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Environmental Assessment

Barboot, Big Bend, Boss, Bruno, Hunt Canyon, Lower Rucker, Pedregosa and Rak Grazing Allotments

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1. PURPOSE AND NEED FOR ACTION

Background

This Environmental Assessment (EA) describes a Forest Service proposal to authorize grazing on the Barboot, Big Bend, Boss, Bruno, Hunt Canyon, Lower Rucker, Pedregosa and Rak allotments in the Chiricahua and Pedregosa Mountains, Douglas Ranger District, Cochise County, Arizona. The EA discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and one alternative.

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 Section 504 of the *Rescission Act (P.L. 104-19, 1995)*. Supporting documentation is on file in the project planning record in the Coronado National Forest Supervisor's Office in Tucson, Arizona. Throughout this EA, references to supporting documentation are shown in parentheses. For example, a reference "(PR 21)" would indicate that a specific passage in the EA is supported by information contained in document No. 21 in the project record.

Purpose and Need for Action

Where consistent with other multiple use goals and objectives, there is congressional intent to allow grazing on suitable National Forest System lands. (*Multiple Use and Sustained Yield Act of 1960, Wilderness Act of 1964, Forest and Rangeland Renewable Resources Planning Act of 1974, Federal Land Management and Policy Act of 1976, National Forest Management Act of 1976*). By regulation, forage-producing lands will be managed for livestock grazing where consistent with land management plans (*36 CFR 222.2(c)*). Where consistent with the goals and objectives of Land and Resource Management Plans, it is Forest Service policy to make forage from lands suitable for grazing available to qualified livestock operators (*FSM 2202.1, FSM 2203.1*).

The Barboot, Big Bend, Boss, Bruno, Hunt Canyon, Lower Rucker, Pedregosa and Rak allotments include land identified as suitable for grazing in the Coronado National Forest Land and Resource Management Plan (Forest Plan). The purpose of the proposed action is to authorize livestock grazing in a manner consistent with Forest Service policy and the Forest Plan. The purpose and need arose because:

- The allotments require environmental analysis necessary to comply with the *Rescission Act (P.L. 104, 1995)*.
- There is a need to incorporate additional management flexibility through an adaptive management strategy consistent with Forest Service policy (*FSH 2209.13, Chapter 90*).
- Additional watering facilities may be necessary to improve livestock distribution and improve the reliability of some pastures.

Existing Condition

The grazing allotments are located on the southern portion of the Chiricahua Mountains (Figures 1 and 2). The Chiricahua Mountains are well known for their high diversity of topography, wildlife and plants. Lower elevations support desert grasslands which transition into broadleaf evergreen woodlands and chaparral at middle elevations. Higher elevations support a plant community dominated by coniferous woodlands. Upper elevations of the Rak allotment fall within the Chiricahua Wilderness. Little grazing occurs in the wilderness due to steep slopes and dense vegetation.

Major drainages in the project area include Rucker, Stanford, Pridham, John Long and Hunt Canyons and their tributaries, as well as several other drainages. None of these drainages support perennial flows, although pools persist in Rucker Canyon in most years. Larger drainages support well-developed riparian communities comprising willows, sycamores, ash, Arizona walnut and Arizona cypress. Riparian condition was last assessed in 2001. These data indicate riparian areas in the Rak, Barboot, and Bruno allotments and in the higher elevations of the Pedregosa allotment appear to be meeting or moving toward forest plan standards and guidelines. In lower elevation riparian areas in Rucker, Big Bend, Pedregosa, and Hunt Canyon allotments recruitment of riparian vegetation is low. Nearly all these areas have roads located in the terrace area near the channel, which affects riparian and channel development. Riparian plant vigor is generally good at higher elevations and fair at lower sites.

Current allotment management practices and management issues are briefly summarized below.

The **Barboot** allotment is permitted for 450 cow/calf pairs from November 1 to April 30. The allotment contains 11,002 acres of which 6,328 are considered capable¹ for grazing. The allotment is composed of four large pastures. Cattle are rotated through three of the pastures during the grazing season. The fourth pasture (Wildcat) is seldom used due to the lack of reliable water. Cattle are removed from the forest during the summer growing season. Rangeland vegetation was assessed in 2005 and determined to be in fair to excellent condition (PR 19). Mesquites are encroaching in many portions of the allotment and this may affect range condition over time. Soils are 100% satisfactory (PR 45). Riparian conditions in Hunt and Box canyons are fair to good (PR 44). The primary management issue is the need to provide more dependable waters, in particular the Wildcat Pasture.

The **Big Bend** allotment encompasses 8,254 acres located in the southwest corner of the project area, of which 6,130 are considered capable. The allotment is permitted for 400 cow/calf pairs from November 1 to April 30. There are five pastures that are used in a deferred rotation in order to provide spring rest in some pastures. Between April and November, cattle are moved off of the Forest and placed on private land. Range conditions were assessed in 2005 and determined to be fair with a static trend (PR 21). Soils in many sites are shallow and showing signs of impairment including compaction, erosion and lack of vegetative ground cover. Nearly 40% of the allotment shows signs of

¹ Capable acres are lands under 40% slope capable of annually producing 100 pounds per acre or more of forage.

soil impairment (PR 45). Riparian vigor in Big Bend Canyon is rated as fair (PR 44). The primary management issue is the need to improve cattle distribution, away from bottoms and existing water developments.

The **Boss** allotment is permitted for 43 yearling cattle from October 1 to March 31. A private land permit for 15 bulls (9/01-2/28) and one horse year-round is also authorized. This is a relatively small allotment, consisting of 873 acres, of which 817 are considered capable. The allotment is composed of two pastures; yearlings are grazed in the main pasture and the second pasture is used for bulls. Because there are only two pastures, they are used season long. The allotment is a small portion of a much larger ranch, and cattle move off of the Forest onto private or state land during the summer growing season. Until 2004, the allotment was used yearlong and vegetation and soil condition were estimated to be poor as recently as 2002 (PR 18, 40). Rangeland assessments conducted in 2006 indicate that resources are now recovering as a result of growing season rest (PR 18). Soil condition is considered 100% satisfactory, and soils retain their inherent productivity (PR 45).

The **Bruno** allotment is located south of the Lower Rucker allotment in lower Bruno Canyon. The allotment is permitted for 266 cow/calf pairs from October 16 to April 30. The allotment contains 7,526 acres of which approximately 5,440 are considered capable. Cattle are rotated between three primary pastures over the course of the grazing season. A fourth pasture is seldom used because it does not have reliable water. Cattle are removed from the Forest during the summer growing season. Rangeland vegetation was assessed in 2004 using the Parker 3-step methodology and determined to be fair at two monitoring locations and poor at one site. Soil stability at all sites is improving as evidenced by increases in litter and decreases in bare soil. Soil condition is 93% satisfactory. Areas with compacted soils and poor vegetation condition are related to livestock concentration in areas where supplements are placed. Riparian vigor is fair and tree recruitment is low in Bruno Canyon (PR 44). The primary management need is to improve distribution to take pressure off of ridges and bottoms areas where cattle concentrate.

The **Hunt Canyon** allotment is located in the southwestern foothills of the Chiricahua Mountains. The allotment is permitted for 195 cow/calf pairs yearlong. The allotment consists of 8,311 acres, of which approximately 6,920 are considered capable for grazing. There are five large pastures and two smaller pastures that are used in a deferred rotation. Allotment condition and trend studies have been conducted since the mid-1950s and most recently in 2006 (PR 24, 30, 37). Range and soil condition is improving and meeting Forest Plan standards, although the presence of Lehmann and Boer's lovegrass tends to reduce condition estimates on some sites. The Forest Service seeded or encouraged seeding of these species into the 1960's. These species affect apparent rangeland condition because non-native species are not counted in plant composition scores used by the Forest Service to estimate ecological condition. Nevertheless, these species provide ground cover and acceptable forage where they occur. Soil stability at all sites is improving as evidenced by increases in litter and decreases in bare soil. Soil condition is 100% satisfactory. The primary management issue is the lack of reliable water in large portions of the allotment.

The **Lower Rucker** allotment is located south of the Rak allotment in lower Rucker Canyon. The allotment is permitted for 151 cow/calf pairs from November 16 to July 15

annually. An additional 20 cow/calf pairs are permitted on a private land permit for the same period². The allotment consists of 4,720 acres, of which approximately 3,190 are classified as capable for livestock grazing. The allotment consists of two pastures on either side of Rucker Canyon and a third pasture in the bottom of the canyon consisting of mostly private land. Cattle normally graze the south pasture and the bottom pasture from November through April, and are moved to the north pasture for the second half of the grazing season. Rangeland vegetation was assessed in 2007 (Parker 3-Step methodology) and determined to be fair to good with a static trend (PR 20). Soils are 91% satisfactory, with indications of compaction and erosion in areas of the north pasture. Riparian recruitment and vigor is good, but channel stability is affected by the presence of a county road in and near the channel (PR 44). The primary management issue is the need to improve soil condition in the north pasture, provide additional reliable stock water improvements in the South Pasture, and reduce use in the North Pasture during the early summer when forage sometimes becomes limiting.

The **Pedregosa** allotment is permitted for 196 cow/calf pairs yearlong. Four horses yearlong are also authorized under a private land permit. Four large pastures and three smaller pastures are used in a deferred rotation. The timing and duration of use is subject to water availability in each pasture. During some portion of the year, cattle are often moved off of the Forest and placed on the permittees' deeded land. Range condition was assessed in 2007 and determined to be fair to excellent with upward trends (PR 39). Soils are 100% satisfactory (PR 45). However, Indian Creek riparian condition was rated poor for vigor (PR 44). The primary management issue is the need to provide more dependable waters and reduce use in drainage bottoms.

The **Rak** allotment is permitted for 400 cows and 25 bulls between August 1 and April 30 each year. The allotment consists of 36,355 acres, of which approximately 13,000 acres are considered capable for grazing. There are twenty pastures broken up into four main grazing units: John Long, Pridham, Stanford in the north and Rucker in the south, which contains eight pastures. Typically, cattle graze in two of the three northern units between August and October while the third is rested. From November to April, cattle are rotated through the eight pastures in the Rucker unit in a deferred rest rotation. Cattle come off of the allotment in April and are moved to deeded land. Rangeland vegetation was assessed in 2004 and 2007 and determined to be meeting Forest Plan standards for rangeland condition (PR 17). Indicators of soil stability are good with upward trends. Soils are 99% satisfactory, with only a small area showing soil compaction. Riparian condition is largely good (PR 44). The primary management issue is the need to introduce additional management flexibility in order to avoid using pastures during the same time each year.

Management Direction

The allotments fall primarily within Forest Plan Management Area 4 (Livestock Grazing, Game Habitat and Fuelwood Harvest), but also include smaller areas designated as MA 1 (Visual Resources), MA 3 (Dispersed Recreation), MA 7 (Unique Resources, riparian)

² A private land permit is issued to persons who control grazing lands adjacent to National Forest System lands and who waive exclusive grazing use of these lands to the United States for use as part of a larger grazing allotment.

and MA 9 (Wilderness) (Figure 4). Management emphasis for these areas is described below.

Management Area (MA) 1 includes steep, rugged lands that are managed for visual resources and semi-primitive dispersed recreation (Forest Plan p. 47). Slopes are generally in excess of 40% and sites included in this management area are generally considered unsuited for livestock grazing. Range management standards and guidelines call for no assigned permitted use for livestock. Cattle may occasionally use these areas (they are not physically excluded), but they are not used to calculate grazing capacity.

Management Area (MA) 3 includes undeveloped lands that have a high attraction for recreation (Forest Plan p. 55). They are managed for a variety of dispersed recreational opportunities while protecting or maintaining the unique physical, biological or cultural resources. The bottom of Rucker Canyon from the forest boundary to the Chiricahua Wilderness is designated as MA 3.

Management Area (MA) 4 includes a variety of vegetation types on lands under 40% slope. They are generally considered capable and suitable for livestock grazing. Management emphasis is on a “sustained harvest of livestock forage and fuelwood while maintaining or improving game animal habitat” (Forest Plan p. 62). The majority of the project area falls within MA4.

Management Area (MA) 7 includes lands that have been “identified as supporting flora and fauna associations that are unique enough to require special management practices... includes riparian ecotypes.” Management emphasis is to manage these areas to benefit riparian dependant resources (Forest Plan p. 67). Several riparian corridors are designated as MA 7. These include John Long, Bruno, Hunt, High Lonesome, Box, Tom Ketchem and Big Bend canyons along with a few smaller drainages. Additional unmapped riparian areas are known from the project area and are managed under this emphasis.

Management Area (MA) 9 includes vegetative and landform types that have been determined to be suitable for wilderness designation. Management emphasizes wilderness values while providing livestock grazing and recreational opportunities that are compatible with maintaining wilderness values and protecting resources (Forest Plan p. 79). Forest Plan standards and guidelines limit utilization to 35% (Forest Plan p. 116).

Desired Condition

The Coronado Forest Plan (page 10) contains the following goals for the range program on the Forest:

- Restore rangeland to at least moderately high ecological condition (70 to 75 percent of potential production, fair range condition) with stable soil and a static to upward trend.
- Produce livestock products consistent with other resources and uses.
- Eliminate grazing from areas not capable of supporting livestock without significant detriment to range or other resources.
- Balance permitted grazing use with grazing capacity.

Based on Forest Plan goals and site-specific knowledge of the allotments, the following objectives constitute the desired conditions for the analysis area:

- Livestock stocking is consistent with annual forage production and use is monitored annually. Management controls livestock use and distribution so that sufficient herbaceous vegetation is retained to protect soils and provide herbaceous wildlife cover; zones of heavy use are minimized. Achievement will be monitored through implementation monitoring described under the proposed action in Chapter 2 of this EA.
- Ecological sites within the allotments have stable soils, functional hydrology and support functional biotic communities. All areas are in good or better range condition. Achievement will be monitored through effectiveness monitoring described under the proposed action in Chapter 2 of this EA.
- Native vegetation in riparian bottoms is a diverse mix of perennial grasses, forbs, shrubs and trees. Recruitment of young trees is occurring and trees and shrubs show no evidence of high-lining or hedging. Riparian bottoms throughout the allotments provide suitable year-round habitat for species dependent on herbaceous cover. Achievement will be monitored through implementation and effectiveness monitoring described under the proposed action and monitoring of established riparian transects.
- Areas of historic heavy livestock use have increasing ground cover and litter and stable soils. Achievement will be monitored through implementation and effectiveness monitoring described under the proposed action in Chapter 2 of this EA.
- Occupied habitats for threatened, endangered, sensitive and management indicator species are maintained or improved, and recovery objectives are being met. Achievement will be monitored through surveys and occurrence records, and implementation and effectiveness monitoring.
- All grazing improvements necessary for management on all allotments are in proper working order and are contributing toward improved livestock distribution and pasture reliability. Achievement will be monitored through implementation monitoring described under the proposed action in Chapter 2 of this EA.

Proposed Action

The Forest's proposed action is to authorize continued livestock grazing on the Barboot, Big Bend, Boss, Bruno, Hunt Canyon, Lower Rucker, Pedregosa and Rak allotments. The proposed action consists of four components - **authorization, improvements, management practices and monitoring** – implemented using an adaptive management strategy. Light to moderate grazing intensities and regular growing season rest or deferment will be used to provide for grazed plant recovery, increased plant vigor and retention of sufficient herbaceous vegetation to protect soils and to provide herbaceous cover for wildlife. Existing structural range improvements would be maintained and new improvements would be built to the degree necessary to maintain or achieve management

objectives. The proposed action is described in detail as Alternative 2 in the Alternatives section (below).

Decision Framework

The Douglas District Ranger is the official responsible for decisions regarding management of the Barboot, Big Bend, Boss, Bruno, Hunt Canyon, Lower Rucker, Pedregosa and Rak allotments. Based on the results of the NEPA analysis, the Ranger will issue a decision document or documents that include(s) a determination of the significance of the environmental effects and whether an environmental impact statement will be prepared. The decision(s) will also include a determination of consistency with the Forest Plan, National Forest Management Act, National Environmental Policy Act and applicable laws, regulations and executive orders.

If the District Ranger determines it is not necessary to prepare an environmental impact statement, the Ranger will decide whether or not livestock grazing will continue to be authorized. If grazing continues to be authorized, the Ranger would determine which management actions, mitigation measures and monitoring requirements would be prescribed in the Allotment Management Plans. These would include permitted use, season of use, allowable utilization standards and the term of the permits. Decisions may be made separately for each allotment. That is, the District Ranger may decide to authorize grazing on one or more allotments, and not on others, or may select different alternatives for different allotments.

Public Involvement

NEPA analysis for the Boss, Hunt Canyon, Barboot and Pedregosa allotments was previously initiated in 1999. This analysis did not proceed past the scoping stage and the proposed actions have been modified since 1999; however, public comments received during scoping in 1999 have been reviewed and considered in the current analysis (PRs 13-14). The current proposal was listed in the Forest's Schedule of Proposed Actions in October 2007 and an interdisciplinary team met in November 2007 to review proposed actions and identify any new issues. The proposal was provided to the public and other agencies for comment during scoping on January 15, 2008 (PR 48). In addition, the Forest has met several times with the permittees on the allotments to identify management objectives and strategies. Using the comments from the public and other agencies, the interdisciplinary team developed a list of issues to address.

In August and September 2008, a draft of the EA (PR 78) was provided to parties who had expressed interest in the project. The public was also notified of the opportunity to comment through a legal notice published in the *Douglas Daily Dispatch* on August 19, 2008. Six comment letters were received in response to this solicitation (PRs 79-84). A summary of these comments and a Forest Service response is contained in the project record at PR 85.

Issues

The Forest Service categorized and sorted comments received into issues and non-issues. Issues are defined as a concern or debate about the effects of the proposal. Issues were

further categorized as key issues (significant issues used to develop alternatives to the proposed action and other issues (concerns that are addressed through mitigation measures or project design). The effects analysis is built around the identified issues. Comments not considered issues to analyze in this EA were identified as those that were: 1) outside the scope of the proposed action and thus irrelevant to the decision being made; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) conjectural and not supported by scientific or factual evidence.³ An analysis of the issues and scoping responses is included in the Record as PR .

Key Issues

No issues were identified that could not be addressed through mitigation or project design modifications.

Other Issues

Other issues and concerns are identified below. Project design features and mitigation measures have been developed to address these other issues.

Wildlife – Continued grazing in the project area could result in effects to wildlife, including listed and sensitive species and their habitats. Effects could be either positive or negative depending on the timing, intensity, frequency and duration of grazing and other management activities.

Soil, riparian and watershed condition – Continued grazing on the allotments could affect soil and watershed condition. Effects could be either positive or negative depending on the timing, intensity, frequency and duration of grazing and other management activities.

Upland vegetation – Continued grazing on the allotments could lead to changes in the composition, structure and vigor of upland vegetation and could affect the condition and trend of rangeland resources. Effects could be either positive or negative depending on the timing, intensity, frequency and duration of grazing and other management activities.

Heritage Resources – Concentrations of livestock and construction of range improvements may affect historic and prehistoric sites located within the project area.

Animal Unit Months - Several comments objected to the Forest Service assigning different AUM factors for different classes of livestock, contending that the Forest Service is arbitrarily cutting permitted use through the inappropriate use of a conversion factor. Capacity estimates are based on standardized production and utilization surveys and records of stocking and monitoring over the past 10-15 years. The Forest's rationale for the use of AUM factors is described in Chapter 2 of this EA under the proposed action.

Additional considerations in this EA include potential effects to **air quality, water quality and quantity and social resources** including **economics**. Effects on these

³ The Council on Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..."

resources are evaluated through specialist's reports and consultation with tribes and regulatory agencies.

2. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the management of the Barboot, Big Bend, Boss, Bruno, Hunt Canyon, Lower Rucker, Pedregosa and Rak allotments. This section presents the alternatives in comparative form, in order to define the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Mitigation and monitoring measures incorporated into the alternatives are also described.

Alternatives

Alternatives Eliminated From Detailed Study

Continue Current Management. Under this alternative, there would be no change in allotment management. As permits expire, new permits would be issued for the classes and numbers of livestock currently permitted. Annual authorized use would continue to be controlled through annual operating instructions. None of the proposed improvements would be implemented, but existing improvements would be maintained. This alternative assumes management intensity, utilization and distribution patterns similar to the past five years. This alternative was not carried forward because it would not address the need to improve pasture reliability and increase management flexibility, nor would it result in significant improvements in livestock distribution.

Alternatives Considered in Detail

Alternative 1

No Action

Under this alternative, grazing would not be authorized and use of the allotments by domestic livestock would be discontinued. Permittees would be given up to one year from the date of the NEPA-based decision to remove livestock from the allotments. Existing structural improvements would remain in place but would not be maintained. Improvements contributing to resource protection or enhancement, such as water developments important for wildlife, would be maintained where feasible using other program funds. Periodic inspection of structural improvements would be used to determine whether maintenance or removal is needed. Removal or maintenance of improvements would be authorized by a separate decision. Where necessary, maintenance of allotment boundary fences would be reassigned to adjacent permittees with the understanding that livestock are to be kept off of the allotments. Woody vegetation treatments would not be authorized, but may be authorized under a future decision. The need for such treatments would remain independent of any grazing authorization.

Alternative 2

The Proposed Action

The Forest's proposed action is to authorize continued livestock grazing on the Barboot, Big Bend, Boss, Bruno, Hunt Canyon, Lower Rucker, Pedregosa and Rak allotments. The proposed action consists of four components - **authorization, improvements, management practices and monitoring** – implemented using an adaptive management strategy. The four components are described below.

1. Authorization

Grazing would be authorized on the allotments under the following terms and conditions.

- **Duration and timing of grazing.** Grazing would be authorized on each allotment using rotational or seasonal grazing in order to incorporate growing season rest or deferment to allow for grazed plant recovery. Pastures grazed during the summer growing season (July-September) will not be grazed during the growing season the following year. On all allotments, the sequence and timing of pasture moves and entry and exit from the allotments would be based on monitoring of range readiness, ecological condition, water availability and utilization.
- **Intensity of grazing.** Forage utilization would be managed at a level corresponding to light to moderate intensity⁴ in order to provide for grazed plant recovery, increased plant vigor, and retention of herbaceous litter to protect soils and provide forage and herbaceous cover for wildlife. Consistent patterns of utilization in excess of 45 percent of key species in key areas would be used as a basis to modify management practices or take administrative actions necessary to reduce utilization in subsequent grazing seasons. Within the Chiricahua Wilderness, annual utilization would not exceed 35 percent, in accordance with Forest Plan direction.

The following administrative actions would be necessary to implement the decision to authorize grazing.

- **Permit issuance.** New 10-year term grazing permits would be issued for each allotment for the numbers and under the terms described below. The term grazing permit will identify the number, kind and class of livestock authorized and the season of use as required by Forest Service policy (FSM 2231.11). Permits will also identify the total animal unit months (AUMs)⁵ authorized for each permit. The number and

⁴ Based on review of numerous grazing intensity studies, Holechek (2004) identifies light to moderate grazing as 32-43 percent average use of primary forage species. These averages are based on pasture-wide utilization averaged over time. The Forest Service monitors utilization based on the use of key forage species in key areas. Key areas are selected to be representative of management effectiveness over the entire pasture. For the purposes of monitoring, an annual use guideline of 35-45 percent of key species in key areas will be used to monitor use in all pastures, which, combined with growing season rest or deferment, should insure pasture-wide *average* use of less than 45 percent.

⁵ An animal unit month (AUM) is a measure of the amount of *forage* required by a 1000 lb cow or its equivalent for one month based on a daily allowance of 26 lbs. of dry forage per day (Society for Range Management 1998, USFS 1997). It is not synonymous with animal month (or head-month), which is an expression of one month's *occupancy* of the range by an animal. The amount of forage consumed varies based on the size and class of livestock consuming the forage. In general, forage consumption increases

class of livestock would be allowed to vary depending on resource conditions and management objectives. Resource conditions that would affect management decisions include but are not limited to precipitation, forage production, water availability and previous annual or seasonal utilization levels. Annual use will not exceed the total AUMs authorized or the season of use identified in the permit. Annual adjustments would be documented and authorized in annual operating instructions. Depending on prevailing climate, resource conditions, management needs and permittee preference, actual use may be significantly less than authorized use in some years. Grazing permits would be issued within 90 days of final agency action following the NEPA decision to authorize grazing [FSH 2209.13(94) and R3 Supplement 2209.13-2007-1]. A comparison of current and proposed authorizations is shown in Table 1.

- **Barboot.** 400 cow/calf pairs or equivalent between October 1 to April 30 (3,168 AUMs). Initially, livestock numbers will not exceed 275 cow/calf pairs (2,178 AUMs). If additional waters (identified below) are developed in order to improve pasture reliability, additional livestock numbers will be authorized to account for the increased forage capacity. The season of use will be extended by one month in the fall to provide some flexibility in entering and leaving the allotment. This would continue current management with a 396 AUM reduction in permitted use.⁶
- **Big Bend.** 400 cow/calf pairs or equivalent, November 1 to April 30 (up to 3,168 AUMs). A private land permit for 8 additional cow/calf pairs for the same period (63 AUMs) would also be issued. This would continue current authorized use. The season of use will be extended by one month in the fall to provide some flexibility in entering and leaving the allotment.
- **Boss.** 43 yearlings or equivalent, October 1 to March 31 (up to 326 AUMs). An on/off permit for four horses would also be issued. This would continue current authorized use.
- **Bruno.** 240 cow/calf pairs or equivalent, October 16 to April 30 (up to 2,052 AUMs). This represents a 222 AUM reduction from current authorized use. Initially, stocking will be maintained at 200-220 cow/calf pairs until the permittee can achieve better distribution in North Bruno, Meadow and Lower Bruno pastures. Once improved distribution is demonstrated, stocking would be allowed be increased.

with increasing size of the animal using the forage. A cow/calf pair will typically consume more forage than a cow without a calf; a yearling will consume less. Thus an area of rangeland with the capacity to support a certain number of mature cows will likely support relatively fewer cow/calf pairs (or bulls or other larger animals) or relatively more yearlings (or other smaller animals) over the same period of time. The concept of animal unit conversion factors is incorporated into production and utilization studies accomplished by the Forest and is useful for comparing initial capacities on allotments for different classes of livestock. With the forage requirement of a mature cow as the base (1 AUM), the Forest Service Handbook defines a cow/calf pair as 1.32 AUM and a yearling as 0.7 AUM (FSH 2209.15(28)). Ultimately, however, range capacity can be variable and stocking is determined on an annual basis in response to actual use monitoring and current forage conditions.

⁶ Permitted use on the Barboot allotment was identified as 350 head in the scoping report. This number was modified in April 2008 after meeting with the permittee (PR 53).

- **Hunt Canyon.** 154 cow/calf pairs yearlong (up to 2,439 AUMs). Authorized use would be reduced by 650 AUMs to reflect recent actual stocking and the lack of reliable waters. Once additional waters are developed, the Forest will conduct additional production/utilization studies and other monitoring as necessary to determine whether authorized use can be increased back to previous levels.
- **Lower Rucker.** 151 cow/calf pairs or equivalent, October 15 to June 15 (up to 1594 AUMs). A private land permit for 20 cow/calf pairs (211 AUMs) for the same season would also be issued. The season of use would be shifted one month earlier in order to reduce use during the hot summer months when forage and water are limiting. This would continue current authorized use.
- **Pedregosa.** 196 cow/calf pairs yearlong, (up to 3,105 AUMs) plus four horses yearlong under a private land permit. Permitted use would not change, but actual use would be limited to 150 animals (2376 AUMs) until proposed water improvements are completed.
- **Rak.** 332 cow/calf pairs or equivalent, August 1 to April 30 (up to 3,938 AUMs). Actual use is expected to change from cows and bulls to cow/calf pairs, but AUMs authorized would not change.
- **Allotment Management Plans.** New allotment management plans (AMPs) for each allotment would be developed (or modified where existing AMPs are in place) concurrent with new permits. These would be included as part of the grazing permits. The AMPs will specify the goals and objectives of management, management strategies, range improvements and monitoring requirements and will incorporate an adaptive management strategy described below.
- **Annual Operating Plans.** On an annual basis, the Forest and permittees would jointly prepare annual plans, referred to as Annual Operating Instructions (AOI), prior to each grazing year. The AOI will set forth:
 - The maximum permissible grazing use authorized on the allotment for the current grazing season and the numbers, class, type of livestock, and timing and duration of use.
 - The planned sequence of grazing in pastures on the allotment, or the management prescriptions and monitoring that will be used to make changes.
 - Structural and non-structural improvements to be constructed, reconstructed, or maintained and who is responsible for these activities.
 - Allowable use or other guidelines to be applied and followed by the permittee to properly manage livestock.
 - Monitoring for the current season that may include, among other things, documentation demonstrating compliance with the terms and conditions in the grazing permit, AMP and AOI.

Table1. Current and proposed permitted use: South Chiricahua Allotments. Associated authorizations for waived private land (private land permits) are also shown.

Allotment	Permitted Use	Permitted AUMs	Proposed Use	Proposed AUMs
Barboot	450 cow/calf pairs 11/1-4/30	3,564	400 cow/calf pairs 10/1-4/30	2,178- 3,168
Big Bend	400 cow/calf pairs and 8 cow/calf pairs (private), 11/1- 4/30	3,168 plus 63 pvt.	400 cow/calf pairs and 8 cow/calf pairs (private), 11/1-4/30	3,168 plus 63 pvt.
Boss	43 yearling cattle 10/1-3/31, 15 bulls 9/1-2/28 and 1 horse year-long (on-off).	328	43 yearling cattle 10/1-3/31, 15 bulls 9/1-2/28 and 1 horse year-long (on-off).	328
Bruno	266 cow/calf pairs 10/16-4/30	2,274	240 cow/calf pairs 10/16-4/30	2,052
Hunt Canyon	195 cow/calf pairs year-long	3,089	154 cow/calf pairs year-long	2,439
Lower Rucker	151 cow/calf pairs and 20 cow/calf pairs (private). 11/16-7/15	1,586 plus 211 pvt.	151 cow/calf pairs and 20 cow/calf pairs (private), 10/15-6/15	1,586 plus 211 pvt.
Pedregosa	196 cow/calf pairs and 4 horsed (private), yearlong	3,105 plus 58 pvt.	196 cow/calf pairs year-long	3,105 plus 58 pvt.
Rak	400 cows and 25 bulls 8/1-4/30	3,938	332 cow/calf pairs 8/1-4/30	3,938

2. Improvements

Several structural improvements are proposed in order to improve livestock distribution and pasture reliability (Figures 9a and 9b). These improvements have been identified as possible practices to assist in the achievement of desired conditions if management alone is not sufficient. Future monitoring may indicate that the projects are not necessary, in which case they will not be constructed. Monitoring may also indicate the need for additional improvements. In this case, the need for, and site-specific effects of, each additional improvement will be evaluated as described under *Adaptive Management*, below. Additionally, current levels of Forest Service funding are likely insufficient to fund all projects identified. Permittees have been notified that it may be necessary to pursue alternative sources of funding in order to accomplish identified projects. Estimated costs of the improvements are shown in parentheses where known.

Barboot

- Install 1.5 mile of pipeline from a well in Hunt Canyon through Chalk Hill pasture to private land below Boot Dam. Permittee would be responsible for materials and installation. (\$9,000)
- Develop a spring in High Lonesome drainage and pipe water downslope to a 5,000 gallon storage and trough. Development would be contingent on securing water rights to the spring. (\$7,000 cost shared between Forest Service and permittee.)
- Install a 12,000 gallon rainwater catchment in Wildcat pasture. Forest Service would fund. (\$6,000)

Big Bend

- Develop a seep on the south slope of Big East pasture by installing a spring box, ½ mile of pipe, 5,000 gallon storage and a trough. This development would be contingent on determination of water rights on the spring. (\$4,200)
- Install a 12,000 gallon fiberglass umbrella rainwater catchment (trick tank) in the Beacon pasture (NW ¼ of Sec. 34, T 21 S, R 29 E.). Installation will require the use of a dozer to repair washed out portions of FR 4862 to provide access to transport equipment and supplies. Forest Service funding (\$6,500)

Bruno

- Extend a pipeline ½ mile south from Bruno well to a 5,000 gallon storage and trough in the Meadow pasture. (\$5,500)
- Extend the north Bruno pasture fence less than ½ mile north to a natural barrier. Forest Service would supply materials and permittee would construct. (\$2,000)
- Install 12,000 gallon fiberglass umbrella rainwater catchment in North Bruno pasture to provide reliable water. (Cost of material and helicopter transport: \$6,400).
- Fence Meadow tank to control access by cattle and encourage use of the upper portion of Meadow pasture. Permittee would construct using Forest Service materials.

Lower Rucker

- Extend ½ mile of pipeline into the Rock Garden and Road pastures. Costs shared between Forest Service and permittee (\$3,500).

Hunt Canyon

- Drill a water well in the upper portion of John's pasture in order to provide reliable stock water for the John's, Doane and High Lonesome pastures.
- Install a fiberglass umbrella rainwater catchment on the ridge west of the gate in Bruno pasture.
- Extend the fence 1.0 mile between the Bruno and the John's pastures.

Pedregosa

- Improve an existing well in the Lonesome pasture by adding storage, pipeline and a trough. (\$15,000).
- Drill a well in the Halfmoon pasture to pipe water to the High Lonesome and Buck Creek Pastures. The project will include 2 miles of pipeline and 3-4 troughs spaced along the line. (\$43,000)
- Install a 1,500 gallon umbrella rainwater catchment in the Indian Creek Pasture south of Devil's Dam. Helicopter installation required. (\$6,500)

Rak

- Install a 12,000 gallon rainwater catchment in the Cottonwood pasture in Stanford Canyon. Forest Service funding. (\$6,500).

The responsibility for maintenance of range improvements is assigned to the permittee(s) in the terms and conditions of each grazing permit (FSM 2244.03). Maintenance activities include the repair of fences and water facilities, cleaning of stock ponds and other actions necessary to maintain the improvement in serviceable condition necessary to serve the purpose intended. On an annual basis, responsibilities for repair and maintenance of existing improvements will be identified in the AOI(s).

3. Management Practices.

To mitigate resource impacts, the following measures will be implemented. These practices have been demonstrated to be successful when used on similar projects and are considered effective at reducing environmental impacts. They are consistent with applicable Forest Plan standards and guidelines, Best Management Practices and the terms and conditions and conservation measures of applicable U.S. Fish and Wildlife Service Biological Opinions. Implementation of the mitigation measures and design criteria is intended to preclude the occurrence of potentially significant environmental impacts.

Soil, Water and Vegetation – the objective is to mitigate effects of livestock grazing and facility construction through the use of Best Management Practices (FSH 2509.22, PR 61) and adaptive management. Practices include, but are not limited to the following.

- Utilization of key upland herbaceous forage species in key areas will be managed to achieve the goal of light to moderate grazing as a pasture average. The objective is to protect plant vigor, increase herbaceous residue needed for soil protection and to increase herbage producing ability of forage plants. A utilization guideline of 30-45% use of key species in key areas will be used to achieve this objective.
- Management practices will be used to achieve proper distribution or lessen the impact on sensitive areas. Practices include herding, salting and controlling access to waters. Salt will be placed on good feed, one quarter to one half mile from waters and salting locations will be moved annually. Placement of liquid or bulk supplements will require prior approval of the District Ranger.
- No hay will be placed on Forest lands in order to minimize the introduction of weed seeds.

Wildlife – the objective is to mitigate impacts to wildlife from livestock grazing and from disturbance associated with maintenance and construction of range facilities.

- All water developments will include wildlife access and escape ramps. Waters will be kept available to wildlife year round.
- All new and reconstructed fencing will be built to Forest Plan standards (Forest Plan, p. 35) to provide for wildlife passage through the fence. At a minimum, this will be a 4-strand fence with smooth bottom wire 16 inches off of the ground and a total height of 42 inches or less.

- Range construction projects will be designed to avoid the destruction of agaves. If impacts to agaves are unavoidable, the Forest will insure that no more than 1% of agaves within 800 meters of a project are impacted. The objective is to avoid impacts to lesser long-nosed bat food resources.
- All proposed range facilities will be evaluated by a qualified wildlife biologist for effects to threatened, endangered or sensitive species prior to any ground-disturbing activities. Facilities will be designed and constructed to have no adverse effect on listed species.
- Within areas meeting the definition of high quality Mearns' quail habitat, herbaceous vegetation will be managed to maintain a minimum of 6 inches of herbaceous stubble height, which is generally interpreted as less than 45% utilization of key herbaceous species. The objective is to provide herbaceous vegetation as cover for quail and other wildlife.

Heritage Resources – The objective is to protect heritage resources (historic and prehistoric sites) from direct or indirect impacts caused by ground-disturbing activities associated with the construction of range facilities and to monitor the effects of cattle grazing on sites to ensure that adverse effects are not occurring. In general, these measures include the following:

- All structural range facilities will be surveyed by qualified personnel for heritage resources prior to any ground-disturbing activities. Facilities will be built or modified to avoid impacts to heritage sites. If unrecorded sites are discovered during the course of project implementation, activities will cease and the Forest or District Archeologist will be notified.
- Range facilities, if needed, will be located so as to avoid concentrations of livestock on identified heritage resource sites.
- No salting will occur within or adjacent to identified heritage sites.
- If impacts from grazing (e.g. excessive trampling, cattle rubbing against and knocking down standing features) are occurring to heritage sites, measures will be taken (e.g. fencing) to protect them.

4. Monitoring

The objective of monitoring is to determine whether management is being properly implemented and whether the actions are effective at achieving or moving toward desired conditions. Monitoring is necessary under the adaptive management strategy proposed in order to implement timely and effective management changes.

Effectiveness monitoring includes measurements to track condition and trend of upland and riparian vegetation, soil, and watersheds. Monitoring will be done following procedures described in the Interagency Technical Reference (1996a), the Region 3 Rangeland Analysis and Training Guide (USDA Forest Service, 1997), and the Riparian Area Survey and Evaluation System (USDA Forest Service, 1989). These data are interpreted to determine whether management is achieving desired resource conditions, whether changes in resource condition are related to management, and to determine whether modifications in management are necessary. Effectiveness monitoring will occur

at five to ten year intervals, or more frequently if deemed necessary. Examples of effectiveness monitoring include, but are not limited to dry weight rank, pace transects, pace quadrat frequency, Parker 3-step, riparian evaluations (RASES or proper functioning condition), soil and watershed condition assessments and repeat photography. Monitoring will occur at established permanent monitoring points.

Implementation monitoring will occur yearly and will include such things as inspection reports, forage utilization measurements, livestock counts, Grazing Response Index and facilities inspections. Utilization measurements are made following procedures found in the Interagency Technical Reference on utilization studies (1996b) and with consideration of the Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands (Smith et al, 2007, PR 55).

Utilization will be monitored on key forage species, which are perennial grasses that are palatable to livestock. At a minimum monitoring will include use in key areas⁷, but may include monitoring outside of key areas. Utilization on non-grass species (forbs, shrubs and trees) may also be measured if appropriate for the site. Utilization may be monitored both during the grazing season (seasonal use) and at the end of the growing season (annual utilization). The Douglas District Range Staff Officer and the permittees will be responsible for monitoring livestock grazing utilization. Over time, changes in resource conditions or management may result in changes in livestock use patterns. As livestock use patterns change, new key areas may be established and existing key areas may be modified or abandoned in cooperation with the permittees.

Permittees will be encouraged to participate in monitoring activities. Records of livestock numbers, movement dates and shipping records will be kept by the permittees and will be provided to the District Range Staff annually.

Adaptive Management

Adaptive management uses the documented results of management actions (monitoring) to continually modify management in order to achieve specific objectives, which are identified under *Desired Condition* in Chapter 1. Adaptive management provides the flexibility to adjust livestock numbers and the timing of grazing so that use is consistent with current productivity and is meeting management objectives. Under the adaptive management strategy proposed, the specific number of livestock authorized, specific dates for grazing, class of animal and modifications in pasture rotations may be administratively modified as determined to be necessary and appropriate, based on implementation and effectiveness monitoring. However, such changes will not exceed the limits for timing, intensity, duration and frequency authorized in the NEPA-based analysis and decision. Administrative changes will be documented and implemented in the AOI, AMP and/or the term grazing permit.

⁷ A key area is a portion of rangeland selected because of its location, use or grazing value as a monitoring location for grazing use, range condition and trend. Key areas are usually ¼ to 1 mile from water, located on productive soils on level to intermediate slopes where prescribed use will occur first. They are 5 acres or more in size. Properly selected key areas will reflect the overall acceptability of current management.

Adaptive management also includes monitoring and analysis to determine whether identified structural improvements are necessary or need to be modified. In the case that changing circumstances require physical improvements or management actions not disclosed or analyzed herein, further interdisciplinary review would occur. The review will consider the changed circumstances and site-specific environmental effects of the improvements in the context of the overall project. Based on the results of the interdisciplinary review, the Ranger will determine whether correction, supplementation or revision of the EA is necessary in accordance with Forest Service Handbook direction at FSH 1909.15(18) and FSH 2209.13(96.1), or whether further analysis under NEPA is required.

Future Review of the Decision

In accordance with Forest Service Handbook direction (FSH 1909.15(18) and 2209.13(96)) an interdisciplinary review of the decision will occur within 10 years, or sooner if conditions warrant. If this review indicates that management is meeting standards and achieving desired condition, the initial management activities will be allowed to continue. If monitoring demonstrates that management options beyond the scope of this analysis are warranted, or if new information demonstrates significant effects not previously considered, further analysis under NEPA will occur.

Comparison of Alternatives

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

Table 2. Comparison of the Alternatives.

Attribute	Alternative 1	Alternative 2
National Forest Policy and Forest Plan Consistency	Consistent with Forest Plan. Not consistent with policy (FSM 2202.1, 2203.1)	Consistent with Forest Plan and policy.
Meets purpose and need	N/A	Yes. Resolves distribution issues and balances use with capacity. Provides management flexibility.
Effect on Wildlife and Plants	No Effects from grazing.	Effects mitigated. Improved distribution reduces localized effects to habitats.
Effects on soil and watershed condition	No effects from grazing. Improvement in soil and watershed cover over time.	Moderate use contributes to watershed stability. Concentrations of cattle contribute to localized soil impairment.
Effects on upland vegetation	No effects from grazing. Increasing plant cover and litter over time.	Additional waters increase management flexibility and contribute to improved distribution. Increased use in uplands and localized effects around waters. Moderate use levels minimize effects.

3. ENVIRONMENTAL CONSEQUENCES

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in the chart above.

Wildlife

The Chiricahua Mountains are the most southeastern of several mountain ranges within the Basin and Range Geographic Province of southern Arizona and are part of an archipelago of “sky islands” connecting the Rocky Mountains to the Sierra Madre Occidental of Mexico (McLaughlin 1995). The mountains are located in an intersection zone where Rocky Mountain forests, Sierra Madrean woodlands, Chihuahuan and Sonoran deserts and plains grasslands converge. As a result, the Chiricahua Mountains are one of the most biologically diverse areas in the continental United States. More than 1400 species of plants, 500 vertebrate species and thousands of invertebrates are known from the area. More than 300 species of birds nest in or migrate through the mountain range. The entire Chiricahua Mountain range is identified by the National Audubon Society as an Important Bird Area.

Affected Environment – Threatened and Endangered Species

Effects of the ongoing grazing activities on the allotments have been evaluated in Biological Assessments (BA) of Ongoing and Long-term Grazing on the Coronado National Forest in 1998 and again in 2002 (USDA-FS 1998, 2002). The effects of continued implementation of the Forest Plan, including livestock grazing, were evaluated in 2005 (USDA-FS 2005, USDI-FWS 2005). Livestock grazing is currently managed to comply with the 2002 and 2005 Biological Opinions from the U.S. Fish and Wildlife Service (PR 64). Based on minor changes in proposed management, updated information on resource conditions and the need to extend the term of the consultation to coincide with the term of the proposed grazing permits, project level consultation was reinitiated for the proposal in 2007 (PR 72, 73). Species potentially affected by the proposed action or alternatives are disclosed below. More extensive discussions, including “no effect” determinations, can be found in the project BA (PR 72).

Lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*). The lesser long-nosed bat (LLNB) was listed as Endangered without critical habitat on September 30, 1988 (53 FR 38456). The species feeds on the nectar and pollen of paniculate agaves (*Agave palmeri*, *A. parryi*, and *A. deserti*) and the nectar, pollen and fruit of columnar cactus. Paniculate agaves are found on all of the allotments and the LLNB is known to roost and forage throughout the Chiricahua Mountains between July and September each year. No bat roosts are known from Forest Service land in the project area. The nearest roost is approximately 8.5 miles north of the Rak allotment. Lesser long-nosed bats are capable of foraging over long distances and suitable foraging habitat in the form of agave stands

is present in the project area. Therefore, it is assumed that bats potentially forage on all of the allotments during the late summer.

Jaguar (*Panthera onca*). The Jaguar is listed as endangered without critical habitat (62 FR 39147, 1997). In January 2008, the USFWS determined that a recovery plan for the Jaguar is not necessary. Jaguars are found in habitats ranging from Sonoran desert scrub to subalpine coniferous forest. Since 1996, jaguars have been photographed twice in the Peloncillo Mountains, approximately 20 miles southeast of the project area. Documented occurrences within the Chiricahua Mountain complex include a confirmed kill in 1986 in the Dos Cabezas Mountains and reports dating back to the early 20th century. The Arizona Game and Fish Department in cooperation with the Jaguar Recovery Team (Hatten, et al, 2003, PR 87) identifies the Chiricahua/Pedregosa/Dos Cabeza/Peloncillo complex as part of the suitable conservation areas (Zone 1) in Arizona. No jaguars are currently known to inhabit the Chiricahua Mountains; however, given the relative orientation to historic and recent jaguar observations, the rugged characteristics of the allotments and the wide-ranging habits of jaguars, all allotments in the project area are considered to have some potential as travel corridors or hunting areas. Based on recent occurrences, a jaguar or jaguars may be reasonably expected to occur in the project area in the next ten years.

Mexican spotted owl (*Strix occidentalis lucida*) and critical habitat. Only the Rak allotment contains protected activity centers (PACs), of which there are two (Figure 10). The PACs have not been monitored recently, but are presumed to be occupied for the purposes of this analysis. Both PACs and nearly all suitable nesting and foraging habitat are located in high elevation sites or steep canyons outside of suitable and capable rangelands. Topographic features and dense vegetation restrict livestock access to these locations. Much of the Rak allotment and small upper elevation portions of the Lower Rucker, Bruno and Hunt Canyon allotments fall within designated critical habitat for the MSO (Figure 10). Not all mapped critical habitat is suitable for MSO. Primary constituent elements⁸ are located in steep, inaccessible sites where livestock grazing is limited by topography. In general, constituent elements are found only at higher elevations in mixed conifer and pine forests where very little grazing occurs.

Chiricahua leopard frog (*Rana chiricahuensis*). The Chiricahua leopard frog (CLF) was listed as Threatened in June 2002 (67 FR 40790). The species requires permanent or nearly permanent pools or ponds for breeding. There are numerous historic observations of the CLF from the northern Chiricahua Mountains, but few from the southern portion of the range. In the project area, the last known record was in Rucker Canyon (Rak allotment) in the 1970's. There are no records for the other allotments. Surveys in 2007 did not detect the species at historic locations within the Chiricahua Mountains (AGFD 2007, PR 91). The CLF appears to be extirpated from the Chiricahua Mountains or reduced to such low abundance that populations are extremely difficult to detect. The apparent extirpation of CLF from the mountain range is consistent with the extensively documented range-wide decline of the species (Clarkson and Rorabaugh 1989, Sredl and Howland 1994, Rosen *et al.* 1994, Sredl *et al.* 1997). Fungal disease and invasion of

⁸ Primary constituent elements are the physical and biological features of the habitat that support nesting, roosting and foraging. Primary constituent elements for the MSO are identified in the final rule listing critical habitat for the species (USDI 2004).

habitats by bullfrogs have been identified as primary causes for this decline. Extended drought leading to the drying of several historic sites has also affected the species. Within the project area permanent water is limited to pools in Rucker Canyon on the Rak allotment and a handful of livestock waters elsewhere.

Environmental Consequences – Threatened and Endangered Species

Lesser long-nosed bat. In 2002 the Forest determined that grazing as practiced on the five allotments *may adversely affect* the LLNB (PR 64). Take was not assessed and no terms and conditions were issued. This determination was based on the following rationale: The LLNB feeds on flowering agaves on the Forest between July and September. Agave stalks, as they begin to bolt are particularly palatable to domestic livestock. If pastures are grazed during April and May when agave stalks are accessible, livestock may feed on young agave stalks, precluding the plant from flowering and potentially reducing forage resources for LLNB. However, it has not been established that grazing by livestock significantly increases herbivory on agaves compared to ungrazed areas. Because deer and other wildlife also feed on the plants, levels of herbivory on agaves have been found to be similar in both grazed and ungrazed pastures. (Widmer 2002, Bowers and McLaughlin 2001, USDA-FS 2007a, PR 74). In addition, livestock herbivory on agaves diminishes significantly at distances greater than 0.75 mile (1.21 km) from water (Widmer 2002).

Under *Alternative 1*, no effects are anticipated as livestock will be removed from the allotments and agaves will not be exposed to grazing. Herbivory on bolting agaves by wildlife would continue, especially in dry years when alternative forage is not as abundant. Under *Alternative 2*, grazing on the Barboot, Big Bend, Boss, Bruno and Rak allotments would be limited by the permit to the periods generally outside of the agave flowering season (April-June), but some use could occur in April. The other allotments will be permitted for use during the agave flowering season. All allotments grazed during the bolting season use rotational grazing, which insures that many pastures are deferred during the bolting season. The duration of exposure would be short and grazing intensity would be light to moderate (30-45%). Moreover, grazing is often deferred during the May-June period because water is often limited during this driest part of the year. During drought periods, the Forest implements its drought policy (2002 BO, Appendix D, PR 90) to insure protection of forage resources. If grazing occurs during the bolting period, the effects of livestock herbivory on agaves are likely to be discernable only within 0.75 mile of the few available waters. These management strategies and considerations, combined with the presence of high quantities of grass and browse in this project area suggests that some floral resources should be available to foraging bats throughout the bolting season.

The proposed action does not include modification of any bat roost on Forest Service land or other activities that would result in disturbance at roosts. Based on this, the Forest has determined that the proposed action *may affect, but is not likely to adversely affect* the lesser long-nosed bat on all seven allotments.

Jaguar. In 2002, the Forest determined that ongoing grazing is *not likely to adversely affect* the jaguar based on the conclusion that grazing does not affect movement corridors for the species (PR 64). The decline of the jaguar in Arizona was concurrent with predator control activities associated with land settlement and the development of the

livestock industry in the early 20th century. Predator control activities aimed at jaguar no longer occur. Activities that potentially affect jaguars are those that result in fragmentation of habitats or disruption of movement corridors that allow dispersal into unoccupied habitat. Excessive removal of woody or herbaceous vegetation, particularly within riparian corridors, could affect cover for jaguars and/or their prey; however, jaguars are not dependent solely on dense vegetation for escape or protective cover. Habitat remoteness and steep topographic relief appear to provide the majority of cover available to this species in the southwest.

Under *Alternative 1*, livestock would be removed. There would be no effects on woody cover, although herbaceous cover may increase in areas that were historically grazed. Assuming that jaguars opportunistically prey on cattle, some reduction in prey availability may occur. However, native deer are abundant in the project area, so this effect would not be significant. Under *Alternative 2*, livestock grazing may result in short term disturbance, but would not disrupt connectivity corridors within the U.S. and between the U.S. and Mexico. Livestock grazing within the project area is not predicted to reduce woody cover in bottoms or uplands. Removal of herbaceous cover by grazing livestock would continue, but this would not significantly affect cover for jaguars. Jaguars may prey on livestock, but such predation has not been documented in the project area. Based on this, the Forest concluded that the proposed action will *may affect, but is not likely to adversely affect* the jaguar on all seven allotments.

Mexican spotted owl and critical habitat. Consultation in 2002 determined that ongoing livestock grazing and management was *not likely to adversely* affect the MSO on all eight allotments (PR 64). The 2004 conference on critical habitat determined that the proposed action *may affect, not likely to adversely affect* critical habitat on the Lower Rucker and Rak allotments because primary constituent elements are largely outside of the portion of the allotment that is grazed.

Grazing in spotted owl habitat can affect habitat structure and composition, as well as the availability and diversity of food for the owl. The Recovery Plan for the Mexican Spotted Owl (USDI 1995) summarizes the effects of livestock grazing on Mexican spotted owls in four broad categories: 1) altered prey availability, 2) altered susceptibility to fire, 3) degeneration of riparian plant communities, and 4) impaired ability of plant communities to develop into spotted owl habitat.

Grazing in the Rak allotment occurs only from August 1-April 30 and at lower elevation woodlands and grasslands outside of protected and restricted habitats. Outside of PACs, the proposed light to moderate utilization of 30-45% should be sufficient to provide residual herbaceous and woody vegetation to provide mammal prey cover and to support prescribed and natural fires necessary to reduce the risk of catastrophic wildfires. Upper elevation stream drainages in the vicinity of MSO habitats are steep, narrow and boulder strewn, making access by grazing livestock difficult. No construction projects are proposed within MSO PACs, so no effects are anticipated as a result of disturbance.

Based on this, the effects of the proposed action are expected to be insignificant or discountable. The proposed action *may affect, but is not likely to adversely affect the Mexican spotted owl and its designated critical habitat within the Rak allotment*. Suitable

MSO habitats are not present on the other allotments, so the proposed action will have *no effect*.

Chiricahua leopard frog. Consultation in 2002 determined that ongoing grazing *may adversely affect* the CLF on the Barboot and Big Bend allotments, based on the allotments' proximity to a historic population in Leslie Canyon. Grazing on the other allotments was determined to be *not likely to adversely affect* the CLF based on the assumption that the allotments contained unsurveyed suitable habitat (USDA-FS 2002). Non-occupied suitable habitats occur in Rucker Canyon and seasonal livestock use may occur in or near these habitats. Upland vegetation, soil and riparian conditions have been assessed throughout the project area and are judged to be contributing to satisfactory watershed and riparian conditions (PRs 18-22, 30-32, 58, 60, 62, 63). Upland and riparian vegetation is meeting forest plan standards. Trends in soil and watershed conditions appear to be upward, based on observations of increasing litter and decreasing bare ground. Best management practices (PR 61) and light to moderate utilization proposed should maintain these trends. The Forest's Chiricahua Leopard Frog Management Guidelines (PR 68) will be implemented as part of the proposed action in order to minimize the potential introduction of predators and/or disease and to maintain cover in suitable habitats. Based on the current condition and trend of resources and mitigation measures in place or proposed, the proposed action *may affect, but is not likely to adversely affect* the Chiricahua leopard frog on the Rak allotment. The species does not presently occur on the Rak allotment, but populations may become re-established in the future through recovery activities. Based on the lack of suitable habitats and the absence of occurrence records, the proposed action will have *no effect* on the CLF on the remaining seven allotments.

Affected Environment - Forest Service Sensitive Species

Sensitive species are those species that have been identified by the Regional Forester as of concern for reduction in population viability as evidenced by 1) significant current or predicted downward trends in population numbers or density, or 2) significant current or predicted downward trends in habitat capability that would reduce a species' distribution. (Forest Service Manual 2670.5). The Regional Forester's list of sensitive plant and animal species was revised and updated in September 2007, and was the basis for the analysis. Due to the high ecological diversity found in the Chiricahua Mountains, numerous sensitive species potentially occur in the project area. Several species identified below have not been documented on the allotments in the project area; however, intensive surveys have not been completed, so the species are presumed to be present based on the availability of suitable habitats. Effects to sensitive species have been analyzed in a biological evaluation prepared for this project (PR 70) and are summarized below.

Environmental Consequences – Forest Service Sensitive Species

For the following species a Forest Service biologist has determined that the proposed action *may impact individuals, but is not likely to result in a trend toward federal listing or a loss of viability*. Impacts are limited to minor disturbance related to management activities and light herbivory (on plants) by grazing livestock.

Mammals

Arizona shrew (*Sorex arizonae*). Dense leaf litter and forest debris, such as downed logs are important as cover for foraging shrews. The species has been documented in the project area in Rucker Canyon (AGFD 1994, PR 75). Effects from livestock grazing would occur if livestock were allowed to concentrate in narrow wet canyons preferred by the shrew, and if this use resulted in the degradation of leaf litter and herbaceous cover that provide habitat. Known occupied habitats in Rucker Canyon are subject to little if any grazing (Rak utilization study, PR 23); however, additional populations may occur undetected downstream.

Birds

Apache Goshawk (*Accipiter gentilis apache*). There are ten goshawk post-fledging family areas (PFAs) within the Chiricahua Mountains. Two of these are associated with the Rak allotment. Nesting habitat includes closed-canopied Madrean oak woodland and Mexican pine-oak woodlands. Forest plan standards and guidelines for goshawk call for management that results in uneven age conditions to sustain a mosaic of vegetation densities (overstory and understory), age classes and species composition well distributed across the landscape. Under the proposed action the combination of winter grazing and moderate (<45%) utilization proposed should maintain vegetative diversity and would not be expected to affect prey species abundance. Effects would be limited to minor disturbance related to grazing, maintenance of existing improvements and movement of livestock. For the most part, grazing will occur outside of the nesting season for this species (March-September).

Gould's Wild Turkey (*Meleagris gallopavo mexicana*). The indigenous population of this subspecies is thought to have been extirpated on the Forest during the late 1800s and early 1900s. The existing population is the result of re-establishment efforts over the past five years. Within the analysis area, suitable habitats are coniferous woodland, riparian corridors in oak woodlands, and grassland savannas. The species appears to be able to coexist with well-managed livestock grazing. Limiting factors appear to be the presence of roost trees of sufficient size and the availability of free water. Mature grass seed heads are a source of forage for turkeys as well as green herbaceous leafage, insects, and mast (acorns and juniper/manzanita berries). The proposed action is expected to retain sufficient herbaceous forage for turkeys across the landscape, although areas of livestock concentration may impact forage resources on a local scale during the late winter and spring. Livestock waters likely benefit turkeys, and mitigation measures would assure that all waters are accessible. Neither alternative will affect roost trees. Effects are expected to be limited to disturbance as a result of minor construction or livestock management activities and localized removal of grass cover and forage.

Northern Buff-breasted Flycatcher (*Empidonax fulvifrons pygmaeus*). The Northern buff-breasted flycatcher occurs quite widely in open pine forests in Mexico and Central America. The U.S. breeding population is restricted to a few higher elevation canyons in the Huachuca and Chiricahua Mountains from March to September each year. Populations of buff-breasted flycatcher appear to be influenced by events such as fire that create or maintain an open grass understory in the bird's pine-oak woodland habitat. Occupied habitats are found in several canyons in the project area but they are almost

entirely at higher elevations where livestock do not graze. Winter use should optimize herbaceous understory by allowing for complete grass re-growth each summer and light to moderate utilization should retain sufficient residual herbaceous biomass to provide suitable year round habitats.

Reptiles

Slevin's Bunchgrass Lizard (*Sceloporous slevini*). This lizard is found mainly above 6,000 feet elevation in sunny patches of bunchgrass in open coniferous forests. Grazing as proposed would result in minor modification of bunchgrass communities, but most grazing would occur during the winter and grasses would be allowed to regrow each year.

Fish

Mexican Stoneroller (*Campostoma ornatum*). This small fish (11 cm) occurs in moderate to high gradient creeks with frequent pools and riffles. Current threats include aquifer pumping, reduction in stream flows, water diversion, drought, and predation by non-native green sunfish (NatureServe Explorer, 2008). This species occurs within the project area only in parts of Rucker Creek. No actions such as diversions are proposed that would affect stream flow. Grazing occurs in and near the stream channel during the October-April period when cattle are in the Rucker pastures. Livestock concentrating in the stream channel could increase sedimentation and degrade fish habitat quality.

Longfin Dace (*Agosia chrysogaster*). This small fish inhabits streams from deserts to lower mountains, generally below 6,500 feet. It is found typically in shallow water with sand substrate and moderate current; eddies, pools near overhanging banks or other cover. It has a high tolerance for elevated temperatures and reduced oxygen and is commonly the only native species at the terminus of desert streams where surface flows disappear (NatureServe Explorer, 2008). This species occurs within the project area only in parts of Rucker Creek. Effects would be similar to those described for the Mexican Stoneroller.

Invertebrates

Chiricahua water scavenger beetle (*Cymbiodyta arizonica*). Adults and larvae are aquatic. There is limited perennial water habitat in the project. There could be trampling effects to wet/damp areas in Rucker Creek. The emphasis on winter use should help to keep cattle up out of the riparian bottoms.

Four Spotted Skipperling (*Piruna polingii*). Habitat is moist woodland openings with lush vegetation, meadows, ravines, and streamsides in the mountains. Caterpillars likely feed on native grasses as do livestock. The proposed grazing intensity and emphasis on winter use would retain more than half of the vegetative biomass.

Plants

Lemmon Milkweed (*Asclepias lemmonii*). This plant is found in upper elevations in the Chiricahua Mountains, but has not been documented in the project area. It appears to be tolerant of disturbance. Most milkweeds contain resinoids and glycosides and are seldom eaten because of low palatability. Effects would primarily be related to ground disturbance by grazing cattle.

Copper Mine Milk-Vetch (*Astragalus cobrensis* var *maguirei*). This plant is found in canyon bottoms and drainages in the Chiricahua Mountains including Chiricahua National Monument. It is not known from the project area allotments. Populations were surveyed in 2001 (Malusa 2001) and do not appear to be threatened by current levels of human use, including grazing. Individual plants could be grazed or trampled, but the species appears to be fairly tolerant of disturbance.

Chihuahuan Sedge (*Carex chihuahuensis*). This grass-like semi-aquatic perennial has been documented from Cave Creek, but not in the project area. The allotments in the group generally lack suitable habitats, although undetected populations may occur in Rucker Creek on the Rak allotment. Summer growing season rest would allow for re-growth and plant vigor to be restored.

Trans-Pecos Indian Paint Brush (*Castilleja nervata*). This plant is known from private land north of the project area. If present on the Forest, this plant could be grazed because it typically occurs on south facing grassy slopes where cattle would graze during winter. Heavy grazing is considered a potential threat, but light to moderate levels proposed and emphasis on winter use would allow the species to persist.

Arid Throne Fleabane (*Erigeron arisolius*). One population is known from upper Pinery Canyon, outside of the project area. Baker (1999) surveyed numerous locations on the Forest and considered it common and abundant over a large range. This annual plant appears tolerant of disturbance and is unlikely to be seriously affected by dormant season grazing with a light to moderate use level. Livestock are not typically present when plant is actively growing.

Bartram Stonecrop (*Graptopetalum bartramii*). This small succulent grows in cracks in rocky outcrops in shrub live oak-grassland on sides of rugged canyons which are usually avoided by livestock. Nevertheless it sometimes grows in situations where trampling or limited grazing may occur. The species has not been found in the project area, but is known from one location north of the project area.

Arizona Mountain Alumroot (*Heuchera glomerulata*). This plant occurs in wet or moist sites from 4,000 to 9,000 feet. These locations are outside of the project area. Given the wide elevational range and the plant's affinity for wet sites, undetected populations could be exposed to grazing. The emphasis on dormant season use should preclude effects while the plant is actively growing.

Toumey groundsel (*Packera neomexicana* var *toumeyi*). Two populations are known from upper elevation sites outside of the project area. Populations may occur undetected elsewhere. Impacts would be limited to grazing of individual plants, but these are expected to be minimal due to the emphasis on low elevation winter grazing.

Davis Mountain Jacob's Ladder (*Polemonium pauciflorum* ssp. *hinckleyi*). The species occurs in Ponderosa pine and oak forests up to alpine fir above 6,800 feet on a variety of substrates. The elevational range of the species is generally above where livestock would graze. Undetected populations growing in canyon bottoms may occasionally be grazed or trampled during the plant's dormant season.

Blumer's Dock (*Rumex orthoneurus*). This herbaceous perennial grows in mid-to-high elevation wetlands in canyon and meadow situations. Populations in the Chiricahua

Mountains grow at elevations that are not exposed to grazing. Under the proposed action, no grazing would occur in the vicinity of populations, but there is a slight chance that cattle may get through fences on rare occasions.

Nodding blue-eyed grass (*Sisyrinchium ceruum*). This small plant could be impacted through trampling in seeps, springs, and wet areas when livestock concentrate around dwindling water. It is not known from the project area. Emphasis on dormant season use would help maintain this plant.

Shade Violet (*Viola umbraticola*). A population is known from the South Fork of Cave Creek, but is not known from the project area. Undetected populations growing elsewhere may be affected by grazing or trampling.

For the following sensitive species, a Forest Service biologist has determined that the proposed action will have *no impact* on the species.

Wildlife

Chiricahua (Mexican) fox squirrel (*Sciurus nayaritensis*). Suitable habitats are found in upper elevations of the project area in pine-oak forests and evergreen and coniferous riparian plant communities. Fox squirrels are highly arboreal and are not affected by moderate levels of grazing. No activities are proposed that would affect the species' forest and woodland habitat.

White-nosed coati (*Nasua narica*). This species is common in oak woodlands and riparian habitats throughout the Forest. Identified threats include indiscriminate killing and predator control. The Arizona Game and Fish Department restricts the take of this species through an annual bag limit. No predator control is proposed as part of the proposed action. Managed grazing does not affect woodland habitats for this species.

Mexican long-tongued bat (*Choeronycteris mexicana*), Allen's lappet-browed bat (*Idionycteris phyllotis*), Townsend's big-eared bat, (*Corynorhinus townsendii pallascens*), Western red bat (*Lasiurus blossevillei*), Western yellow bat (*Lasiurus xanthinus*). Populations of these five species could be affected by disturbance or destruction of roost sites, which are primarily caves, crevices, abandoned mines or, in the case of the western red bat and western yellow bat, riparian trees. Bat roosts have not been documented in the project area, but likely occur in rock crevices, caves and trees. These are not affected by grazing. The proposed action includes mitigation that would avoid disturbance of known or newly discovered bat roosts. Grazing in riparian areas would not be of sufficient intensity or duration to alter the composition or recruitment of mature riparian trees.

American Peregrine Falcon (*Falco peregrinus anatum*). Active peregrine falcon eyries are known from Cave Creek and Portal Peak, well outside of the analysis area. Falcons have been observed in the allotments, indicating that the area is likely used as a foraging area for birds nesting nearby. The primary threat to the species is disturbance at nest sites. No eyries are known from the project area, so disturbance effects would not occur. Light to moderate grazing intensity under the proposed action should maintain vegetative diversity and corresponding prey species habitat quality.

Broad-billed Hummingbird (*Cynanthus latirostris*). This is a summer resident in riparian areas of southern Arizona. The species would be affected by activities that

degrade riparian areas. Light to moderate dormant season grazing is not expected to affect riparian vegetation to a significant degree. Much of the best habitat for this species is located in Cave Creek, outside of the project area.

White-eared Hummingbird (*Hylocharis leucotis*). Suitable habitats of this species are from Cave Creek outside the project area or in higher elevations that are not grazed.

Violet-crowned Hummingbird (*Amazilia violiceps*). This is a primarily Mexican species that reaches the northern extent of its range in southern Arizona. The species nests most often high in Arizona sycamores. Suitable habitats are found in upper elevation drainages in the Rak allotment. These habitats are lightly grazed and riparian monitoring data indicate they are in good condition.

Lucifer Hummingbird (*Calothorax lucifer*). This hummingbird prefers open arid landscapes with agave, ocotillo, yucca and penstemon. These types of landscapes are widespread in southern Arizona. Heavy grazing in preferred habitats could potentially affect the species, but light to moderate primarily dormant season grazing proposed is not expected to affect the species.

Eared Quetzal (*Euptilotis neoxenus*). This is a forest bird of Mexico that rarely ranges north into Arizona. It is observed infrequently in the Chiricahua Mountains. Threats are associated with the loss of nesting trees due to logging. No tree removal is proposed.

Abert's Towhee (*Pipilo aberti*). This species is widely distributed throughout lower elevations in southern Arizona, nesting in dense vegetation ranging from riparian thickets to suburban back yards (Corman 2006). The Chiricahua Mountains are largely above the elevation range preferred by the species. Suitable habitats are limited in the project area and there are no breeding records.

Twin-spotted Rattlesnake (*Crotalus pricei*). This small rattlesnake is locally common on talus slopes and other rocky sites in ponderosa pine, aspen, and mixed conifer, generally above 8,000 feet in elevation. The greatest threat is illegal collecting. Preferred rocky habitats are typically avoided by cattle due to loose footing and sparse vegetation and are found at elevations above which grazing occurs. In addition, most grazing will occur during the winter when the snake is not active.

Green Ratsnake (*Senticolis triapsis*). The subtropical species is rarely seen, although its Madrean evergreen woodland habitats are quite abundant. There are no known threats, other than collecting for the pet trade. The effects of grazing on this species are not well documented, but rocky woodland sites preferred by this species would normally be avoided by cattle.

Reticulate Gila Monster (*Heloderma suspectum suspectum*). The species is threatened by overcollection and loss of habitat near urban areas, but populations and habitats in remote locations like the Chiricahua Mountains are secure. Livestock grazing is not known to be a threat.

Plants

Chiricahua Rockcress (*Arabis tricornuta*). All known occurrences of this plant are on steep rocky sites at elevations above which livestock grazing would occur.

Chiricahua Fleabane (*Erigeron kuschei*). This plant is known only from the Chiricahua Mountains at elevations above 6,900 feet on shaded, north-facing cliffs and ledges carpeted with moss. Known populations are not accessible to livestock.

Wislizeni Gentian (*Gentianella wislizeni*). High-elevation clearings 6,900 feet and above, usually with open sunlight appear to be the best habitat. Plants survived the 1994 Rattlesnake Fire and increased in number at some locations that experienced low intensity fire. This plant is found only at highest elevations within the Chiricahua Wilderness along the crest trail where no grazing is planned.

Purple-spike coralroot/Texas Purple-spike (*Hexalectris warnockii*). This orchid is known to occur in the Chiricahua National Monument, but is not known from the project area. Spikes of this plant are not above ground during season when livestock are grazed.

Lemmon Lily (*Lilium parryi*). A single population was discovered in 1992 in East Turkey Creek growing on the edge of an inaccessible waterfall. This population was washed out in 1994 after the Rattlesnake Fire.

Lemmon's lupine (*Lupinus lemmonii*). There are no known records from the analysis area. One location occurs on private land west of the Chiricahua Mountains. Not likely to occur in analysis area.

Chiricahua Rock Daisy (*Perityle cochisensis*). This plant grows in crevices and ledges of rhyolitic cliff faces. This habitat is not accessible by livestock.

Chiricahua Mountain brookweed (*Samolus vegans*). This perennial herb is confined to areas with permanent water. One population is known from Cave Creek, but it has not been found in the project area.

Huachuca groundsel (*Senecio multidentatus*). This herbaceous perennial grows in montane conifer forests above 7,000 feet. A single population is known from the vicinity of Chiricahua Peak. This population is outside of the project area.

Porsild's Starwort (*Stellaria porsildii*). Known locations are in high elevation meadows. Suitable habitats are not found in the project area.

Affected Environment – Management Indicator Species

Of the 33 total Management Indicator Species (MIS) on the Forest, eight species and one group (cavity nesters) potentially occur within the analysis area. Three of these – Peregrine Falcon, Buff-breasted Flycatcher and Gould's Turkey - are not identified as indicators for habitat and are therefore not considered in detail in the MIS analysis. These species are Forest Service Sensitive species for which effects are analyzed in the biological evaluation (BE) prepared for the project and summarized above.

Five species plus the group of cavity nesters were selected for analysis as management indicators at the project level based on their known occurrence within or near the project area. All other species were eliminated from consideration in this analysis because their known distributions are well outside of the project area and/or the project area does not contain suitable habitats for the species.

Forest-wide trends of all MIS have been assessed and are reported in the Forest-wide Status Report for Management Indicator Species (USDA Forest Service 2005, PR 89).

The background information and conclusions of this report are incorporated by reference. Population status and trends for the species addressed were evaluated based on the following sources: Arizona Game and Fish Department (AGFD) Heritage Data Management System (HDMS), North American Breeding Bird Survey (NABBS) data from 1980-2004 (U.S. Geological Survey web site <http://www.mbr.nbs.gov/bbdbbs.html>), Christmas Bird Count (CBC) data (<http://www.audubon.org/bird/cbc/>), the Arizona Partners in Flight Bird Conservation Plan (Latta, et al 1999), Arizona Breeding Bird Atlas (Corman and Wise-Gervais 2006), and supporting documentation on file in Forest Service offices. Where necessary and appropriate, the information in the Forest-wide report has been updated in the species accounts that follow below.

Primary and Secondary Cavity Nesters. Primary cavity nesters are those species that excavate and nest in cavities, whereas secondary cavity nesters use cavities excavated by primary cavity nesters. Cavity nesters occur primarily within forested areas including riparian habitats, Madrean evergreen woodlands, coniferous forests, and in Sonoran desert habitats that contain saguaro cactus (*Carnegiea gigantea*). In general, cavity nesters require large, older age class trees and snags to provide a suitable substrate for cavities. Although the species in this group specifically nest in cavities, some of them make use of many other habitats in completing their life cycles. For example, the American kestrel and eastern bluebird often forage in open grasslands, and many members of the group winter in Mexico or Central America.

North American Breeding Bird Survey information for the Cavity Nester group in the Mexican Highlands physiographic region show slight but statistically insignificant declines for Ash-throated Flycatcher and Bewick's Wren. The Arizona Breeding Bird Atlas identifies both of these species as common and widespread in Arizona (Corman and Wise-Gervais 2006). The NABBS trend for the Ladder-backed Woodpecker indicates a slight, but statistically insignificant increase (Sauer 2004).

Cavity nesters generally benefit from conditions that promote uneven aged forests with older age trees for cavities and sufficient recruitment of younger trees. No activities are proposed that would change the amount or distribution of cavity bearing trees in upland sites. In riparian areas, grazing potentially affects the recruitment of trees through trampling or browsing on small trees by livestock. Pasture rest and deferment and/or growing season rest will limit the amount of time livestock are in any pasture, allowing for recruitment of riparian vegetation where the potential exists (see riparian effects analysis, below). The proposed action is not anticipated to affect the amount or distribution of trees in the project area. Grazing as proposed is unlikely to cause a detectable change in cavity-nester populations or a loss of occupied habitat.

Bell's Vireo (*Vireo bellii arizonae*). Bell's vireo is included in the *Species Needing Dense Canopy* and *Threatened and Endangered Species* indicator groups. The species was selected to represent riparian understory condition at elevations below 4,400 feet. Although Bell's Vireo numbers have declined in parts of the species' range, notably California, they are common and widespread in Arizona (Corman and Wise-Gervais 2006), breeding throughout central and southwestern U.S. and northern Mexico. This species occurs near rivers and desert washes with thick understory vegetation. On the CNF, their distribution is limited to lower elevation mesquite thickets near the Forest

boundary. Most high quality habitat for the species occurs off of the Forest at lower elevation river valleys between the mountains. The species is regularly detected during breeding bird surveys in southeastern Arizona. NABBS data (Sauer 2004) for Bell's vireo in Arizona indicate a very slight downward trend in the population for this species in Arizona since 1980. More recently the Arizona Breeding Bird Atlas characterized the population as stable or slightly increasing (Corman and Wise-Gervais 2006).

The species is affected by the loss of dense riparian nesting habitat. Riparian areas in the project area are stable (PR 58), and suitable habitats are very limited. No actions are proposed that would reduce available dense riparian canopy cover. The proposed action is unlikely to cause a detectable change in Bell's vireo populations or a loss of occupied habitat.

Northern Beardless-Tyrannulet (*Camptostoma imberbe*). Northern beardless tyrannulet is included in the *Riparian Species*, *Species Needing Dense Canopy*, and *Special Interest Species* indicator groups (PR 1). The species' range is centered in Mexico and Central America where it is found in lowland tropical deciduous forests. It only reaches the U.S. in extreme southern Arizona, and only in small numbers (Tenney 2000). Mesquite, hackberry, and cottonwood thickets in valleys are the preferred habitat for this species during the breeding season (Taylor 1995). Preferred habitats are generally at lower elevations than are found in the Chiricahua Mountains. It may wander into higher elevations during the winter. Arizona Breeding Bird Atlas data indicate that the population in Arizona is stable (Corman and Wise-Gervais 2006). There are not sufficient data to determine population trends on the CNF, but optimal habitats are very limited, primarily because much of the Forest is above the elevational range of the species.

The species is affected by the loss of dense riparian nesting habitat, especially in the lowland tropical deciduous forests in Mexico and Central America. Riparian areas in the project area are stable, and no actions are proposed that would reduce available dense riparian canopy cover. The proposed action is unlikely to cause a detectable change in Bell's vireo populations or a loss of occupied habitat.

Montezuma Quail (*Crytonyx montezumae*). Montezuma quail is included in the *Species Needing Herbaceous Cover*, *Game Species*, and *Special Interest Species* indicator groups. This species is identified as a priority bird species in the Arizona Partners in Flight Bird Conservation Plan (Latta 1999). Overgrazing has been shown to be deleterious to Montezuma quail due to its effects on cover. The maintenance of grass height over 6" is necessary to provide sufficient cover for the birds to hide from predators (Heffelfinger and Olding 2000). Across the Forest, the amount of potential habitat has not changed significantly since 1986, but habitat suitability has likely improved as a result of improved livestock management and reductions in utilization over the past two decades. Much of the Chiricahua Mountains is identified as primary range by AGFD (AGFD 2005, PR 66).

In a study of the effects of human activities and habitat conditions on Montezuma quail populations from 1997 to 2000, Bristow and Ockenfels (2000) found no clear population trends in any of four study areas that included both grazed and ungrazed sites. Their study and other studies (Brown 1989, Stromberg 1990) suggest that population trends of

this species appear to be dependent upon summer monsoon and winter rains and there may be significant population fluctuations on an annual basis. Bristow and Ockenfels concluded that grazing management as practiced on the Coronado National Forest was not significantly affecting Montezuma quail populations.

The monitoring plan for the Forest Plan identifies the following for monitoring population trends: "Population and trend data from hunter wing barrel returns." (Plan p. 93). A significant amount of effort has been expended since the mid-1980s in attempts to monitor quail populations on the Forest. AGFD biologists, Forest Service biologists and volunteers conducted periodic flush counts from the mid-1990's to the early 2000's. These efforts were discontinued because they were not adequate to determine long-term population trends. AGFD has collected harvest data from quail hunters since approximately 1980 (Figure 1). As with many small game species, harvest data provide an index to population levels from year to year. Harvests have fluctuated widely, but are currently near the same levels they were at in the early 1980's.

Alternative 1 (No Action/No Grazing) is expected to result in the greatest development of herbaceous vegetation over the life of the project. This alternative would maximize the amount of residual herbaceous cover that provides Montezuma quail habitat. However, light to moderate grazing that leaves adequate cover apparently benefits habitat quality when compared to ungrazed areas by increasing the availability of food resources (Brown 1982, Bristow and Ockenfels 2000). Therefore, the No Action alternative may not be optimum for Montezuma quail. In addition, Montezuma quail populations are highly correlated to the amount and timing of summer precipitation. In the absence of sufficient precipitation, the effects of management changes alone on long-term trends for quail populations may not be discernable. *Alternative 2* (Proposed Action) will maintain sufficient levels of herbaceous cover in most years by restricting utilization to 45% or less. In drought years, this use level may be too high to maintain sufficient cover for quail across the landscape and the intensity or duration of use may need to be reduced using adaptive management, consistent with the Forest's drought policy (PR 90). The emphasis on dormant season use and growing season rest should increase grass plant production and vigor. In summary, grazing as proposed under any of the alternatives is unlikely to cause a detectable change in Montezuma quail populations or a loss of occupied habitat.

Coues White-tailed Deer (*Odocoileus virginianus couesi*). Coues white-tailed deer is included in the *Species Needing Diversity*, *Species Needing Herbaceous Cover*, and *Game Species* indicator groups. Coues white-tailed deer inhabit mixed-oak forests, semidesert grasslands, pine forests, and riparian habitats (Hoffmeister 1986). White-tailed deer tend to use hilly, mixed-oak habitats more than other types and tend to avoid open, grassy areas (Ockenfels et al. 1991). Bedding areas are often dependent on adequate thermal (canopy) and security cover. Shrubs compose over half of the yearly diet. The presence of freestanding water is important for suitable whitetail habitat and they no doubt benefit from the presence of permanent livestock waters in the allotments.

The Arizona Game and Fish Department actively manages white-tailed deer as a game species and works to maintain a steady population through annual harvests and maintaining areas with a medium to high quality habitat. Survey data are collected on the basis of Game Management Units. The project area is included in Units 29 and 30A.

AGFD does not typically estimate populations, but monitors trends based on fawn survival and recruitment. Fawn survival in southeast Arizona averages about 37%.

Heavy grazing prior to and during the fawning period reduces hiding cover and may reduce fawn survival and recruitment (Ockenfels et al. 1991). Overgrazing by livestock may reduce available grass forage and lead to increased livestock use of browse plants and forbs used by deer. However, grazing as proposed would not be of sufficient intensity or duration to affect large-scale reductions in cover or result in competition.

Displacement or disturbance during range construction activities may occur, but such effects would be of short duration and relatively minor and would have no effect on population trends. Grazing as proposed continues management practices that have been in place for several years and that have allowed white-tailed deer to persist. In consideration of the foregoing, grazing as proposed is unlikely to cause a detectable change in white-tailed deer populations or a loss of occupied habitat.

Black Bear (*Ursus americanus*). Black bears are included in the *Riparian Species*, *Species Needing Diversity*, and *Game Species* indicator groups. Because of the “sky island” nature of the CNF, black bear populations tend to be isolated from each other by wide expanses of non-suitable habitat between the mountain ranges. Some movement between ranges is known to occur, but is not common. The Forest Plan identified 641,113 acres of occupied habitat in all vegetation types except plains grassland and dry desert riparian. A small percentage of the project area could be considered suitable as bear habitat due to prevalence of open terrain without a high vegetative diversity.

Because of their secretive and solitary nature, bears are difficult to census, and there have been no recent attempts to census bear on the Forest. AGFD estimates populations based on qualitative analyses of habitat carrying capacity. A limited fall hunting season occurs annually in the Chiricahua Mountains. Harvest is limited through a female harvest objective that closes the season once a specific number of female bears have been taken.

Black bear populations are highly correlated to annual precipitation and its effect on the production of preferred foods such as oak acorns and manzanita berries (mast).

Manzanita, oak and other mast-producing plants are present throughout the project area. Grass can be seasonally important in black bear diets, especially in the spring. Given the moderate use grazing levels and rest and deferment proposed, competition for forage would not be expected under any of the action alternatives. There may be a slight potential for bear depredation on livestock during years of poor forage production, but this potential is considered small in light of the lack of records of past problems. In consideration of the foregoing, grazing as proposed is not expected to cause a detectable change in black bear populations or a loss of occupied habitat.

Neotropical Migratory Birds and Important Bird Areas

Executive Order 13186, of January 10, 2001 directs Federal agencies to support migratory bird conservation and to “ensure that environmental analyses of Federal actions required by the NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern”. Advice from the Forest Service Southwestern Regional Office is to analyze effects in the following manner: (1) effects to Species of Concern listed in the Arizona Partners in Flight Bird Conservation Plan; (2) effects to Important Bird Areas

(IBAs) identified by the National Audubon Society; and (3) effects to important overwintering areas.

Species of Concern

The Arizona State Partners in Flight Bird Conservation Plan (Latta 1999) lists priority species of concern by vegetation type. Table 3 displays the species that may occur in or near the project area.

Table 3. Summary of effects of the proposed action on migratory bird species of concern and habitat types in the project area.

Species	Habitat Type	Habitat Description	Effects
Northern Goshawk	Mixed Conifer Madrean Pine-Oak Woodland	Mature forests with a mosaic of dense stands and openings	Suitable habitats ungrazed. No effects on tree canopy or structural diversity. (See Biological Evaluation)
Mexican Spotted Owl	Mixed Conifer	Mature forests with dense canopy and midstory. Woody debris in understory. Cool, steep sided canyons.	Suitable habitats ungrazed. (See Biological Assessment)
Buff-breasted Flycatcher	Madrean Pine-Oak Woodland	Apache and Chihuahuan pines with herbaceous understory	Suitable habitats ungrazed (See MIS analysis and biological evaluation)
Montezuma Quail	Madrean Pine-Oak Woodland	Oak canopy of greater than 20% with understory of perennial grass greater than 6".	Light seasonal grazing will retain herbaceous understory. (See MIS analysis).
Band-tailed Pigeon	Madrean Pine-Oak Woodland	Mixture of acorn-producing trees and a shrubby component.	No actions are proposed that would change the abundance or distribution of oaks.
Cactus Ferruginous Pygmy-owl	Sonoran Desertscrub	Arizona Upland with high foliage height diversity and high plant species diversity. Flats and alluvial fans below 4,000 feet.	Elevations and topographic relief tend to limit habitat suitability. No nesting records from project area. No effects due to lack of suitable habitat. (See biological evaluation).
Costa's Hummingbird	Sonoran Desertscrub	Lower Sonoran life zone. Small dense trees and shrubs below 3,300 feet.	Project area is above elevation range of the species. No effects due to lack of suitable habitat
Gilded Flicker	Sonoran Desertscrub	Associated with saguaro in Sonoran desert uplands.	No suitable habitat (saguaro) within project area.
Purple Martin	Sonoran Desertscrub	Associated with saguaro in Sonoran desert uplands.	No suitable habitat (saguaro) within project area.
Rufous-winged	Sonoran	Grass and thorny brush in	Moderate grazing intensities

Species	Habitat Type	Habitat Description	Effects
Sparrow	Desertscrub Desert Grassland	Sonoran desert. Prefers flatter sites and avoids hillsides.	should retain sufficient grass cover. Suitable habitats absent from project area.
Common Black-hawk	Low Elevation Riparian	Sycamore, cottonwood gallery riparian near open water.	Growing season rest in most riparian areas should assure recruitment of young trees. No removal of mature trees proposed. (see biological evaluation).
Lucy's Warbler	Low Elevation Riparian	Cottonwood-willow riparian and dry washes with dense vegetation (mesquite bosques). Cavity nester.	Proposed action will not affect nesting habitat. No thinning or tree removal proposed.
Red-faced Warbler	High Elevation Riparian	High elevation canyons containing maple, oak and sycamore with dense midstory. Ground-nester.	Primary threat is logging; suitable habitats largely ungrazed. Project will not affect woody species needed by the bird.

Important Bird Areas (IBA)

The Chiricahua Mountains are identified as an IBA by the National Audubon Society (<http://www.tucsonaudubon.org/azibaprogram/ibalist.htm>). The proposed action is limited to the authorization of low intensity, seasonal livestock grazing and continues practices that have been in place for many years. The authorization is not expected to affect the designation of the IBA or to affect the characteristics that led to the designation of the IBA.

Important Overwintering Areas

The Chiricahua Mountains are part of the “sky island” region of southwestern North America in an intersection zone where Rocky Mountain forests, Sierra Madrean woodlands, Chihuahuan and Sonoran deserts and plains grasslands converge. The mountains are located in an important migratory corridor for numerous avian species. Over 100 species are typically counted during the Christmas bird count in the Chiricahua Mountains (<http://www.audubon.org/bird/cbc/hr/>).

The proposed action is limited to the authorization of low intensity, seasonal livestock grazing and continues practices that have been in place for many years. The proposal is not expected to affect the overall diversity of the area that provides habitat for wintering birds.

Vegetation Condition

Affected Environment

Rangeland condition is an expression of the degree to which the composition, frequency and vigor of plants in a community resemble the climax plant community for that site. Grazing by domestic livestock may impact vegetation by changing the mix of species in the plant community being grazed (vegetation composition), by changing the density and frequency of perennial forage plants, and by changing the vigor of the grazed plants. Measurements of these three vegetation parameters are used to place range sites into vegetation condition classes that reflect the relative effects of grazing on vegetation.

The project area falls within the Mexican Oak-Pine Woodland and Oak Savannah Land Resource Unit (41-1 AZ) and Range Woodlands Land Resource Unit (41-3 AZ) as defined by the Natural Resource Conservation Service. The reference range sites used to describe the potential natural community for the purpose of determining rangeland condition include Sandyloam Uplands, Clayloam Uplands, Loamy Uplands, Limy Slopes, Shallow Hills and Volcanic Hills in the 16-20 inch and 20-23 inch precipitation zones. Rangeland vegetation was assessed between 2004 and 2007 by the Forest Service using Parker 3-Step and dry weight rank methodologies (PRs 17-22, 32). Monitoring is done in accordance with the Interagency Technical Reference *Sampling Vegetation* Attributes # 1734-4 (Interagency Technical Reference 1996a). Additional monitoring data were also collected by consultants for the Hunt Canyon and Barboot allotment permittees in 2001 (Allen 2001, PRs 30-31). Monitoring results are summarized below.

Barboot. Data collected in 2005 indicated rangeland conditions of fair, good and excellent at each of three monitoring locations (PR 19). Additional data submitted by a consultant (PR 31) indicated good to excellent conditions at seven additional locations.

Big Bend. Forest Service data collected in 2005 (dry weight rank) identified generally fair conditions at three monitoring locations (PR 21). Indicators of watershed condition, such as the amount of litter and bare soil showed positive trends.

Boss. Data collected in 2005 resulted in an estimate of fair condition with upward trends attributable to a change from year-long use to dormant season use in 2000 (PR 18).

Bruno. Three monitoring clusters were evaluated in 2004 (PR 22). The results of monitoring indicated fair to poor condition at three locations based on plant composition. The sites are dominated by blue grama (*Bouteloua gracilis*). Indicators of soil stability (litter and bare soil) showed positive trends.

Hunt Canyon. In 2005 and 2006, five dry weight rank transects were evaluated. The transects rated out at mostly fair to excellent condition. One transect was rated poor due to the extensive presence of Lehmann lovegrass, which reduces plant composition scores. Indicators of soil stability (litter and bare soil) showed positive trends. Additional data submitted by a consultant (PR 30) indicated generally fair to good conditions in 2001.

Lower Rucker. Data collected in 2004 ranged from fair to good with a static trend (PR 20). Monitoring locations indicated a slight increase in woody species since the 1970s.

Pedregosa. Five monitoring sites were evaluated in 2007. Monitoring results indicate fair to good conditions on all sites with indications of upward trends as a result of decreased

stocking in response to drought. Groundcover is improving on all sites but is comprised primarily of annuals which may not be available in all years.

Rak. Five monitoring clusters were read in the winter of 2004 and an additional four were read in 2007 (PR 17). Conditions range from fair to excellent on all but one site. On this site, a significant increase in junipers and agaves contributed to a poor vegetation condition class; however, groundcover measurements on the site indicate improving soil stability.

Environmental Consequences

Utilization by grazing animals affects vegetation composition and productivity. Defoliation on a repeated basis (frequency), in excessive amounts (intensity) or for extended periods without recovery (duration) can cause changes in the vigor of preferred forage plants. Numerous analyses of grazing intensity (summarized in Holechek 2004, PR 56) have demonstrated that heavy grazing (>50-60% utilization) will negatively affect vegetation composition and productivity, but that light to moderate grazing (<45% utilization) can maintain or improve these vegetation attributes in semi-desert grassland and oak woodland plant communities found in the project area. Vegetation condition can be improved through reductions in the intensity of utilization or by increasing the amount of rest to allow for grazed plant recovery.

Upland vegetation condition on the allotments is close to its ecological potential under current management and is meeting Forest Plan standards, except in isolated areas where the presence of the exotic Lehmann lovegrass is affecting vegetation composition. Additional improvement may occur over time under both the no action alternative and current management, but changes would be small and incremental.

Under *Alternative 1*, there would be no direct or indirect effects as a result of livestock utilization. Some light use by wildlife may occur, but there are no large wild grazing herbivores in the project area, so use would be negligible. Over the long term, the effects of this alternative would be increases in preferred forage plant frequency, plant density and plant vigor. The most noticeable changes would be around waters and other areas where livestock tend to concentrate. Under this alternative, these areas would retain more herbaceous vegetation than they would under the proposed action.

Under *Alternative 2*, grazing livestock would continue to remove herbaceous vegetation. However, this level of use appears to be sustainable as shown by vegetation condition and trend data collected in recent years. Effects would occur when cattle are grazing pastures, but rest and deferment would allow for recovery prior to re-use. Over time, improved distribution and flexible stocking rates, combined with the mitigation features proposed should allow for increases in plant vigor and herbaceous production, especially in areas currently receiving heavier-than-desired use. Utilization guidelines would provide for light to moderate utilization, but use across the landscape would be more homogenous. Patterns of heavy use in some locations would be reduced while use in previously lightly used areas would increase.

Riparian Condition

Affected Environment

Numerous drainages are found in the analysis area and all allotments except the Boss allotment support stands of riparian vegetation in some locations (Table 4). Only Rucker Creek supports perennial or semi-perennial flows. In dry years permanent water is restricted to isolated pools during the early summer. Riparian vegetation is sustained throughout much of the year by sub-surface flow. Many drainages have roads located in or adjacent to the channel and some, especially Rucker Creek, are subject to high recreational activity. This use also affects riparian hydrology and vegetation.

Forest Plan standards and guidelines for riparian vegetation are to: 1) Maintain at least 60 percent of the woody plant composition in three or more riparian species; 2) Maintain at least three age classes of riparian woody plants; and 3) Maintain at least 60 percent of natural shrub and tree crown cover (50 percent canopy cover is considered “natural, so 30 percent canopy is required).

The analysis of riparian area condition is based primarily on information gathered at established riparian area monitoring points using the Riparian Area Survey and Evaluation System (RASES, USDA-FS 1989). These areas were assessed in 1998 and 2001 for condition and to verify the accuracy of the vegetation classification (PR 58). Additional RASES monitoring has not occurred since 2001, but inspection records in the allotment files do not indicate that there have been significant changes in riparian condition. Monitoring data show riparian areas in the RAK, Barboot, and Bruno allotments and in the higher elevations of Pedregosa allotment appear to be meeting or moving toward Forest Plan standards and guidelines. Lower Rucker, Big Bend, the lower elevations of Pedregosa, and Hunt Canyon are below standards for tree canopy and recruitment. Some locations had no riparian tree reproduction recorded. Vigor is generally good, but the lowest elevation riparian areas were rated fair. Indian Creek on the Pedregosa allotment was rated “poor” for vigor in 2001. This area was revisited in April 2008 and found to be improving in response to changes in management over the past seven years. Management changes have provided for additional growing season rest through the implementation of a deferred rotation and a reduction in numbers. Willows (*Salix spp.*) and deergrass (*Muhlenbergia rigens*) are now growing in the channel; recruitment and plant vigor have improved. Stream channel and stream bank information was also collected at these same locations. These channels are generally meeting the standards found in the Coronado Forest Plan (PR 58).

Table 4. Riparian condition: South Chiricahua Allotments.

Allotment	Stream Name	Year Data Collected	Tree Species Recruitment	Tree and Shrub Canopy (Percent Shade)	Vigor
Barboot	Hunt Canyon	2001	1 of 2 (riparian)	60	Fair
	Box Canyon	2001	1 of 2 (riparian)	60	Good
Big Bend	Big Bend Canyon	1998	2 of 3 (none riparian)	15	Fair

Allotment	Stream Name	Year Data Collected	Tree Species Recruitment	Tree and Shrub Canopy (Percent Shade)	Vigor
Bruno	Bruno Canyon (lower)	2001	1 of 2 (riparian)	22	Fair
	Bruno Canyon (upper)	2001	No reproduction observed	80	Fair
Hunt Canyon	Hunt Canyon	2001	1 of 3 (riparian)	80	Fair
Lower Rucker	Rucker Canyon	1998	2 of 3 (none riparian)	15	Good
Pedregosa	High Lonesome Canyon	2001	No reproduction observed	18	Good
	Indian Creek	2001 2008	No reproduction observed (2001) 2 of 2 (2008)	20	Poor (2001) Fair (2008)
RAK	Pridham Canyon	1998	4 of 5 (none riparian)	80	Good
	John Long Canyon	1998	6 of 6 (1 riparian)	65	Good
	Rucker Canyon (lower)	1998	4 of 6 (1 riparian)	80	Good
	Rucker Canyon (upper)	1998	5 of 5 (1 riparian)	60	Good
	North Fork Rucker Canyon	1998	6 of 6 (none riparian)	55	Excellent
	Cottonwood Canyon	1998	5 of 5 (none riparian)	55	Good

Environmental Consequences

Livestock grazing may impact riparian area condition by compacting or altering the soil surface or by removing plant material, thereby affecting bank stability; or by grazing on individual plants, thereby changing the vegetation composition and affecting the vigor of the grazed plants.

Under *Alternative 1* some increases in herbaceous cover would be anticipated as cattle would no longer graze in canyon bottoms. Bulk density and soil structure would trend toward natural levels. A reduction in streambank alteration caused by cattle and increases in vegetative groundcover would contribute to bank stability. Elimination of browsing on riparian vegetation would be expected to increase riparian plant vigor and recruitment of young trees. Where trails and roads occur in drainage bottoms, traffic would continue to affect soils and bank stability.

Effects of the proposed action (*Alternative 2*) are described below by allotment.

Barboot. The proposed reduction in numbers with planned rotation and rest will allow for Hunt Canyon to develop more stable banks as more vegetation is established, and will allow for riparian obligate tree reproduction.

Big Bend. Summer rest and the reduction in numbers will allow for riparian tree reproduction, improved bank stabilization, and improved vigor in the riparian areas, resulting in a trend toward meeting Forest Plan standards and guidelines.

Boss. There are no riparian areas on the Boss allotment.

Bruno. Reduced numbers and summer rest will allow for improved bank stability, vigor, and riparian tree reproduction in the riparian portion of Bruno Canyon. Improved water availability provided by the pipeline extension will allow for a faster rate of riparian area improvement by pulling cattle away from the riparian bottom.

Hunt Canyon. Reduced numbers and rotation will allow for banks to stabilize and vigor to improve in riparian portions of Hunt Canyon.

Lower Rucker. The slight reduction in numbers coupled with grazing the riparian pasture only in winter will allow for the banks of Rucker Canyon to stabilize where they aren't being affected by use and maintenance of the county road. Existing good vigor and tree composition will continue.

Pedregosa. The slight reduction in numbers and continued flexibility for rest and deferment will allow for continued riparian development in the higher elevations of this allotment, particularly in High Lonesome Canyon. If water development in Indian Creek pasture distributes cattle out of the riparian of Indian Creek, plant composition and vigor should continue to improve toward Forest Plan standards and guidelines.

Rak. Continued rotation, deferment, and rest for the riparian areas within the various pastures of this allotment will allow for continued riparian development. All riparian areas are expected to continue to meet or move toward Forest Plan standards and guidelines.

Soil Condition

Affected Environment

The geology underlying the project area is rhyolite, limestone, and andesite with minor areas of alluvium along the gentle terrain in the largest canyons with minor occurrences of basalt, limestone, and other volcanic and sedimentary rock. In general, the soils are shallow to deep very cobbly to extremely cobbly sandy loams with numerous rock outcrops.

Soil condition field monitoring has been ongoing for years and the latest information was collected in 2006 (Table 5, PR 60). All allotments were evaluated using protocols from Forest Service Soil Management (FSH 2509.18-99-1 R3 Supplement). Interpretations of soil condition are based on site visits, historical livestock use patterns, soil properties, and slope characteristics. Observations made in the field are that some areas of the most gentle terrain display surface soil characteristics characterized by compaction; vegetative plant communities that represent a drier less productive site, lack of vegetative ground cover, and poor root distribution. Some areas of erosion are also described. The greatest

extent of soil impairment is found on the Big Bend allotment where poor distribution has been exacerbated by supplemental feeding of cattle. No areas are considered unsatisfactory.

Table 5. Soil Condition, South Chiricahua Mountains Allotments.

Allotment	Acres in Satisfactory Soil Condition	Acres in Impaired Soil Condition	Total	Percent Impaired
Barboot	11,277	0	11,277	0%
Big Bend	3,586	2,382	5,968	39.9%
Boss	891	0	891	0%
Bruno	7,296	229	7,525	3%
Hunt Canyon	8,311	0	8,311	0%
Lower Rucker	4,506	439	4,945	9%
Pedregosa	9,891	0	9,891	0%
Rak	36,056	247	36,303	1%

Environmental Consequences

Livestock grazing may impact soil function by compacting the soil surface, removing plant material or changing the plant community composition. Where soils are impaired, *Alternative 1* will lead to improved soil quality in areas such as cattle bed grounds and around water sources where cattle tend to concentrate. Over time soil bulk density and structure would return to natural levels, but changes would be slow. Areas of impaired soils on the Big Bend allotment would persist for several years.

Under *Alternative 2*, growing season rest and light to moderate utilization should maintain adequate vegetation cover and contribute to satisfactory nutrient cycling and soil structure. Areas with satisfactory soils should remain satisfactory. On impaired soils, bulk density and soil structure will continue to be altered by grazing livestock to some degree, but current positive trends are expected to continue. Change in soil quality is a long-term process and no significant improvements would occur over the short term (5-10 years) under either alternative. Nutrient cycling and soil structure may continue to be impaired even under light grazing. Effects of the proposed action (*Alternative 2*) are described below by allotment.

Barboot. The reduction in numbers and continued management with the Turkey Creek allotment will allow for extended rest periods and moderate utilization. This management will allow satisfactory soil conditions to be maintained or improve.

Big Bend. Changes in the vegetation community observed on the allotment will be difficult to reverse in the absence of fire or more intensive vegetation treatments; however, a trend toward potential natural vegetation will begin with growing season rest that allows ground cover to improve. Accelerated erosion will be slowed by the presence of more ground cover, but where gully systems are established, they may continue to

expand. Management practices that eliminate supplemental feeding should reduce livestock concentrations and their effects on soils in the allotment.

Boss. Continued winter only grazing will allow for continued satisfactory soil conditions.

Bruno. The slight reduction in numbers and emphasis on winter grazing, combined with the improvements designed to improve cattle distribution will allow for compaction to be broken up and soil structure to improve in the impaired areas as natural plant growth occurs.

Hunt Canyon. The reduction in numbers, water development for improved cattle distribution, and continued adaptive management will allow for continued satisfactory soil conditions. The isolated pockets of compaction and plant community alteration will become smaller in size.

Lower Rucker. Continuing to graze the same numbers on the same schedule will cause area of impaired soil conditions in the North pasture to remain or expand in size. Monitoring actions identified under the proposed action and adaptive management strategies will allow management to respond to changes in conditions.

Pedregosa. The slight reduction in numbers and continued rotation management will maintain soil conditions without further watershed treatments. Additional water developments should improve distribution and maintain continued satisfactory soil conditions.

Rak. No change in management will allow for satisfactory soil conditions to remain over the majority of the allotment. Impaired soils in the shipping pasture will continue to be affected by livestock.

Water Quantity and Quality

Affected Environment

The allotments are located within the upper headwaters of six fifth code watersheds: Leslie Creek-Whitewater Draw, Upper San Bernardino Valley, San Simon River Headwaters, Silver Creek, Whitewater Draw Headwaters and Ash Creek of Sulphur Springs Valley Area. (Figure 7). The average annual precipitation at Rucker Canyon on the west side of the allotment group is 19.15 inches, but can be quite variable. The only surface water flow gauging station in the vicinity of the project area is on Leslie Creek downstream from the Barboot, Big Bend, Bruno, Hunt Canyon, and Pedregosa allotments (<http://waterdata.usgs.gov/nwis>). Total surface water yield is controlled by annual precipitation in areas receiving less than 20 inches of precipitation per year, and by vegetation type and density in areas receiving more than 20 inches of precipitation per year. Vegetation and soil monitoring data collected for this analysis indicate that watersheds in the project area are functioning properly (PRs 17-32, 60, 62, 63).

Surface water quantity peak flow is affected by hydrologic function, which is the ability of soil to capture, hold and release water. Hydrologic function is strongly influenced by soil condition. As the surface soil parameters of bulk density and structure degrade due to compaction by hoof impact and vehicle traffic, water quantity in the form of runoff increases. The result is generally an increase in peak flow discharges.

Water quality is assessed by comparing existing conditions with desired conditions that are set by the States under the authority of the Clean Water Act. The Arizona Department of Environmental Quality (ADEQ) is the regulating authority for water quality in Arizona. Rucker Canyon on the Rak and Lower Rucker allotments is the only water course that has been assessed in or near the project area. It rated Category 2 – attaining some uses. There are not enough samples for cadmium, copper, or zinc to assess the aquatic and warm water fishery standards. All other uses are attained with the exception that dissolved oxygen is low due to natural low flow levels.

Environmental Consequences

Water Quality. Surface water quality is affected by erosion of the soil surface. Adequate vegetation groundcover is necessary to slow the movement of water and trap and filter sediments. Under *Alternative 1*, adequate diversity and vegetation groundcover (VGC) would contribute to maintaining a satisfactory hydrological function and runoff would continue to be satisfactory. In areas with impaired soils, the potential increase of VGC and elimination of livestock-caused soil compaction would contribute to an incremental improvement in hydrological function resulting in less runoff, better infiltration and an improvement in water quality due to less sediment and lower turbidity. Under *Alternative 2*, areas of impaired soils would continue to contribute small amounts of sediment downstream and surface runoff would be expected to be slightly greater, relative to no grazing, due to poor VGC in some areas. Under the proposed action, the potential increase of VGC and slight reduction in compaction would contribute to an incremental improvement in hydrological function resulting in less peak runoff. However, the changes are unlikely to be measurable. Allowable use levels of 30-45% are expected to provide sufficient residual biomass to protect upland areas and drainage systems over time.

Water Quantity. Under *Alternative 1*, adequate vegetation groundcover would contribute to satisfactory hydrological function and runoff would continue to be satisfactory. Water currently consumed by or diverted and stored for livestock would be returned to the system, but this accounts for less than 1% of the total water yield on the analysis area and is unlikely to be significant. Under *Alternative 2*, light to moderate use should provide sufficient residual plant material to protect uplands and drainages and contribute to soil stability over time. Existing water developments would divert and store water that would otherwise percolate back into the ground and support sub-surface flow. Livestock would consume some of the stored water. However, this amount is unlikely to significantly affect total water yield. No new diversions are proposed.

Best Management Practices recommended by the Arizona Department of Environmental Quality are included in the proposed action to minimize the effects of the proposed action on soils and watersheds.

Air Quality

Affected Environment

The project area is located entirely within a Class II (generally rural) airshed. Air quality in and around the area is high due to the relative isolation from urban centers, limited access, good vegetative ground cover, and the large scale of the analysis area. None of

the project area is within a non-attainment area. Currently, the air quality in the project area is within the standards and guidelines of the Forest Plan.

Environmental Consequences

Activities resulting from this project will not significantly affect the factors contributing to a high quality air shed. Selection of the No Action Alternative or the Proposed Action would not negatively affect air quality. No direct or indirect effects would occur to air quality from this project. Because there will be no direct or indirect effects, no cumulative effects are anticipated.

Special Management Areas

Affected Environment

Wilderness. Upper elevation portions of the Rak allotment fall within the Chiricahua Wilderness (Figures 2 and 4). Areas within the wilderness are almost entirely outside of capable and suitable rangelands and are not grazed to a significant degree. These areas are heavily wooded, steep and often rocky. Forest Plan direction limits livestock utilization to 35% of current year's growth. Estimated use in wilderness pastures on the Rak allotment was 6-15% in 2005-2006 (PR 23).

Wild and Scenic Rivers. Rucker Canyon from its headwaters to the wilderness boundary has been identified as potentially eligible for designation as wild, scenic or recreational river (USDA Forest Service, 1993). The outstandingly remarkable values associated with this segment include scenery, recreation and geology. The segment is located in an ungrazed portion of the Rak allotment. Forest Service policy (FSM 1924.2) requires the Forest Service to assure that site-specific projects do not impact the free-flowing character or outstandingly remarkable values associated with eligible river segments.

Inventoried Roadless Areas. Portions of the project area fall within inventoried roadless areas (Figure 11). Inventoried roadless areas are to be managed to preserve their roadless characteristics (FSM 1925.03, WO Interim Directive 1920-2006-1)⁹. Roadless area characteristics are defined in the 2001 Roadless Rule (36 CFR Part 294, Subpart B) as the following: (1) High quality or undisturbed soil, water and air; (2) Sources of public drinking water; (3) Diversity of plant and animal communities; (4) Habitat for threatened, endangered, candidate and sensitive species dependant on large, undisturbed areas of land; (5) Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation; (6) Reference landscapes; (7) Natural appearing landscapes with high scenic quality; (8) Traditional cultural properties and sacred sites; and (9) Other locally identified unique characteristics.

Environmental Consequences

Very limited grazing occurs on the margins of the Chiricahua Wilderness. This use is within the standards set by the Forest Plan and does not affect wilderness values at current levels. This limited use would not occur under *Alternative 1*. Under the proposed

⁹ This interim directive expired on July 16, 2007, and the Roadless Rule has been in litigation since 2001. Nevertheless, the Forest continues to manage roadless areas to preserve the roadless characteristics.

action, no management changes are recommended that would result in new or different effects to the Wilderness.

Relative to Wild and Scenic River values, livestock grazing is not expected to occur within the eligible segment under either alternative. Some limited incidental grazing may occur under the proposed action, as the area would not be excluded. However, this is not known to occur under current management. No impoundments, diversions or other modifications of the waterway are proposed, so the free-flowing character of the segment would not be affected. Therefore, the proposal will have no effect on the eligibility status for the Rucker Canyon Segment. The proposal is consistent with existing standards for classification as scenic, and the proposed management will have no effect on this classification.

Relative to inventoried roadless areas (IRAs), no road construction is proposed under either alternative. Repairs to FR 4862 on the Big Bend allotment may be necessary to access a proposed improvement; however, these repairs will occur outside of inventoried roadless areas. Therefore, there will be no direct, indirect or cumulative effects on the roadless status of the IRAs. Managed seasonal livestock grazing will continue within portions of the IRAs at moderate levels under the proposed action. As documented elsewhere in this analysis, the limited intensity and duration of grazing is not expected to result in adverse effect to soil, air, water, wildlife and plants, or traditional cultural properties. Thus, the roadless area characteristics will be maintained.

Heritage Resources

Affected Environment

Heritage resources (also called “cultural resources”) include archaeological and historical sites and other properties important to maintaining the traditional beliefs and lifeways of local social groups (“traditional cultural properties”). Although only approximately 2% of the project area has been surveyed for heritage resources, 96 heritage resource sites have been documented and recorded in Forest Service files, and many more likely occur throughout the area. Many of these are associated with the Rucker Canyon Archeological District. These sites reflect the depth and diversity of human presence throughout the Chiricahua Ecosystem Management Area (EMA) and surrounding regions. Native American sites that pre-date European contact include artifact scatters that represent temporary campsites or resource processing locations, small villages consisting of the remains of buried pit structures, more expansive habitation sites with vestiges of adobe architecture, rock shelters and rock art. Five precontact habitation sites are on the National Register of Historic Places. Several sites are associated with Historic Period occupation, including nine listed on the National Register of Historic Places. This includes Camp Rucker which was an army supply depot in the 1860, and 1870s, and later became the headquarters for the original Rak family cattle ranch. Livestock damage to some of the facilities at Camp Rucker has occurred in the past, but the site is now fenced to exclude cattle.

Environmental Consequences

Construction of range improvements can directly damage artifacts or structures and alter their spatial relationships, while also encouraging concentration of livestock in the

vicinity of the improvements. Concentration of livestock on archaeological and historical sites can also result in damage to artifacts and structures, and alteration of their spatial relationships. These impacts can compromise various aspects of the integrity of historic properties and diminish their research and interpretive potential.

Adoption of *Alternative 1* would result in no direct or indirect effects from livestock grazing on heritage resources. The proposed action (*Alternative 2*) would require implementation of the mitigation measures identified as part of the proposed action in order to insure that there would be no adverse effects to heritage resources as the result of new range improvements. Implementation of range facilities will occur in accordance with Section 2(c) of the Standard Consultation Protocol for Rangeland Management, Appendix H of the Forest Service Region 3 First Amended Programmatic Agreement Regarding Historic Property Protection (PR 76). Specific design details and precise locations have not been identified for several proposed range facilities. When exact locations have been established, the sites will be surveyed for cultural resources prior to ground-disturbing activities. Provided the consultation protocol would be followed, a Forest Archeologist has determined that the proposed action would have no adverse effect on historic properties in the project area. A resources report was prepared and submitted to the Arizona State Historic Preservation Office (SHPO) for concurrence (PR 77). Concurrence from SHPO was received on June 27, 2008. Representatives of 12 Native American tribes with traditional ties to southeastern Arizona were also notified of the results of this investigation in 2008. No concerns were expressed.

Economics

The economic effects of the proposal were not identified as a key issue during scoping, and specific operating costs and revenue estimates are not available for each ranch. Therefore a detailed economic analysis was not conducted. However, the generalized effects of the alternatives can be compared in the context of the local economy. The allotments are located in Cochise County, Arizona. Tourism and financial services are a growing segment of the economy of Cochise County. Farm and ranch employment is considered an important segment of the economy, but total agricultural employment (farming and ranching) accounted for 3.3% of the economy in 2000 (USDA Forest Service 2005, Headwaters Economics 2007). Ranching operations in the area tend to be characterized by small profit margins with the need for off-ranch supplemental income to continue operations. Forest-wide, grazing accounts for an estimated 4% of the direct and indirect employment generated in the local economy associated with the Coronado National Forest (USDA Forest Service, 2005). Compared to other sectors such as recreation (which accounts for 60%), this contribution is relatively minor.

Environmental Consequences

Decisions relative to livestock grazing on individual allotments primarily affect 1) the permittees, who pay grazing fees and receive economic returns on their investments in livestock grazing and who contribute funds for the construction of range improvements; and 2) the Forest Service, which collects grazing fees and expends grazing receipts and appropriated tax dollars to construct improvements and to administer the allotments. Local communities may also benefit from the sale of goods and services associated with ranch operations.

Termination of the grazing authorizations (*Alternative 1*) would likely result in negative economic effects on the individual permittees. Although they would no longer pay grazing fees or expend money to maintain the allotments, the permittees would be dependant on adjacent private or state land, if available, to maintain ranching operations. Annual grazing receipts to the Forest Service would vary from zero under *Alternative 1* to approximately \$21,150 under maximum allowable use on all allotments under *Alternative 2*¹⁰. Typically, 25% of these receipts are returned to the Forest in the form of Range Betterment Funds used to construct range improvements. These funds (approximately \$5,300/year under full stocking) would not be available to the Forest Service under *Alternative 1*.

In general, *Alternative 1* would have the lowest cost as neither the Forest Service nor the permittees would expend money for new improvements and only limited maintenance would occur. There would, however, still be costs associated with management of the allotments. Maintenance of improvements is typically the responsibility of the permittee. In the absence of a permittee, maintenance or removal of existing structural improvements may become necessary and costs would be borne by the Forest Service. Under *Alternative 2*, some structural range improvements have been identified as possible practices to improve livestock distribution and optimize management. Although not all improvements may be constructed, the costs would clearly be greater than under *Alternative 1*. Forest Service funding levels would require these projects to be phased in over a number of years, unless permittees are willing to bear an additional share of the costs or pursue alternative funding such as grants.

Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Executive Order 12898 (February 11, 1994) directed all Federal agencies to evaluate their proposed actions to determine the potential for disproportionate adverse impacts to minority and low-income populations. The memorandum from the President to heads of departments and agencies that accompanied the Executive Order states that “each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by [NEPA].”

The project area is located in rural Cochise County. The area is sparsely populated, primarily by ranchers and a few owners of private parcels adjacent to Forest Service lands. Selection of any of the alternatives would not result in adverse or disproportionate effects on low income or minority populations. The alternatives, including no grazing, are consistent with activities that have been implemented throughout the Coronado National Forest over many years. As such, the effects are predictable. There would be no displacement of minorities or increases in taxes or fees that would constitute an economic hardship to minorities under any of the alternatives. There would be no effects to public

¹⁰ Estimate based on the 2008 grazing fee of \$1.35 per AUM

health. Therefore, disproportionate direct, indirect or cumulative adverse impacts on low income or minority populations would not occur.

Cumulative Effects

Cumulative effects are the past, present and reasonably foreseeable future actions that add to the direct and indirect effects considered in this EA. The following activities have been identified as potentially contributing to the effects analyzed herein. These activities and occurrences have contributed incrementally to changes in ecological conditions in the project area and may continue to influence conditions in the project area over the term of the project. Foreseeable future actions are those for which a proposed action has been approved or those proposed for NEPA analysis in the future. No additional activities that would affect resources in the project area are listed in the Forest's June 2008 Schedule of Proposed Actions. Other possible future actions are considered too speculative to include in this analysis.

Historic Grazing. Livestock grazing has occurred within the analysis area for over 100 years. In the late 1800s, widespread unregulated grazing resulted in erosion, heavy surface runoff, flooding and down-cutting of streams throughout the southwest. Livestock consumption of herbaceous fine fuels, combined with active fire suppression beginning in the early 1900's has likely contributed to a decreased fire frequency and subsequent invasion of many grasslands by woody plants. The introduction of exotic grasses, most notably Lehmann lovegrass, has resulted in the displacement of native perennial grasses in some sites. The effects of these activities and events are still evident in the project area. The proposed action is designed to correct the effects of historic management, but these effects will likely continue to influence resource conditions, especially soil condition, for the foreseeable future.

Human Activities. Authorized activities in the project area include camping, hiking, hunting, wildlife watching and vehicle use on surfaced and unsurfaced roads. Impacts from these activities are short term and primarily consist of minor ground disturbance in popular camping areas and minor wildlife disturbance in popular bird watching spots. There are several developed recreational facilities (campgrounds and picnic areas) in the project area, primarily in the vicinity of Rucker Canyon. Private land inholdings are scattered throughout the area, and much of lower Rucker Creek is privately held. Uses on these lands are largely rural and many are managed as part of ongoing grazing operations. These uses are not expected to contribute significant effects to ongoing livestock management.

Portions of the area show substantial evidence of trailing by undocumented aliens and/or drug traffickers. The effects of these activities include accumulations of trash, creation of wildcat foot and vehicle trails and vandalism of range improvements, especially fences. In addition, the area has seen a substantial but unquantified increase in vehicle traffic related to interdiction efforts on the part of the U.S. Border Patrol and other enforcement agencies. The effects of border crossing activities are largely outside of the control of the Forest Service and the permittees, but they are likely to require additional efforts to maintain improvements and keep to a rotation schedule.

These facilities and activities will continue to result in short term and relatively minor effects to soils and hydrology and wildlife, especially where activities are concentrated in drainage bottoms. However, because no significant direct or indirect effects of the proposed action and alternative are anticipated, neither of the alternatives is expected to contribute significant cumulative effects.

4. CONSULTATION AND COORDINATION

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Glenn Klingler, Wildlife Biologist Douglas Ranger District	Wildlife Analyses
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The Forest Service consulted the following Federal, State, and local agencies, tribes and organizations during the development of this environmental assessment. Several individuals not identified specifically below also participated in this process.

FEDERAL, STATE, AND LOCAL AGENCIES:

Arizona Game and Fish Department
 Arizona Department of Agriculture
 Arizona Department of Environmental Quality
 Arizona Cooperative Extension Service
 Arizona State Land Department
 USDA Natural Resource Conservation Service
 USDI Fish and Wildlife Service

TRIBES:

Fort Sill Apache Tribe	Hopi Tribe
Mescalero Apache Tribe	Pueblo of Zuni
San Carlos Apache Tribe	Tohono O'odham Nation
White Mountain Apache Tribe	Yavapai Apache Nation
Ak-Chin Indian Community	Gila River Indian Community
Pascua Yaqui Tribe	Salt River Pima-Maricopa Indian Community

OTHERS:

National Wild Turkey Federation	Sky Island Alliance
Western Watersheds Project	Center for Biological Diversity
Forest Guardians	Arizona People for the USA

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