scale that assures adequate aspen recruitment over time to replace decadent stands.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

If the no action alternative were selected, no cattle grazing or improvements would be implemented so there would be no direct, indirect, or cumulative effects associated with the project.

Alternative 2: Proposed Action

Direct, Indirect and Cumulative Effects

Although sapsuckers do occur on the Peaks Allotment, the area has declining trends, similar to the rest of the forest, due to aspen and specifically aspen snag decline.

In the proposed action, 68% of the allotment would be deferred from all grazing and associated activities; of the 32% that would be grazed, aspen is a minimal component,with no aspen stands and so would not impact aspen snags and red-naped sapsucker habitat. Therefore, the proposed action would not have a direct, indirect or cumulative effect, nor would it result in a change in the forest-wide trend for the red-naped sapsucker.

Mule Deer

Mule deer are considered to be demonstrably widespread, abundant, and secure on a global, national and state level. However, over the past 15 years statewide trends have shown a decline in mule deer populations (Arizona Game and Fish Dept. 2001a). A declining trend has also been observed on the Coconino National Forest. In good years, fawn production has been at levels minimal to sustaining populations; in poor precipitation and forage years, fawn production has not kept up with mortality rates.

Mule deer populations are declining, and have been affected by many factors, including disease, poaching, climatic conditions, and habitat changes. Early seral aspen and pinyon-juniper reproduction has not occurred at a sufficient level to positively influence browse production. Historically, mule deer occurred more frequently on the allotment; the decline can be attributed to the loss and fragmentation of habitat from the development of communities, fencing, major roadways, and degeneration of aspen.

Alternative 1: No Action

If the no action alternative were selected, no cattle grazing or improvements would be implemented, so there would be no direct, indirect, or cumulative effects associated with the project.

Alternative 2: Proposed Action

Direct and Indirect Effects

One new fence is proposed and would be built to wildlife standards; this fence may also benefit mule deer. Although mule deer are mostly browsers, they do eat grass and shrubs located within the grassland habitat type and therefore, may compete with cattle for food resources.

Because 68% of the allotment would not have any grazing or associated activity, and the remaining 32% does not occur in aspen habitat the proposed action would not result in a change in the forest-wide habitat trend. Similarly, about 50% of the grazing in the allotment occurs in pinyon-juniper woodland. Grazing does not effect the structure of the woodland, therefore, there would be no change in the habitat and no change in the forest wide trend for the habitat. Since there we be no change in the trend for the two habitats for this species, there will be no change in the trend for the mule deer population.

Cumulative Effects

Cumulative effects include those associated with wild ungulate grazing, hunting, recreational use, highway and right-of-way fencing, fires, and vegetation treatments within the cumulative effects area.

Deer may be disturbed at critical time periods like fawning, breeding or wintering or when human uses increase above a certain level. This could result in increased stress to animals, fawning spread over a long time period or less time spent with young. Human use in this area is expected to increase over the life of the permit.

Hunting activities may result in, gut piles, animals wounded and not recovered, and other human related impacts, which could provide increase food sources for predators. This could result in increased population of predators. Hunting or scouting during the breeding season may result in disturbance that could extend the breeding and parturition dates out to the point where predators may have a longer advantage period when fawns are small and unable to outrun predators. Hunting is not expected to affect the population through over-harvest, as only very small portion of the males are harvested.

Past wildfires have created or improved grassland within the cumulative effects boundary. The result of these fires for deer is greater visibility; fewer obstructions between winter and summer habitats, and more nutritious plants are expected to germinate in the fire areas.

Tree encroachment is a concern within the project area because it may reduces the amount and quality of deer habitat where encroachment is significant. Pinyon-juniper woodland and young ponderosa pine have established in areas that were historically grassland, savannah-like grassland interspersed with trees, and aspen, areas where deer were historically more common. Many areas have been treated to remove or limit this encroachment and to increase grass and forb production. Growth of shrub and tree species since the treatments were done has reduced the quality of habitat for deer in these areas. As tree density and canopy cover increases, predator hiding cover may increase; herbaceous understory can decline in vigor, abundance and diversity, and erosion may increase.

Migratory Birds

President Clinton signed Executive Order 13186 on January 10, 2001, placing emphasis on conservation of migratory birds. This order requires that an analysis be made of the effects of Forest Service actions on species of concern listed by Partners in Flight, the effects on important bird areas (IBA) identified by Partners in Flight (Latta et al 1999), and the effects to important over-wintering areas. There are no IBAs within the project area.

There are six species listed by Partners in Flight as species of concern that have already been addressed in this analysis under listed species, sensitive species, and/or management indicator species, and will therefore not be addressed again in this section. These birds include: Mexican spotted owl (mixed conifer), northern goshawk (ponderosa pine), bald eagle, re-napped sapsucker (aspen), burrowing owl (grassland), and Ferruginous hawk (grassland).

Several species that use the project area or have habitat in the project area are identified by Partners in Flight as priority species or by Arizona Game and Fish as birds of concern, and will be addressed in detail below. The following is a summary table and a description of migratory bird species status within the project area and an analysis of effects for each alternative. Species of concern are organized by the type of habitat they use.

Mixed Conifer Habitat Type Priority Species

Although only a small portion of the allotment, mixed conifer woodlands do occur on the allotment. Partners in Flight identified three species of concern for mixed conifer habitats: northern goshawks, olive-sided flycatchers, and Mexican spotted owl. As both the northern goshawk and the Mexican spotted owl were discussed in detail in previous sections (“Sensitive Birds” and “Threatened and Endangered Species” respectively), they will not be addressed again under this section.

Table 11: Summary of Impacts from the Proposed Action on Migratory Bird Priority Species

Habitat Type	Migratory Bird Priority Species	Impact of the Proposed Action
Mixed Conifer	Northern goshawks	See Sensitive Species Section – May impact.
	Mexican spotted owl	See T&E Section – No impact.
	Olive-sided flycatchers	No effect.
Pine	Northern goshawks	See Sensitive Species Section – May impact.
	Olive-sided flycatchers	No effect.
	Cordilleran flycatchers	No effect.
	Purple martins	No effect.
Pinyon-Juniper	Gray flycatchers	No effect.
	Pinyon jays	No effect.
	Gray vireos	No effect.
	Black-throated	No effect.
	Gray warblers	No effect.
	Juniper titmouse	No effect.
High Elevation Grassland	Ferruginous hawk	See Sensitive Species Section – May Impact.
	Swainson's hawk	No effect.
	Burrowing owl	See Sensitive Species Section – May Impact.
	Grasshopper sparrow	No effect.

Olive-sided Flycatcher

The olive-sided flycatcher prefers forest openings and edges within mixed conifer and Ponderosa Pine with snags. They utilize areas with numerous dead trees and limbs for singing and hunting perches, and are often associated with the wooded shores of rivers, ponds, and beaver ponds due to the presence of downed snags and possible increase in insects. The flycatcher often occurs at the edges of recently-burned areas for foraging and singing. Olive-sided flycatchers need live mature pines for nesting, are highly territorial and have strong site fidelity in both breeding and wintering grounds. Declines in populations may be related to the destruction of wintering habitat.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

If the no action alternative was selected, no cattle grazing or improvements would be implemented, so there would be no direct, indirect or cumulative effects to the olive-sided flycatcher.

Alternative 2: Proposed Action

Direct and Indirect Effects

Livestock grazing in mixed conifer would have limited affects to olive-sided flycatchers as flycatchers depend on trees and snags for nesting, roosting, and foraging for insects. Therefore, no measurable direct, indirect, or cumulative effects would occur to the olive-sided flycatcher as a result of the proposed action alternative.

Pine Habitat Type Priority Species

Ponderosa pine woodlands occur on the allotment. Partners in Flight identified four species of concern for pine habitats: northern goshawks, olive-sided flycatchers, Cordilleran flycatchers, and purple martins. The northern goshawk and olive-sided flycatcher will not be addressed under this section as both have been previously discussed in detail under “Sensitive Birds” or “Mixed Conifer Habitat Type Priority Species” respectively.

Cordilleran Flycatcher

Cordilleran flycatchers are considered a common summer resident and uncommon transient (Morrall and Coons 1996). They are associated with snags and high overstory canopy closure. Stands of old growth ponderosa pine and closed canopy forest occur within the project area in small patches, on steep slopes, or in pine stringers in small drainages. Cordilleran flycatcher populations are considered to be increasing but at risk due to concerns about loss of suitable habitat and habitat components such as snags, downed logs, and loss of closed canopy. Within the project area, populations are static to increasing.

Purple Martin

Purple martins are an uncommon summer resident in ponderosa pine (Morrall and Coons 1996; USDA 2000b). This species has been nearly extirpated from ponderosa pine forests since fire suppression has resulted in much denser conditions, and logging has reduced the number of snags and large old trees. Breeding bird survey (BBS) data indicates that this species is static to slightly declining in the project area.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

If the no action alternative is selected, no cattle grazing or improvements would be implemented, so there would be no direct, indirect or cumulative effects to the olive-sided flycatcher, the Cordilleran flycatcher, or the purple martin.

Alternative 2: Proposed Action

Direct, Indirect and Cumulative Effects

Livestock grazing at the levels proposed in this alternative would not impact recruitment of snags and downed logs, which are the primary concerns about loss of habitat and habitat components for olive-sided flycatchers, Cordilleran flycatchers, and purple martins as all three depend on trees and snags for nesting, roosting, and foraging for insects. The proposed grazing levels would not result in loss of snag recruitment or large old trees. As livestock grazing would not affect the habitat or habitat components of these species, it is determined that no direct, indirect or cumulative effects would occur to the olive-sided flycatcher, the Cordilleran flycatcher, or the purple martin as a result of the proposed action.

Pinyon-Juniper Habitat Type Priority Species

There is a large amount of pinyon-juniper on the allotment. Partners in Flight have identified five priority bird species on concern for this habitat type: gray flycatchers, pinyon jays, gray vireos, black-throated gray warblers, and juniper titmouse.

Gray Flycatcher

Gray flycatchers primarily occupy pinyon pine and juniper, or ponderosa pine with an open overstory. They may need some ground cover to support insect populations for foraging. Larger tall stands of sagebrush and greasewood are also used. The status of the gray flycatcher is expected to be static to increasing, and they are expected to be common in the project area.

Pinyon Jays

Pinyon jays are common to uncommon permanent residents in the pinyon influenced portion of the project area (Morrall and Coons 1996). Pinyon jays are thought to be relatively stable in Arizona. Mixed stands of pinyon-juniper occur over large areas and pinyon trees are heavily impacted by drought and beetle kill. In general, trees greater than 75 years old are preferred in large numbers. Pinyon jays were more common to the project area prior to pine beetle outbreak. Their presence and breeding behavior is dependent upon the availability of pine seed crops.

Gray Vireo

Gray vireos breed in open and mature juniper woodlands where there is an understory of broadleaf shrubs. They are insectivorous during breeding season and frugivorous during the winter. They nest low in small trees or shrubs and are known hosts to brown-headed cowbirds.

Black-throated Gray Warblers

Phillips et al (1964) described black-throated gray warblers as common summer residents in pinyon-juniper woodlands. This species is frequently encountered in tall stands with a higher density of mature pinyon pine. During Arizona Breeding Bird Atlas surveys, they were frequently absent in drier stands primarily composed of juniper (Corman and Wise-Gervais 2005). The black-throated gray warbler population is thought to be stable or slightly increasing in Arizona.

Juniper Titmouse

In Arizona, it is a fairly common to common resident in the northeastern, northern, central, and locally southeastern portions of the state. An obligate inhabitant of pinyon-juniper woodlands, the juniper titmouse occurs as individuals or pairs and does not typically form conspecific flocks, although it does occur in mixed-species flocks. It is likely largely insectivorous during the warmer half of the year. The juniper titmouse is an obligate secondary cavity nester; of the 13 active nests found as part of the Arizona Breeding Bird Atlas, nine (79 %) were in junipers (T. Corman, AGFD, pers. observ.). The juniper titmouse is probably not subject to brood parasitism by brown-headed cowbirds; because it is clearly associated with mature pinyon-juniper woodlands, management activities that favor these stands will benefit this species.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

If the no action alternative is selected, no livestock grazing or improvements would be implemented; therefore there would be no direct, indirect, or cumulative effects to gray flycatchers, pinyon jays, gray vireos, black-throated gray warblers, or Juniper titmouse.

Alternative 2: Proposed Action

Direct and Indirect Effects

Impacts on gray flycatchers are usually related to breeding habitat loss and modification of pinyon-juniper woodlands. Grazing by wildlife and cattle can reduce ground cover, inhibit regeneration of shrubs, and increase local cowbird populations (Latta et al 1999). However livestock grazing in the project area is expected to occur at a level that maintains grass cover and shrub component, though there would be some impact to grass and shrubs. Gray flycatcher nests may be parasitized by brown-headed cowbirds when grazing occurs in nesting habitat during the nesting season. This is offset by the deferment of 68% of the allotment as grazing would not then occur in all gray flycatcher habitats, and not all nesting habitat would face the potential for parasitism each year. No measurable direct, indirect, or cumulative effects would occur to the gray flycatcher as a result of the proposed action.

For the pinyon jays, three main factors are considered to have an affect: (1) the size of pinyon pine seed crops, (2) the amount of nest predations, and (3) the harshness of the physical environment, particularly the amount of snow during the nesting season (Marzluff and Balda 1992). Livestock grazing does not directly, indirectly or cumulatively affect this species due to lack of impact to pinyons.

Grazing could have slight impacts to gray vireo when it causes hedging on shrubs. However, under the utilization and intensities proposed—as well as the 68% deferral—grazing on shrubs should be at a minimum and there would be negligible direct, indirect and cumulative effects to the gray vireo.

Similar to the Pinyon jays above, due to the deferment of 68% of the allotment, grazing would not occur in all black-throated gray warbler and Juniper titmouse habitats, and not all nesting habitat would face the potential for brown-headed cowbird parasitism each year. No measurable direct, indirect, or cumulative effects would occur to the black-throated gray warbler and Juniper titmouse as a result of the proposed action.

High Elevation Grassland Habitat Type Priority Species

Partners in Flight have identified four priority bird species of concern for this habitat type: ferruginous hawk, Swainson's hawk, burrowing owl, and grasshopper sparrow. Ferruginous hawks and burrowing owls are now on the Region 3 Regional Forester's sensitive species list, and were discussed in detail in the "Sensitive Birds" section of this chapter.

Swainson's Hawk

Swainson's hawks, like ferruginous hawks, prefer grasslands and open desert scrub habitats. Their primary food source is insects, including grasshoppers and beetles. Small mammals, lizards and snakes are often foraged upon during the breeding season. They nest in trees including cottonwood, juniper, mesquite, and oak.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

If the no action alternative is selected, no livestock grazing or improvements would be implemented, so there would be no direct, indirect, or cumulative effects to Swainson's hawks associated with the project.

Alternative 2: Proposed Action

Direct, Indirect and Cumulative Effects

The Arizona Partners in Flight recommend setting allowable grazing utilization levels throughout all grasslands to maintain the long-term sustainability of grassland habitat for the Swainson's hawk. Grazing and grazing management activities could disturb individual hawks as well as impact their habitat, particularly habitat for prey species. Historically, hawks occurred more frequently on the allotment; however community development, fencing, major roadways, and encroachment of grasslands with junipers and other conifers have resulted in a decrease in available habitat.

Though Swainson's hawks do occur on the Peaks Allotment, it is not the major area of use. The major area occurs south of the analysis area in the Anderson Mesa area. Therefore, the proposed action would have negligible direct, indirect and cumulative effects to the Swainson's hawk

Grasshopper Sparrow

The grasshopper sparrow prefers grassland habitats without trees or shrubs, and requires abundant thatch and dry grass for concealment. These grassland birds breed during monsoon season in July and August. They construct nests in ground depressions and conceal the nest with a dome of dry grass. During the summer, these sparrows are insectivorous; during the winter they depend almost entirely on grass seeds as insects are not available.

Alternative 1: No Action

Direct, Indirect and Cumulative Effects

If the no action alternative is selected, no livestock grazing or improvements would be implemented, so there would be no direct, indirect, or cumulative effects to grasshopper sparrows associated with the project.

Alternative 2: Proposed Action

Direct, Indirect and Cumulative Effects

Grazing and grazing management activities could disturb individual birds as well as impact their habitat and the habitat for prey species. However, grasshopper sparrows are not known to nest on the Coconino National Forest. Because they may occur only as accidental, and due to the lack of available habitat on the allotment, the proposed action would have no direct, indirect or cumulative effects to the grasshopper sparrow.

Economy

Although the contributions of livestock grazing to local economies and county governments is small in comparison to other businesses and funding sources, this section discusses the effects based on National Forest fees, jobs, and other revenues.

Livestock grazing contributes to the livelihood of the Peaks Allotment permittee as well as to the economy of local communities and counties. As mentioned previously, the Peaks Allotment is located in

Coconino County and is currently permitted for 1,200 head of adult cattle with a seasonal use period of May 22 to October 15. The presence of cattle grazing does not limit hunting or recreational activities on lands contained within the allotment. The nearest community to the allotment is Flagstaff, which is a large and fairly diverse community with livestock grazing associated revenues making up a very small portion of the economy. Although livestock grazing revenues represent only a small percentage of the funds Coconino County receives from National Forest fees, they are an important contributor. Additionally, individual allotments provide incremental contributions to local economies: a change to one allotment may result in no impacts to the local economy, but changes to several would most likely result in a cumulative impact to the area economy.

The economy of Coconino County gains revenue from several sources: 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. Coconino County also receives National Forest fees from uses on the Kaibab and Apache-Sitgreaves National Forests. National Forest fees are used primarily for highway maintenance and public schools in Coconino County.

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 cattle grazing. Table 11estimates the effects expected on these indicators in Coconino County from implementing the No Action alternative and the Proposed Action alternative on the Peaks Allotment.

Table 12. Economic effects for Coconino County

Economic Effects	No Action	Proposed Action
Direct and Indirect Jobs*	0	4.3
Federal Payments to Counties**	0	$641.25

*Approximately 1.14 jobs per 100 cattle

**The amount shown under the Proposed Action alternative is based on 25 percent of the Peaks Allotment grazing fees paid to Coconino County at the 2009 grazing fee rate of $1.35/HM and at the maximum permitted Head Months of 1,900. Not shown in this amount are the taxes that counties collect 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 improvments.

Quantifiable factors such as economic costs and outputs, along with projected animal months (AM) or animal unit months (AUM) have been used to help describe the economic effects of grazing on the Peaks Allotment. The Quick-Silver economic analysis program (version 6.00.001) was used to calculate these factors. Although projections from the Quick-Silver 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.

The investment analysis anticipates the rate of return for the projected expenditures by the permittee and Forest Service on the Peaks Allotment over a 10 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 12 displays the results of this investment analysis for the No Action alternative and the Proposed Action alternative for the Peaks Allotment. These figures have been rounded to the nearest dollar.

Table 13. Investment Analysis

Investment Analysis	No Action	Proposed Action
Forest Service		
Present Value of Benefits [1]	0	$20,004
Present Value of Costs [2]	0	($63,087)
Present Net Value [3]	0	($43,083)
Benefit/Cost Ratio [4]	NA	0.32
Permittee – Peaks Allotment		
Present Value of Benefits [1]	0	$149,365
Present Value of Costs [2]	0	($94,993)
Present Net Value [3]	0	$54,372
Benefit/Cost Ratio [4]	NA	1.57
All Partners		
Present Value of Benefits [1]	0	$169,370
Present Value of Costs [2]	0	($158,080)
Present Net Value [3]	0	11,290
Benefit/Cost Ratio [4]	NA	1.07

Note: Dollar figures in ( ) indicate a negative amount, or loss of money

[1] *Present value of benefits* represents the income generated from grazing on the Peaks Allotment by the permittee, along with the present value of the grazing fees collected by the Forest Service.

[2] *Present value of costs* represents the cost of range improvement maintenance, range improvement construction, and range inspections (Permittee), along with the costs of range inspections, permit administration, monitoring and materials for new range improvements (Forest Service).

[3] *Present net value* represents present value of benefits minus present value of costs.

[4] *Benefit/cost ratio* represents the present value of benefits divided by the present value of costs.

Effects to the Peaks Permittee

Gross revenue estimates are created by estimating the amount of calves produced each year for each alternative. Table 13 represents a comparison of the No Action alternative and the Proposed Action alternative for Estimated Gross Annual Revenue.

Table 14. Estimated Gross Annual Revenue

Value	No Action	Proposed Action
Estimated Gross Annual Revenue	0	$128,775

Alternative 1: No Action

Direct and Indirect Effects

Under the No Action alternative, the allotment would not be grazed and the permit for grazing cattle on this allotment would be cancelled. The permittee would lose future potential revenue derived from the sale of cattle that would have been produced on the Peaks Allotment.

The No Action alternative would result in the loss of annual Federal payments to Coconino County for livestock grazing on the Peaks Allotment. This loss, by itself, is not substantial; however, the county would also lose revenues 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 Peaks Allotment would be eliminated. Some of the jobs indirectly associated with livestock grazing on the Peaks 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, it is not anticipated that the local economies would be enhanced due to increased recreational use once cattle are removed.

Cumulative Effects

Individual allotments provide incremental contributions to local economies: a change to one allotment may result in no impacts to the local economy, but changes to several would most likely result in a cumulative impact to the area economy. There are current or reasonably foreseeable future actions that would result in removal of grazing on other allotments on the Coconino National Forest. However, a decision to choose the No Action alternative would result in an incremental impact to the local economy of loss of over $100,000 gross annual revenue.

Alternative 2: Proposed Action

Direct and Indirect Effects

For the Proposed Action alternative, the following factors were used in the calculations for estimating the Gross Annual Revenue: 375 head of permitted livestock; 15 percent of the permitted livestock are non-productive animals (young replacement animals and bulls); 80 percent calf crop; average sale weight of 500 pounds per calf; and an average sale price of $101/cwt (National Agricultural Statistics Service; December, 2009). These factors will vary annually but serve as a point of comparison. No complete projections were made for the permittee's actual costs, the ability to cover costs, or any supplemental income that may be available.

The Proposed Action alternative 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 Peaks 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.

Cumulative Effects

The Proposed Action alternative would help maintain current jobs within the surrounding communities and revenues to Coconino County and the State of Arizona and would not result in a detrimental cumulative effect on the local economy.

Chapter 4 - Monitoring

The proposed action alternative would implement adaptive management. Adaptive management provides flexibility in the application of management options as they relate to the needs of the area. A critical component of adaptive management is monitoring.

Under the proposed action alternative, two types of monitoring would be used for monitoring upland vegetation: implementation monitoring and effectiveness monitoring. Under the no action alternative, monitoring of upland vegetation would not continue. Both qualitative and quantitative monitoring methods would be used in accordance with the Interagency Technical References, Region 3 Rangeland Analysis and Management Training Guide, and the Region 3 Allotment Analysis Handbook. Monitoring frequency varies by each activity and would be accomplished collaboratively by Forest Service personnel, the permittee, and cooperating agencies.

Implementation Monitoring

Implementation monitoring would be conducted on an annual basis and would include: permit compliance, livestock actual use data, grazing intensity, utilization, assessments of forage production and ground cover, precipitation, and allotment inspections.

Permit Compliance

Throughout each grazing season, Forest Service personnel would monitor activities on the allotment to ensure compliance with permit terms and conditions, the Allotment Management Plan, and the Annual Operating Instructions.

Livestock Actual Use

Permittee would keep accurate records regarding actual livestock numbers and pasture use dates on the form supplied as part of the Annual Operating Instructions. This form would be submitted to the Forest Service at the end of the grazing season.

Grazing Intensity

Grazing intensity monitoring would occur within each of the main grazing pastures during, or immediately after, the period when livestock are grazing the pasture. Grazing intensity is defined as the amount of herbage removed through grazing or trampling during the grazing period. Grazing intensity would 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 grazing intensity guideline is reached before the planned move date. Likewise, livestock may stay longer in a pasture if grazing intensity is below the established guideline when the planned move date arrives.

Grazing intensity measurements would be taken in key areas which reflect grazing effects within an entire pasture. A minimum of one key area would be established within each main grazing pasture, at existing long-term monitoring sites if possible, to represent the overall grazing intensity within the pasture.

Utilization

Utilization monitoring would 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 would be taken in key areas which reflect grazing effects within an entire pasture. A minimum of one key area would be established within each main grazing pasture, at existing long-term monitoring sites if possible, to represent overall pasture utilization. Utilization guidelines are not intended as inflexible limits. Utilization measurements can indicate the need for management changes prior to this need being identified through long term monitoring. Utilization data would not be used alone, but would be used along with climate and condition/trend data, to determine stocking levels and pasture rotations for future years.

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

Forage Production and Ground Cover

Forage production assessments would be made to determine stocking levels for the grazing season and would also be used during the grazing season to determine if adjustments in the stocking level should be made. Qualitative assessments of ground cover would also be made and used as an indicator of condition and trend; observed changes may indicate the need to conduct effectiveness monitoring (condition and trend) 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

A written summary would be completed each year by Forest Service personnel to document the overall history of that year's grazing. This document would include a monitoring summary, livestock actual use, weather history, and a discussion of the year's accomplishments and problems. Information from this report would be used in preparing the following year's grazing plan.

Effectiveness Monitoring

Effectiveness monitoring would be used to evaluate the success of management in achieving the desired objectives. Effectiveness monitoring would occur within key areas on permanent transects at an interval of 10 years or less. Effectiveness monitoring may also be conducted if data and observations from implementation monitoring (annual monitoring) indicate a need. Effectiveness monitoring would include forage production and vegetation condition and trend.

Forage Production

Forage production surveys would be conducted using the best available methods at that time. Forage production data would be used as a tool to manage this allotment, but would not be the sole measurement to establish carrying capacity. The most recent forage production survey was completed in 2009. The next survey is scheduled to occur after 2015.

Condition and Trend

Three Parker Three-Step clusters were established within the analysis area in 1954 and three additional Parker Three-Step clusters were added in 1962. These transects are one of the best historic records of range condition and trend. The photo points and vegetative ground cover data show how the site has changed over time. All of these locations were converted to use the Pace Frequency method and one-tenth acre canopy cover plots in 2007. The change in monitoring methods was necessary to obtain ground cover and vegetation data that correlate with data presented in the Terrestrial Ecosystem Survey of the Coconino National Forest (1995).

Frequency and ground cover data would be collected using the widely accepted plant frequency method (University of Arizona, Extension Report 9043, 1997). These plots would monitor trends in plant species abundance, plant species distribution and ground cover. This would provide information on plant composition and additional information on regeneration.

Ocular plant canopy cover 0.10-acre plots would be used to compare existing conditions with potential and desired vegetative community conditions. Over time, these plots would document canopy cover changes.

The most recent data collection from these monitoring locations was completed in 2007. These monitoring locations would be read at least every 10 years by Forest Service personnel.

Chapter 5 - Consultation and Coordination

The Forest Service consulted the following individuals, Federal, state and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

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Arizona State Land Department
City of Flagstaff
Coconino County Board of Supervisors
Coconino County Community Development
Coconino County Parks and Recreation
Natural Resources Conservation Service
State Historic Preservation Office.
U.S. Fish and Wildlife Service

Tribes

Fort McDowell Yavapai Nation
Havasupai Tribe
Hopi Tribe
Hualapai Tribe
Navajo Medicine Men's Association
Navajo Nation
Navajo Nation Tolani Lake Chapter
Navajo Nation, Cameron Chapter
Navajo Nation, Coalmine Canyon Chapter
Navajo Nation, Dilcon Chapter
Navajo Nation, Gap-Broadway Chapter
Navajo Nation, Leupp Chapter
Navajo Nation, Tuba City Chapter
Navajo Tribe of Indians, Dept of Agriculture
Pueblo of Acoma
Pueblo of Zuni
San Carlos Apache Tribe
Tonto Apache Tribe
White Mountain Apache Tribe
Yavapai-Apache Nation
Yavapai-Prescott Indian Tribe

Chapter 6 – Glossary

A

Adaptive Management: The alternatives are designed to provide sufficient flexibility to adapt management to changing circumstances. If monitoring indicated that desired conditions are not being achieved, management will be modified in cooperation with the permittee. Changes may include administrative decisions such as the specific number of livestock authorized annually, specific dates of grazing, class of animal or modifications in pasture rotations. Such changes would not exceed the limits for timing, intensity, duration and frequency defined for the alternatives.

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". .

B

Best Management Practices (BMP): A combination of practices that are the most effective and practical means of achieving resource protection objectives (primarily water quality protection) during resource management activities.

C

Carrying 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. Capacity classifications are as follows:

> *Full Capacity* – Areas which can be used by grazing animals under proper management without long term damage to the soil resource or plant communities. The land is stable and vegetation ground cover is maintaining site productivity and producing a minimum of 100 pounds of forage per acre on slopes less than 40%.
>
> *Potential Capacity* – Areas that could be used by grazing animals under proper management but where soil stability is impaired, or range improvements are not adequate under exisiting conditions to obtain necessary grazing animal distribution. Grazing capacity may be assigned to these areas, but conservative allowable use assignments must be made.
>
> *No Capacity* – Areas that are incapable of being grazed by livestock without long-term damage to the soil resource or plant community, or are barren or unproductive naturally. In addition, it includes areas that produce less than 100 pounds per acre of forage and/or are on slopes greater than 40 percent. Grazing capacity is not assigned to sites with a "no capacity" classification.

Condition: As evaluated and ranked by the USFS, is a subjective expression of the status or health of the vegetation and soil relative to their combined potential to produce a sound and stable biotic community.

Soundness and stability are evaluated relative to a standard that encompasses the composition, density, and vigor of the vegetation and the physical characteristics of the soil.

Critical Habitat: That portion of a wild animal's habitat that is critical for the continued survival fo the species ("critical" is a formal designation under the Endangered Species Act).

Cumulative Effects: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7).

D

Decision Notice: A decision document prepared for an environmental assessment that explains the rationale for the decision.

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.

Developed Recreation: Recreation that requires facilities that result in a concentrated use of an area. Examples are campgrounds and ski areas. Facilities might include roads, parking lots, picnic table, toilets, water systems, ski lifts, and buildings.

Direct Effects: The effects caused by the action which occur at the same time and place (40 CFR 1508.8).

Dispersed Recreation: Recreation use that occurs outside of developed sites and requires few, if any, improvements other than roads and trails. Representative activities are hiking, backpacking, driving for pleasure, scenery viewing, snowmobiling, cross-country skiing, hunting, off-road vehicle use, and berry picking.

E

Effects: The results expected to be achieved from implementation of actions relative to physical, biological, and social (cultural and economic) factors resulting from the achievement of outputs. Examples of effects are tons of sediment, pounds of forage, person-years or employment, and income. There are direct, indirect, and cumulative effects.

Environmental Assessment (EA): A concise public document [that] briefly provides sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI), and shall include brief discussions of the need for the proposal, alternatives, the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted (40 CFR 1508.9).

F

Finding of No Significant Impact (FONSI): A document briefly presenting the reasons why an action will not have a significant effect on the human environment and for which an environmental impact statement will not be prepared (40 CFR 1508.13).

Forage: All non woody plants (i.e. grass, grass-like plants, and forbs) and portions of woody plants available to livestock and wildlife for food.
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.

G

Grasslands: Lands where the vegetation is dominated by grasses, grass-like plants, and/or forbs. Nonforest land is classified as grassland when herbaceous vegetation provides at least 80 percent of the canopy cover excluding trees.

H

I

Impaired Soil Condition: Indicators signify a reduction in soil quality. The ability of the soil to function properly has been reduced and/or there exists an increased vulnerability to irreversible degradation. An impaired category should signal land managers that there is a need to investigate the ecosystem further to determine the cause and degree of decline in soil functions. Changes in management practices or other preventative actions may be appropriate.

Important Bird Area (IBA): An internationally recognized place on the landscape that provides exceptionally valuable or essential habitat for one or more species of birds, including breeding, wintering, or migratory habitat.

Indirect Effects: Effects caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR 1508.8).

Interdisciplinary Team (IDT): A group of individuals with skills from different disciplines. An interdisciplinary team is assembled because no single scientific discipline is sufficient to adequately identify, analyze, and resolve issues or problems.

Issue: A subject, question, or conflict of widespread public discussion or interest regarding management of National Forest System lands.

K

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 genereal management of the entire area of which it is a part.

L

M

Managed Fire: Fire used for resource benefit. Can be caused by either planned (prescribed) or unplanned ignition (i.e. lightening).

Management Area (MA): As defined in the Coconino National Forest Plan, "An area that has common direction throughout and that differs from neighboring areas. The entire forest is divided into management areas where common standards and guidelines apply.

Management Indicator Species (MIS): Any species, group of species, or species habitat element selected to focus management attention for the purpose of resource production, population recovery, maintenance of population viability, or ecosystem diversity (FSM 2605).

Mitigation Measures: Actions that are taken to lessen the severity of effects of other actions.

N

Nongame Species: Animal species that are not usually hunted.

O

Old-Growth: Stand of timber that is past full maturity and well into old age, and is the last stage in forest succession.

Overstory: That portion of trees, in a stand of trees of more than one story, forming the upper or uppermost canopy layer.

P

Permittee: An individual or group that has been granted a federal permit to graze livestock for a specific period of time on a range allotment.

Prescribed Fire: Fires set under conditions specified in an approved plan to dispose of fuels, control unwanted vegetation, stimulate growth of desired vegetation, and change successional stages to meet range, wildlife, recreation, wilderness, watershed, or timber management objectives. (see Managed Fire).

Proper Functioning Condition (PFC): A methodology for assessing the physical functioning of riparian and wetland areas. The term PFC is used to describe both the assessment process, and a defined, on-the-ground condition of a riparian-wetland area. In either case, PFC defines a minimum or starting point. The PFC assessment provides a consistent approach for assessing the physical functioning riparian-wetland areas through consideration of hydrology, vegetation, and soil/landform attributes. The PFC assessment synthesizes information that is foundational to determining the overall health of a riparian-wetland area. The on-the-ground condition termed PFC refers to how well the physical processes are functioning. PFC is a state of resiliency that will allow a riparian-wetland system to hold together during a 25- to 30-year flow event, sustaining that system's ability to produce values related to both physical and biological attributes.

Proposed Action (PA): In terms of the National Environmental Policy Act, the project, activity, or action that a federal agency proposes to implement or undertake. The PA is sent to the public and interested agencies for their review and comment.

Protected Activity Center (PAC): An area established around a Mexican spotted owl nest or roost site for the purpose of protecting the area. Management of these areas is largely restricted to managing for forest health objectives.

R

Range Allotment: A designated area of land available for livestock grazing. Usually a grazing permit is issued designating a season of use and specifying the number and kind of livestock to be grazed in accordance with direction found in an allotment management plan. It is the basic land unit used in the management of livestock on National Forest System lands, and associated lands administered by the Forest Service.

Rangeland (Range): Land that supports vegetation useful for grazing; vegetation is routinely managed through manipulation of grazing rather than cultural practices.

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 rested 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.

Revegetation: Re-establishing and developing plant cover. This may take place naturally through the reproductive processes of existing flora or artificially by planting.

Riparian Area: Riparian ecosystems are distinguished by the presence of free water within the common rooting depth of native perennial plants during at least a portion of the growing season. Riparian ecosystems are normally associated with seeps, springs, streams, marshes, ponds, or lakes. The potential vegetation of these areas commonly includes a mixture of water (aquatic) and land (phreatic) ecosystems.

S

Satisfactory Soil Condition: Indicators signify that soil quality is being sustained and the soil is functioning properly and normally. Ability of the soil to maintain resource values, sustain outputs, and recover from impacts is high.

Seasonal Intensity/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 maeasurement. Seasonal Intensity/seasonal utilization is measured at the end of the grazing period. Seasonal intensity/seasonal utilization differs from utilization because it does not account for subsequent growth of either the ungrazed or grazed plants.

Sediment: Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice, and has come to rest on the earth's surface either above or below sea level.

Sensitive Species: Plant and animal species identified by a regional forester for which population viability is a concern, as evidence by significant current or predicted downward trends in population

numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution (FSM 2670.5(19)).

Seral: One stage in a series of steps in the process of ecological succession.

Snag: Standing dead tree from which the leaves or needles may have fallen.

Stand: A plant community sufficiently uniform in cover type, age class, risk class, vigor, size class, and stocking class to be distinguishable from adjacent communities thus forming an individual management or silviculture unit. Most commonly used when referring to forested areas.

Stock Tank: An earthen tank for providing water for livestock and wildlife.

Structural Improvement (Range and Wildlife): Any type of range or wildlife improvement that is human-made, such as fences, water developments, corrals, and waterfowl islands.

Succession: An orderly process of biotic community development that involves changes in species, structure, and community processes with time.

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).

T

Threatened and Endangered Species (TES): Species identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act, as amended.

> *Threatened Species* – Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
>
> *Endangered Species* – Any species that is in danger of extinction throughout all or a significant portion of its range.
>
> *Proposed Species* – Any species of fish, wildlife, or plant that is proposed in the Federal Register to be listed under Section 4 of the Endangered Species Act (50 CFR 402.02).

Transition Zone: As used for forest planning purposes, is the area of transition between ponderosa pine and pinyon-juniper. Includes the area where alligator juniper commonly occurs.

Travel Management Rule (TMR): The Travel Management Rule requires designation of those roads, trails, and areas that are open to motor vehicle use. Designations are made by class of vehicle and, if appropriate, by time of year (36 CFR 212.51(a)). The TMR prohibits off-road driving and decreases road densities on the National Forest.

Trend: The direction of change in resource value ratings or attributes as observed over time. 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.

U

Understory: The trees and other woody species growing under a more or less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.

Ungulate: A four-legged, hooved herbivorous mammal (i.e. cows, elk, deer, etc).

Unsatisfactory Soil Condition: Indicators signify that degradation of soil quality has occurred. Impairment of vital soil functions results in the inability of the soil to maintain resource values, sustain outputs, or recover from impacts. Soils rated in the unsatisfactory category are candidates for improves soil management practices or restoration designed to recover soil functions.

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 useor desired stocking rate to be achieved over a period of years.

V

Viable Populations: A wildlife or fish population of sufficient size to maintain its existence over time in spite of normal fluctuations in population levels.

W

Watershed: An entire area that contributed water to a drainage or stream.

Wildfire: Any wildland fire that requires a suppression action. This includes all fires not meeting the requirements of a prescribed or managed fire. (See Managed Fire).

Woodland: Plant communities with a variety of stocking comprised of various species of pinyon pine and juniper, typically growing on drier sites.

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Appendix A – Estimated Grazing Capacity

The analysis used grazing capability, forage production, topography, and an appropriate allowable use to determine the estimated grazing capacity. The following describes these factors and their implications on the calculation of the estimated grazing capacity:

- Grazing Capability: Grazing capacity was assigned only to Full Capacity and Potential Capacity acres. A conservative assignment of capacity to Potential Capacity acres was achieved through a 50% reduction in estimated grazing capacity and a conservative allowable use.
- Forage Production: An average forage production of 150 pounds/acre was used for all TES units.
- Topography: Adjustments in the grazable land area was made to account for slope. The following were used for topography adjustments on the allotment:
    - Class 1 - 0 to 10% Slope; No reduction in grazing capacity
    - Class 2 - 11 to 30% Slope; 30% reduction in grazing capacity
    - Class 3 - 31 to 40% Slope; 60% reduction in grazing capacity
    - Class 4 - >40% Slope; 100% reduction in grazing capacity (No Capacity)
- Allowable Use: Allowable use was established at 35%.
- A deferred, rest-rotation livestock grazing management system would be used within the Badger, Headquarters, Holding, Kelly, Kendrick, Missouri Bill, Saddle Mountain, #13, and #18 pastures of the Peaks Allotment.
- Only the main grazing pastures were used to determine the estimated grazing capacity. Management pastures (gathering, holding, shipping, etc.) less than 100 acres in size and waterlots were not included in the calculations.
- Estimated capacity is expressed in Animal Unit Months (AUMs), which 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).

Based on the existing conditions, the factors listed above, and the implementation of a rest-rotation management system, the estimated grazing capacity for the analysis area of the Peaks Allotment (Badger, Headquarters, Holding, Kelly, Kendrick, Missouri Bill, Saddle Mountain, #13, and #18 pastures) is approximately 1,900 Animal Unit Months or 375 Animal Units from May 15 to October 15.