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Environmental Assessment

O'Donnell, Post Canyon, Sawtelle, Sycamore, U-D and Miller Canyon Range Allotment Analysis

Sierra Vista Ranger District, Coronado National Forest
Santa Cruz and Cochise Counties, Arizona

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For Information Contact: Richard A. Gerhart
Coronado National Forest
300 West Congress
Tucson, AZ 85701
520-388-8374

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CHAPTER 1 – PURPOSE AND NEED

Background

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment (EA) discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. Supporting documentation, including more detailed analyses of project area resources, 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 linked to information contained in document No. 21 in the project record.

Purpose and Need for Action

The O'Donnell, Post Canyon, Sawtelle, Sycamore, U-D and Miller Canyon allotments contain lands identified as suitable for domestic livestock grazing in the Coronado National Forest Land and Resource Management Plan (Forest Plan).Where consistent with the goals, objectives, standards and guidelines of Forest Plans, it is Forest Service policy to make forage from lands suitable for grazing available to qualified livestock operators[1]. The purpose of the proposed action is to authorize livestock grazing and management activities consistent with this policy and in a manner that maintains or improves project area resource conditions and achieves the objectives and desired conditions described in the Coronado National Forest Plan. This action is needed here and now because:

- The allotments currently lack sufficient environmental analysis to comply with the Rescission Act (*P.L. 104-19, 1995*).
- There is a need to incorporate additional flexibility into the management of the allotments in order to allow the Forest Service and individual grazing permit holders to be able to adapt management to changing resource conditions or management objectives and to comply with Forest Service Policy (FSH 2209.13 Chapter 90).
- Additional waters and fences may be necessary to improve distribution and increase the reliability of some pastures. These facilities will aid in providing additional rest periods and will allow management to decrease use in traditional livestock concentration areas.

[1] Authority to manage National Forest System (NFS) rangeland resources is derived from laws enacted by Congress that authorize the Secretary of Agriculture to administer NFS lands and issue necessary regulations. Summaries of these laws and regulations are found in the Forest Service Manual (FSM) Chapter 2201. Forest Service objectives and policies for rangeland management are found in FSM 2202 and 2203.

- Permitted use on the Post Canyon allotment exceeds what is considered sustainable. Forest Plan direction to balance permitted use with capacity is not being met.
- Woody understory shrubs, especially manzanita (*Arctostaphlyos* spp.) and juniper are encroaching into formerly more open grasslands and woodlands. Dense chaparral reduces herbaceous production and results in bare soil and increased erosion. Extensive manzanita stands also contribute to the potential for catastrophic wildfires by providing large quantities of flammable material.

Existing Conditions

Location and Setting. The allotments are located in the foothills of the Huachuca Mountains (Miller Canyon) and in the Canelo Hills (all of the others) in Santa Cruz and Cochise Counties (Figures 1 and 2). Broadleaf evergreen woodland is the dominant vegetation type in the project area (Figure 3). Several drainages run seasonally in response to precipitation events, but water persists year round in only a few locations. Vegetation associated with stream courses is a mixture of evergreen oaks and deciduous riparian trees, primarily sycamore and cottonwood. Elevations in the project area range from 4,900 to 6,000 feet. The allotments combined encompass approximately 19,770 acres, of which approximate 16,600 acres are considered capable[2] (Table 1).

Resource Condition. The allotments are meeting Forest Plan objectives for rangeland condition. Vegetation condition on all the allotments was assessed in 2004 (PR 12, 13, 14, 15, 16). With one exception (see Post Canyon, below), ecological condition on all monitoring transects ranges from fair to excellent and shows marked improvement from conditions assessed in the 1950s and 1960s. Increasing densities of woody shrubs, especially manzanita and juniper have been noted as a concern on many transect sites. Over the past century, fire has been largely absent from the landscape in the project area due to such factors as heavy grazing and active fire suppression. Manzanita is a fire-successional species that germinates after fires. A regular fire interval tends to kill large mature plants and maintains a more open landscape. Many areas have burned once and never re-burned, encouraging manzanita to germinate and eventually dominate these sites to the exclusion of other species. Dense manzanita stands have the potential to burn with high intensity, creating hydrophobic soils and resulting in long-term effects to soil productivity and stability.

Grazing Management. Information on recent livestock use is summarized in Table 1. All allotments are permitted for grazing year-round under a deferred rest rotation. Recent management and current conditions are described briefly below.

O'Donnell Allotment. The allotment is currently permitted for 120 cattle year long (CYL) on a cow-calf basis. The allotment is divided into six pastures and is managed under a deferred rotation. However, the lack of reliable waters makes it difficult to utilize

[2] Capable rangelands are those areas under 40% slope and capable of producing 100 lb. dry forage per acre. Areas considered "not capable" are not used to calculate grazing capacity

the entire allotment. Ecological condition monitoring (PR 12) indicates that the allotment is meeting Forest Plan standards for range condition. In general, uplands are in good ecological condition, although some sites are below potential due to the presence of dense manzanita stands. Inspection records (PR 7) indicate utilization is generally well under 45%. The northern third of the allotment burned in the spring of 2002 and has now fully recovered.

Post Canyon and Sycamore Allotments. The Post Canyon allotment is permitted for 100 CYL on a term permit and an additional 20 CYL on an on-off basis. Monitoring of actual use and resource condition indicates that optimal numbers are somewhat less than permitted. The Sycamore allotment is permitted for 12 CYL. Both allotments are permitted to the same permittee and are part of a larger ranch that includes substantial state and private lands adjacent to the Forest. The entire ranch has been managed under a holistic resource management system for a number of years[3]. As a result, the numbers of livestock and the duration and timing of grazing have fluctuated greatly from year to year (Table 1). While all pastures can and have been used during any time of the year, the Post Canyon allotment has traditionally been used in the fall and winter months and the Sycamore allotment has been used in the late spring if water is available. Ecological condition monitoring indicates that the Post Canyon and Sycamore allotments are meeting Forest Plan standards for range condition at four out of five monitoring locations. One transect on the Post Canyon allotment indicates poor condition attributed to soil compaction related to historic and prehistoric human occupation of the site. Inspection records indicate utilization is under 45% (PR 8).

In January 2006, the boundary between the Post Canyon and Papago allotments was administratively realigned in order to facilitate management on the two allotments (PR 26). The southwestern portion of the Post Canyon allotment was transferred to the Papago allotment permittee, and the Z-Triangle portion of the Papago allotment was transferred to the Post Canyon Permittee. Roughly equal areas were exchanged and capacities on the two allotments remain the same.

Sawtelle Allotment. The allotment is permitted for 85 CYL on a cow/calf basis. A significant portion of the ranch is fenced private land, but there is no private land permit associated with the allotment. The allotment is divided into ten pastures and is managed under a deferred rotation. However, because of the availability of private pastures, use on the Forest has been intermittent over the past several years and is often well below permitted (Table 1). As a result, utilization is usually light (PR 9). The large Mountain pasture in the south end of the allotment is rarely used. Ecological condition monitoring indicates that the allotment is meeting Forest Plan standards for range condition.

U-D Allotment. The allotment is permitted for 20 CYL on a cow-calf basis. During the 1980's and early 1990's the allotment was managed under a high intensity-short duration system, but this was not successful. In 2001 all of the electric fences were removed and the allotment was converted to a grass bank to be used as needed to provide rest to other

[3] During the 30-day comment period, one reviewer expressed concern that management under holistic resource management (HRM) requires high intensity/short duration grazing on the Forest allotments. In actual practice, grazing intensity on the allotments is limited to 45% of current year's growth, a level that is considered moderate.

Forest grazing allotments. The allotment has been used three times in this capacity since this conversion. Once used, a full growing season's rest is provided between grazing periods. Ecological condition monitoring indicates that the allotment is currently meeting Forest Plan standards for range condition (PR 15). There is one permanent spring on the allotment which has been excluded from livestock use.

Miller Canyon Allotment. The allotment is permitted for 15 cattle under a term grazing permit and 7 cattle under a private land permit for dormant season use (November 1 to February 28. The allotment is close to the city of Sierra Vista and receives heavy recreational use. Until 2002, the permit was year long and cattle would concentrate in riparian areas during the warmer months, resulting in excessive utilization of riparian grasses and conflicts with recreational activities. This issue was resolved by changing to winter use. Cattle tend to avoid drainage bottoms during the cooler months and riparian plants are dormant during the winter. Because the primary water is on private land outside of the Forest, cattle typically use only the eastern (lower) portion of the allotment. The western, higher elevation portion of the allotment is classified as not capable for grazing due to steep slopes and limited forage. Ecological condition monitoring indicates that the allotment is currently meeting Forest Plan standards for range condition (PR 16). Because of its location on the Sierra Vista urban interface and the low economic viability of the permit (22 head), the Forest Service would retire the allotment should the permittee waive the permit.

Table 1. Allotment size, stocking and recent use.

	O'Donnell	Post Canyon	Sawtelle	Sycamore	U-D	Miller Canyon
Total Acres	7,385	3,243	4,825	480	872	2965
Capable Acres	7,093	3,243	4,234	480	712	905
Permitted Use	120 cow/calf 1440 HM	100 cow/calf 1200 HM	85 cow/calf 1020 HM	12 144 HM	20 cow/calf 240 HM	15 cow/calf 60 HM
Recent Use (Head Months)[4]						
2000	1253	460	243	0	Variable	No data
2001	816	993	223	0	(Grass bank)	45
2002	519	544	335	0		59
2003	747	1010	310	0		59
2004	1020	900	492	0		59

Range Suitability and Capability

Determination of rangeland capability and suitability is a two-step process. The first step involves the determination of those areas that can support domestic livestock grazing (capability). Capable rangelands are defined as rangelands under 40% slope and capable of producing 100 pounds per acre of dry forage. The second step refers to the appropriateness (suitability) of livestock grazing in an area relative to all other competing resource values and management objectives. Suitability is determined both during the Forest planning process and at the project level. Although a project area may be located in a management area considered broadly suitable in the Forest Plan, analysis at the project level may identify additional areas (e.g. campgrounds, wetlands, etc.) considered

[4] A head-month (also animal-month) is one month's occupancy by an animal on the range.

unsuitable for grazing because other resource values are emphasized. In the project area, approximately 3,000 acres are considered not capable for grazing based on steep slopes or low forage production. A portion of these are designated as Management Area 1 (see below). Nearly all of the non-capable acreage is located in upper elevations of the Miller Canyon allotment (Figure 4). O'Donnell Creek has previously been identified as unsuitable due to conflicts with riparian resources and is therefore fenced to exclude livestock.

Management Direction

The allotments fall within Forest Plan management areas 1, 4, 7 and 9 (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. Slopes are generally in excess of 40% and sites included in this management area are generally considered unsuited and not capable for livestock grazing. Range management standards and guidelines (LMP pp. 47-49, PR# 1) call for no assigned permitted use for livestock. The two peaks on either side of Canelo Pass on the O'Donnell and U-D allotments fall within MA1. These areas are not physically excluded from grazing, but topography generally limits access and use by grazing cattle.

Management Area (MA) 4 comprises a majority of the project area. These lands include 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).

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. Portions of Middle, Pauline and O'Donnell Canyons, Turkey Creek and Miller Canyon are designated as MA7.

Management Area (MA) 9 includes designated wilderness areas. Management emphasizes wilderness values while providing livestock grazing and recreational opportunities that are compatible with maintaining wilderness values and resources (Forest Plan p. 79). Upper elevations of the Miller Canyon allotment are located within the Miller Peak Wilderness. The Wilderness portion of the allotment receives no grazing use because of steep slopes and dense vegetation.

Desired Condition

The Coronado National Forest Plan identifies the following goals for the range, wildlife, soil, water and lands programs on the Forest.

Range

- To restore rangeland to at least moderately high ecological condition (70% to 75% 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.

Wildlife

- Provide habitat for wildlife populations consistent with the goals outlined in the Arizona and New Mexico Department of Game and Fish Comprehensive Plans and consistent with other resource values.
- Provide for ecosystem diversity by at least maintaining viable populations of all native and non-native wildlife, fish and plant species through improved habitat management.
- Improve the habitat of and protection for local populations of Threatened and Endangered species to meet the goals of the Endangered Species Act.

Soil and Water

- Provide a favorable flow of water in quantity and quality for off-forest users by improving or maintaining all watersheds to a satisfactory or higher level.

Lands

- Allow the use of available National Forest lands for appropriate public or private interests consistent with National Forest Policies.

Forest Service monitoring indicates that the allotments are generally meeting these goals for resource condition. However, within each allotment there are opportunities to improve resource condition or management. The following specific objectives constitute the desired condition in the analysis area. They are intended to achieve the goals of the Forest Plan consistent with the management emphasis for each Management Area and site-specific resource conditions in the project area:

- Ecological condition as expressed by the number of acres in fair or better condition is maintained or improved.
- Range production and movement toward site potential for each soil/vegetation site is maintained or increased.
- All grazing improvements on all allotments are in proper working order and are contributing toward improved livestock distribution and pasture reliability.
- Livestock use and distribution is in balance with existing capacity and zones of heavy use are minimized.
- Within dense chaparral stands, shrub density contributing to poor ecological condition and high fire hazards is reduced and herbaceous cover is increased.

Decision Framework

The Sierra Vista District Ranger is the official responsible for decisions regarding management of the O'Donnell, Post Canyon, Sawtelle, Sycamore, U-D and Miller Canyon 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 AMPs, including permitted number of animals, season of use, allowable utilization standards and the term of the permits. These 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.

Public Involvement

The proposal has been listed in the Forest's Schedule of Proposed Actions continuously since September 2004. In January 2005, a Forest interdisciplinary team met to develop proposed actions and to identify preliminary issues, concerns and measures to carry forward into the analysis. The proposal was provided to the public and other agencies for comment during scoping in July 2005 (PR 18). Four comment letters were received in response to scoping (PR 19-22). Using the comments from the public and other agencies, the interdisciplinary team developed a list of issues and concerns to address.

In September 2006, a draft of the EA (PR 43) 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 *Sierra Vista Herald/Bisbee Daily Review* on August 29, 2006 (PR 44). Two comment letters were received in response to this solicitation (PR 46, 47). These comments have been considered by the responsible official and incorporated into the analysis as appropriate (PR 48).

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 in Chapter 3 is built around the identified issues and concerns. 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[5].

Key Issues

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

Other Issues

Project design features and mitigation measures have been developed to address the following issues.

Wildlife – Continued grazing in the project area could result in effects to wildlife, including listed, sensitive and management indicator species and their habitats. Effects could include modification of the structure and composition of plant communities that provide habitat through selective removal of forage, disturbance during critical periods, and changes in the availability of water. Effects can be both positive and negative, depending on the timing, intensity, frequency and duration of grazing.

Soil and watershed condition – continued grazing in the project area could affect soil condition and impact riparian areas. Groundcover modification through grazing or mechanical treatment and water developments for livestock may affect hydrological function in watersheds.

Upland vegetation – Continued grazing on the allotment could lead to changes in the composition, structure and vigor of upland vegetation and could affect the condition and trend of rangeland resources.

Utilization. Some comments indicated a concern that proposed utilization limits exceed currently accepted guidelines for utilization (often citing summaries such as Holechek 1988, 1999, 2004 and Galt, et al 2000, PR 27, 28, 29, 30). Proposed utilization (30-45%) is set to meet the physiological needs of forage plant species common in the project area. It is further refined to meet specific management objectives (e.g. plant production and vigor, soil protection, litter increases, maintenance of wildlife cover). Utilization measurements will be used to evaluate the short-term effectiveness of management and to monitor achievement of specific resource objectives (see proposed action, Chapter 2). However, attainment of desired rangeland condition will be based on assessment of ecological condition and trend. Because the Forest is not proposing changes in utilization on the allotments, utilization was not identified as a separate issue for the analysis.

[5] 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)…"

CHAPTER 2 - ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the management of the O'Donnell, Post Canyon, Sawtelle, Sycamore, U-D and Miller Canyon 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 Eliminated From Detailed Study

One scoping comment (PR 19) proposed reducing stocking rates (utilization) to 25% on the allotments, but gave no site-specific resource information in support of the recommendation. The issue of utilization was discussed in the previous section. The same comment suggested an alternative that would limit additional water developments on the allotments. Alternative 2, below, meets this criterion.

Alternatives Considered in Detail

Alternative 1

No Action

Since the proposed action would authorize grazing, under the No Action alternative grazing would not be authorized and use of the allotments by domestic livestock would be discontinued. Permittees would be given one year from the date of the decision to remove livestock from the allotment(s). 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. Manzanita treatments would not be authorized.

Alternative 2

Continue Current Management

Livestock grazing would continue on all allotments as currently permitted. As permits expire, new permits would be issued for the classes and numbers of livestock currently allowed. Authorized use would continue to be controlled through annual operating instructions using an adaptive management strategy described under the proposed action (Alternative 3). The duration, timing, frequency and intensity of grazing would be the same as described under the proposed action. Existing fences, water developments and other range improvements would be maintained, but no new infrastructure would be proposed or developed. Manzanita treatment described under the proposed action would

be authorized, since the need for this action would remain even in the absence of livestock grazing. Allotment management plans would include mitigation and monitoring features described under the proposed action.

Alternative 3

The Proposed Action

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

Duration, Frequency and timing of grazing. Use on the allotments will be authorized year-round using rotational grazing. Periodic growing season rest or deferment will be used to provide for grazed plant recovery. The sequence and timing of pasture moves will be based on monitoring of range readiness, ecological condition, and utilization.

Intensity of grazing. Forage utilization will be managed at a level corresponding to light to moderate intensity[6] in order to provide for grazed plant recovery, increased herbage production and retention of herbaceous litter to protect soils.

Grazing authorizations will be accomplished through the issuance of new 10-year term grazing permits in accordance with Forest Service policy (FSH 2209.13) (Table 2). New allotment management plans (AMPs) will be developed for each allotment and will become part of Part 3 of the grazing permits issued under the proposed action. The AMPs would incorporate an adaptive management strategy (see below). Using adaptive management, specific numbers of livestock to be grazed would be set each year based on resource conditions and management objectives for the allotments. Pasture rotations will be planned at the beginning of each grazing year and will be continually modified in response to changing resource conditions with the objective of not grazing any one pasture during consecutive growing seasons. Grazing systems identified in Table 2 are those in effect on the allotments at present. Over time these may be modified to adapt to changing resource conditions or management objectives.

Proposed permitted use (Table 2) is based on knowledge of actual use on the allotments over the past 10 years. It reflects the estimated average annual forage production (AUMs)[7] available for livestock on the allotments considering the duration, timing, frequency and intensity of grazing proposed, and assumes proper livestock distribution.

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[6] Based on review of numerous grazing intensity studies, Holechek (2004) (PR# 27) identifies light to moderate grazing as 32-43% 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 30%-45% 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%. (Holechek, J.L, T.T Baker and J.C, Boren. 2004. Impacts of controlled grazing verses grazing exclusion: What we have learned. Range Improvement Task Force Report # 57. New Mexico State University, Las Cruces, NM.).

[7] 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. dry forage per day. 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. A cow/calf pair is 1.32 AUMs; alternatively a yearling is 0.7 AUM.

Proposed improvements for each allotment are shown in Table 3. Not all of the projects shown in Table 3 would necessarily be implemented. The improvements have been identified as possible practices that may be necessary to construct in the future if management alone is insufficient to achieve desired conditions. Typically, improvements are funded on a cost-share basis with the Forest Service providing materials and the permittee providing the labor to construct or install the improvement. Funding constraints will likely require the projects to be completed over a period of years, unless the permittees pursue alternative sources of funding.

Table 2. Proposed Grazing Management and Authorization

Allotment	Grazing System	Animal Unit Months	Cattle Yearlong (cow/calf)	Change from Current Permit
O'Donnell	6-Pasture deferred rest rotation	1900	120	No change in numbers. Issue permit for AUMs.
Post Canyon	Deferred rest rotation Variable pasture no.	200-1050	13-66	Issue permit for a range of AUMs. Reduce permitted numbers.
Sawtelle	10-pasture deferred rotation.	1346	85	No change in numbers. Issue permit for AUMs.
Sycamore	Deferred rest rotation	190	12	No change in numbers. Issue permit for AUMs.
U-D	Grass Bank. Used as needed to provide rest to other forest allotments, but not in consecutive growing seasons.	0-317	0-20	No change in numbers. Issue permit for AUMs.
Miller Canyon	1 pasture, Winter use (Nov.1-Feb. 28)	348 AUM	15 – Forest 7 –Private land	No change in numbers. Issue permit for AUMs.

Table 3. Description and Management Objectives for Proposed Improvements.

Allotment	Proposed Action	Objective
O'Donnell U-D	Install a pipeline from East well on the U-D allotment to Canelo Pass.	Provide reliable water to O'Donnell, U-D and San Rafael Allotments; improve livestock distribution.
O'Donnell	Extend a pipeline from Western well to provide upland waters in West, Canelo and Lower Pauline pastures.	Improve livestock distribution and increase reliability of pastures/rotations.
O'Donnell	Develop upland waters in the upper and lower Pauline pastures by piping water from the Pauline well or the Silver Tank pipeline on the Sawtelle Allotment.	Improve livestock distribution within pastures and increase reliability of pastures/rotations.
Post Canyon,	Extend pipeline into uplands on Calloway pasture.	Improve livestock distribution within the pasture and increase reliability of pastures/rotations.
Post Canyon	Fence Forest Boundary in Callaway Pasture.	Regulate livestock access to and use on Forest.

Allotment	Proposed Action	Objective
Post Canyon O'Donnell	Install a pipeline from Post Well to the south end of the Mountain pasture to provide water for the O'Donnell and Post Canyon allotments.	Improve livestock distribution within the pasture and increase reliability of pastures/rotations.
Post Canyon	Remove invading small junipers in Cemetery and Mountain pastures by hand cutting.	Control invasive plants and restore native community.
Sawtelle	Re-align the southern fence in the Bull pasture to exclude riparian areas in Algerita and Lyle Canyons.	Improve livestock distribution and improve riparian condition by reducing use in bottoms.
Sawtelle	Cross fence Mountain pasture.	Increase management flexibility and opportunities for pasture deferment.
Sawtelle	Extend a pipeline from Korn well to new storage and two troughs in the Becker pasture.	Improve livestock distribution and increase reliability of pastures/rotations.
Sawtelle	Extend a pipeline from Rogers well to a new storage and trough in the Howell Pasture.	Improve livestock distribution and increase reliability of pastures/rotations.
Sawtelle	Extend a pipeline from the Canelo allotment to the Highway pasture.	Increase livestock distribution and increase reliability of pastures/rotations.

In addition, the Forest proposes to mechanically thin manzanita stands in uplands on three allotments (O'Donnell, Sawtelle and U-D). This would involve the use of a Hydro-axe or similar machine to shred individual manzanita plants in order to reduce canopy cover and increase herbaceous ground cover. A Hydro-axe is a rubber tired, articulated tractor with a front-mounted rotating mower attachment capable of chopping woody material into small pieces, which are scattered on the ground leaving a cover of woody mulch. The mower blade operates in a horizontal plane and can cut within 4 inches of the ground, minimizing soil disturbance.

Mitigation and Monitoring

The proposed action includes mitigation and monitoring features intended to preclude or avoid significant impacts (mitigation) and to assure that management is being properly implemented and management objectives are being met (monitoring).

Mitigation Measures

To mitigate resource impacts, the following measures will be implemented under both action alternatives. These measures have been used on previous projects and are considered to be effective at reducing environmental impacts. They are consistent with applicable Forest Plan standards and guidelines and the terms and conditions and conservation measures of applicable biological opinions. Implementation of the mitigation measures, in combination with project design criteria, should preclude the occurrence of potentially significant environmental impacts.

Soil, Water and Vegetation – the objective is to mitigate effects of livestock grazing management and to assure that management is responsive to changing resource

conditions. The objective will be accomplished through the use of Best Management Practices (FSH 2509.22, PR 30, 56) 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, provide herbaceous residue 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.
- The Forest and permittees will jointly prepare annual operating plans that consider current conditions and management goals. Periodic field checks including stock counts, range readiness and utilization monitoring will be used to identify needed management adjustments. The objective is to assure achievement of resource and management objectives.
- 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 supplement will require prior approval of the District Ranger.
- No hay or bulk feed will be placed on Forest lands in order to minimize the introduction of weed seeds.
- Manzanita thinning will not be conducted in wet conditions in order to avoid soil disturbance and compaction. Areas to be treated will be limited to less than 20% slope and buffers will be left around all primary drainages.

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

- All water developments will include wildlife access and escape ramps.
- All new 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.
- All proposed range facilities will be surveyed for 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.
- 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.
- 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 (PR 32). The objective is to provide herbaceous vegetation as cover for quail and other wildlife.
- The O'Donnell Creek and Freeman Spring exclosure fences (Post Canyon allotment) will be inspected and, if necessary, maintained annually in compliance with the current Biological Opinion (PR 24).

- Stockpond maintenance activities will be conducted in compliance with the Forest's stockpond management and maintenance guidelines for the Sonoran Tiger Salamander and the Chiricahua leopard frog (PR 33) in order to reduce effects to these species as a result of stockpond maintenance activities. The objective is to maintain occupied habitats for the species

Heritage Resources – the objective is to protect heritage resources (historic and prehistoric sites) from impacts caused by range construction projects or livestock concentration.

- All proposed range facilities will be surveyed for heritage resources prior to any ground-disturbing activities. Facilities will be built or modified to avoid construction impacts and located to avoid concentrating livestock on identified heritage resource sites.
- If unrecorded sites are discovered during the course of project implementation, activities will cease and the forest Archeologist will be notified.
- No salting will occur within or adjacent to identified heritage sites.
- Fence posts will be hand-driven in the vicinity of site AR03-05-03-352 on the Post Canyon Allotment to avoid ground disturbance.
- Site AR03-05-03-356 on the Sawtelle allotment will be flagged and avoided during manzanita cutting.

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.

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[8] and the Region 3 Rangeland Analysis and Training Guide.[9] 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.

Implementation monitoring will occur yearly and will include such things as inspection reports, forage utilization measurements in key areas, livestock counts and facilities inspections. Utilization measurements are made following procedures found in the

[8] Sampling Vegetation Attributes, Interagency Technical Reference. 1996. Cooperative Extension Service, USDA Forest Service and Natural Resources Conservation Service, and USDI Bureau of Land Management.

[9] Rangeland Analysis and Management Training Guide. 1997. USDA Forest Service, Southwestern Region.

Interagency Technical Reference[10] and with consideration of the Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands (PR 34).

Utilization will be monitored on key forage species, which are native perennial grasses that are palatable to livestock. At a minimum monitoring will include use in key areas[11], but may include monitoring outside of key areas. The Sierra Vista 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 permittee(s).

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

The proposed action is intended to provide sufficient flexibility to adapt management to changing circumstances. If monitoring indicates that desired conditions are not being achieved, management will be modified in cooperation with the permittees. Changes may include administrative decisions such as the specific number of livestock authorized annually, specific dates for grazing, class of animal or modifications in pasture rotations, but such changes will not exceed the limits for timing, intensity, duration and frequency defined for the proposed action and analyzed herein. Adaptive management will be implemented through annual operating plans, which will adjust livestock numbers and the timing of grazing so that use is consistent with current productivity and is meeting management objectives.

In the case that changing circumstances require physical improvements 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).

[10] Utilization Studies and Residual Measurements. Interagency Technical Reference. 1996. Cooperative Extension Service, USDA Forest Service and Natural Resources Conservation Service, and USDI Bureau of Land Management. Revised 1999.

[11] 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.

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 the 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 5 summarizes the more detailed effects analysis contained in Section 3.

Table 5. Comparison of the Alternatives

Attribute	Alternative 1	Alternative 2	Alternative 3
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.	Consistent with Forest Plan and policy.
Meets purpose and need	N/A	Adaptive management will provide flexibility but does not resolve distribution issues; permitted use is not balanced with capacity.	Yes. Resolves distribution issues and balances use with capacity. Provides management flexibility.
Effect on Wildlife and Plants	No Effects from grazing.	Effects mitigated, but poor distribution may impair achievement of desired conditions in some areas.	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.	Continued livestock concentration in some areas contributes to less than optimal watershed and soil condition.	Additional waters and pastures increase management flexibility and contribute to improved distribution. Moderate use contributes to watershed stability.
Effects on upland vegetation	No effects.	Continued livestock concentration in bottoms and flat areas, resulting in localized heavy use.	Additional waters and pastures increase management flexibility and contribute to improved distribution. Increased use in uplands.

CHAPTER 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. The section is organized by resource. Within each section, the affected environment is briefly described, followed by the environmental consequences (direct and indirect effects) of implementing each alternative. The cumulative effects of the alternatives are considered at the end of the section.

Wildlife

Affected Environment

The allotments are located within Arizona Game Management Unit 35A. Broadleaf woodland, chaparral, plains grassland and riparian vegetation provide habitat for a variety of native wildlife. Larger species found in the area include white-tailed deer, javelina, mountain lion and black bear. Avian fauna include Mearns' quail, mourning dove, band-tailed pigeon, a variety of raptors and songbirds. Portions of the area provide suitable habitat for Gould's turkey. Other smaller species that may occur within the project area include coyote, gray fox, bobcat, coati, striped, hooded and spotted skunks, raccoon, badger, and ringtail. The area may be used for foraging and roosting by a variety of bat species including cave myotis, Mexican free-tailed bat, the endangered Lesser long-nosed bat and several other species. Aquatic habitats are limited. O'Donnell Creek and Turkey Creek are located in the project area, but perennial flows are found only on private land or portions of the Forest that are both outside of the allotments and excluded from grazing. Portions of the two streams are designated critical habitat for the Gila Chub.

Threatened, Endangered and Sensitive Species.

Listed or proposed threatened or endangered species that potentially occur in the project area are shown in Table 5.

Table 5. Threatened or Endangered Species Considered for Analysis.

Name	Status	2002 Effect Determination	Comments
Lesser long-nosed bat *Leptonycteris curoasoae yerbabuenae*	Endangered	LAA: all allotments	Post breeding roost within 7 mile radius of all allotments. Foraging habitat on all allotments. Agave monitoring transect on Post Canyon.
Mexican spotted owl *Strix occidentalis occidentalis*	Threatened w/ Critical Habitat	NLAA: Miller Canyon	Spotted owls and critical habitat occur on Miller Canyon allotment; however, grazing use occurs greater than one-mile down canyon from spotted owl habitat. Forest proposes to retire allotment no later than 2021.
Northern aplomado falcon *Falco femoralis septrendionalis*	Endangered	NLAA: Sycamore	Potential habitat identified on Sycamore allotment.
Sonora tiger salamander *Ambystoma tigrinum*	Endangered	LAA: U-D, Sawtelle	No records on allotments. Occurs in upper Turkey Creek watershed adjacent to Sawtelle.

Name	Status	2002 Effect Determination	Comments
stebinsi			Also occurs adjacent to UD.
Chiricahua leopard frog *Rana chiricahuensis*	Threatened	LAA: O'Donnell, Post Canyon, Sawtelle and U-D NLAA: Miller Can. and Sycamore.	Occupied and suitable habitat. Other historic locations.
Gila chub *Gila intermedia*	Endangered w/ Critical Habitat	LAA: O'Donnell, Post Canyon, Sawtelle NLAA: Sycamore	No occurrence on allotments. Occurs in lower O'Donnell Canyon and historically in lower Turkey Creek. Critical Habitat on Post Canyon allotment inside grazing exclosure.
Huachuca water umbel *Lilaeopsis schaffneriana recurva*	Endangered	MANLAA	Populations in O'Donnell Creek and Freeman Spring inside fence exclosure.
Canelo Hills ladies-tresses *Spiranthes delitescens*	Endangered	MANLAA	Population in O'Donnell Creek within fenced exclosure.

Forest Service Sensitive animals and plants considered for the analysis are shown in Tables 6 and 7. Species for which there are no records in the project area, but for which suitable habitat is found in the project area are presumed to be present.

Table 6. Forest Service Sensitive Species Animal Species Included in the Analysis

Species	Comments
Mammals	
Arizona shrew *Sorex arizonae*	Occurs in upper Miller Canyon, possibly higher elevation canyons elsewhere in canyons and riparian habitats with dense ground cover.
Southern pocket gopher *Thomomys umbrinus intermedius*	Occupies oak woodlands. Suitable habitat in all allotments.
Birds	
Yellow-billed cuckoo *Coccyzus americanus*	Occupied habitat occurs within one mile of allotments on adjacent private land along Turkey and O'Donnell Creeks. Likely forages in lower elevation drainages in project area.
Northern goshawk *Accipter gentilis*	Post Fledging Area (PFA) established in Upper Turkey Creek (PFA No. 0503102).
Gould's turkey *Meleagris gallopavo mexicana*	Suitable habitat present. Locally common in drainages in and near project area.
American peregrine falcon *Falco peregrinus anatum*	Potential foraging habitat, particularly on Miller Canyon.
Amphibians	
Western barking frog *Eleutherodactylus augusti cactorum*	Not documented in project area. Possibly in Miller Canyon above where grazing occurs.
Ramsey Canyon leopard frog *Rana subaquavocalis*	Occupied habitat in Miller Canyon upstream from allotment. Species may disperse through allotment in monsoon season.
Reptiles	
Mexican garter snake *Thamnophis eques megalops*	Occurrence records from Sawtelle and O'Connell and downstream in Canelo Hills Cienega.
Arizona ridgenosed rattlesnake *Crotalus willardi willardi*	Occurrence Records from Sawtelle and O'Donnell. Suitable habitat present on other allotments.
Invertebrates	
Agathymus evansi Evans giant skipper	Host plant is *Agave parryi.* Plant is present in project area, but status of butterfly unknown.

Species	Comments
Agathymus aryxna Arizona giant skipper	Host plant is *Agave palmeri.* Suitable habitat present; within range of the species.
Megathymus ursus ursus Ursine giant skipper	Host plant is Y*ucca schotti* and *Y. baccata*. Found in lower reaches of open yucca-oak woodland.
Calephelis arizonensis Arizona metalmark	Damp edges of woodlands and mountain canyons. Host plant is *Bidens sp.*
Sympetrum signiferum Mexican meadowfly	Record from Audubon Research Ranch. Potentially occurs near permanent water in project area.
Pyrgulopsis thompsoni Huachuca springsnail	Suitable habitat nearby; within range of the species.

Table 7. Forest Service sensitive plant species considered in the analysis.

Species	Comments
Plants	
Alium rhizomatum Redflower onion	Species found along dry stream beds north of Canelo Pass and in upper Middle Canyon.
Asclepias lemmonii Lemmon milkweed	Potential habitat in upper Turkey and Middle Canyons. Occurs in Miller Canyon at 6128 ft elevation.
Asclepias uncialis Greene milkweed	Records from Canelo Hills, south of Sonoita and on the Audubon Research Ranch; not known from the project area.
Astragalus hypoxylus Huachuca milk vetch	Found in Huachuca and Patagonia Mountains. No records from the project area.
Browallia eludens Bush violet	Occupied habitat north of Canelo Pass, along shallow drainages and under junipers, and in upper reaches of Middle Canyon, along canyon bottoms, especially on moist banks.
Coursetia glabella Smooth babybonnets	Dry slopes in oak-juniper woodlands. Population in Western Canyon, O'Donnell.
Erigeron arisolius Arid throne fleabane	Wide distribution. Moist rocky soils in grasslands or openings in woodlands. No records, but suitable habitat present.
Hedeoma dentatum Mock pennyroyal	Records from EMA outside of project area. Suitable habitat on all allotments.
Heterotheca rutteri Huachuca golden aster	Occurs in roadcuts and disturbed sites, primarily off Forest. Found in habitats that historically burned with high frequency.
Ipomoea thurberi Thurber's morning glory	Record from project area in O'Donnell Canyon. Suitable habitat.
Laennecia eriophylla Wooly fleabane	Record from project area.
Margaranthus lemmonii Lemmon globe berry	Only record from 1882 in Huachuca Mountains. Possibly invalid taxon.
Metastelma mexicanum Wiggins milkweed vine	Population in Middle Canyon.
Muhlenbergia dubioides Box Canyon Muhly	Population in Huachuca Mountains (Parker Canyon), but no records from project area. Suitable habitat present.
Paspalum virletii Virlet paspalum	Population in Huachuca Mountains, but no records from project area. Suitable habitat present.
Pectis imberbis Beardless chinch weed	Population in Post Canyon. Adapted to disturbance. Suitable habitat throughout project area.

Species	Comments
Samolus vagans Chiricahua Mountain brookweed	Confined to areas with permanent water in Huachuca Mts. Species more likely to occur in upper Turkey and Pauline Canyon. No records from project area.
Senecio hartwegii Seemann groundsel	Found in understory of pine/oak woodland; possible in upper Turkey and Pauline Creeks.
Sisyrinchium cernuum Nodding blue-eyed grass	Found in wet soils along streams. No records from the EMA.
Stevia lemmonii Lemmon's stevia	Record from Patagonia Mts. No records from the project area.
Talinum humile Pinos altos flame flower	Record from O'Donnell Canyon off Forest and Canelo Hills. No records from project area. Possibly suitable habitat.
Talium marginatum Tepic flameflower	Occurrence documented in Canelo Hills, Western Canyon and WNW of Lookout Knoll.
Tephrosia thurberi Thurber hoary pea	Records from Huachuca and Patagonia Mts. No records from project area.
Tragia laciniata Sonoran noseburn	Found in Western Canyon at 5,340 ft elevation. Suitable habitat in all but Miller Canyon.

Management Indicator Species.

Forest Plan direction for Management Indicator Species (MIS) is to maintain or improve occupied habitat (PR 1). Forest-wide trends of all MIS have been assessed and are reported in the Forest-wide Status Report for Management Indicator Species (PR 25 and at www.fs.fed.us/r3/coronado). The background information and conclusions of this reported are incorporated by reference. Fourteen MIS and one group (cavity nesters) potentially occur within the analysis area (Table 8).

Table 8. Management Indicator Species considered in the analysis.

Species	Comments
White-tailed deer	Occurs within analysis area; widespread suitable habitat. Monitored annually by Arizona Game and Fish Department (AGFD).
Black bear	Limited suitable habitat, primarily in ungrazed portions of Miller Canyon.
Elegant trogon	Occurs in Huachuca Mountains, possibly in Miller Canyon.
Sulphur-bellied flycatcher	Occurs in Huachuca Mountains, possibly in Miller Canyon.
Blue-throated hummingbird	Occurs in Huachuca Mountains, possibly in Miller Canyon.
Buff-breasted flycatcher	Suitable habitat in upper elevations of Miller Canyon allotment.
Mearns' quail	Occurs within analysis area; suitable habitat widespread and abundant. Population trends and recruitment monitored through harvest data.
Baird's sparrow	Suitable habitat present in plains grassland habitats. Recorded nearby.
Gould's turkey	Occurs within the analysis area, but is not a habitat indicator. Effects evaluated in Biological Evaluation.
Primary and secondary	Occur within analysis area; suitable habitat available. Monitored

Species	Comments
cavity nesters	through breeding bird surveys.
Arizona ridge-nosed rattlesnake	Suitable habitat available, documented from analysis area. Not a habitat indicator and not known to be affected by grazing. Effects assessed in Biological Evaluation.
Sonora tiger salamander	Suitable but unoccupied sites in the analysis area. Not a habitat indicator. Effects evaluated in Biological Assessment.
Arizona (Mountain) tree frog	Records from Turkey Creek and Miller Canyon (Range=Huachuca Mts. and Canelo Hills). Not a habitat indicator.
Gila topminnow	Occurs in O'Donnell Creek since 2004. Effects evaluated in Biological Assessment. Not a habitat indicator.
Gila chub	Occurs in O'Donnell Creek. Effects evaluated in Biological Assessment. Not a habitat indicator.

Environmental Consequences

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. Livestock grazing is currently managed to comply with the 2002 Biological Opinion from the U.S. Fish and Wildlife Service (PR 24). 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 2005 (PR 35, 55) using Guidance Criteria established by the Forest Service and the U.S. Fish and Wildlife Service in 2004[12]. For species potentially affected by the proposed action or alternatives, effects are disclosed below. More extensive discussions, including "no effect" determinations, can be found in the project BA (PR 35).

Lesser long-nosed bat. Grazing potentially affects this species through removal of food plants either as a result of ground-disturbing livestock management activities or herbivory by livestock on agaves. In 2002 the Forest determined that grazing as practiced on the six allotments may adversely affect the LLNB based on the fact that flowering agaves would be exposed to livestock grazing, thereby potentially affecting the food supply for the bat. Take was not assessed and no terms and conditions were issued.

Systematic surveys of agave populations on the Post Canyon allotment are being completed in compliance with the 2002 BO (PR 40). Preliminary data from three years of data collection indicate that flowering agave densities vary from 3.5 to 5.0 flowering agaves/hectare, well above the BO threshold of 0.2 flowering plants/hectare that would trigger reinitiation. Field observations indicate that agaves are patchily distributed (i.e., no major concentrations) throughout the allotments. No maternity roosts are known to occur on the Forest but other roosts are known within six miles of the allotments. These

[12] Framework for Streamlining Informal Consultation for Livestock Grazing Activities. USDA Forest Service, Southwestern Region. March 31, 2004.

are occupied generally during the July-September post-maternity period. Due to the proximity of known roosts it is assumed that the bats use agaves on the allotments.

Agave stalks are rich in carbohydrates, and as they begin to bolt are particularly palatable to domestic livestock and wild herbivores. Livestock and wild herbivores feed on young agave stalks, which precludes the plant from flowering and potentially reduces forage resources for LLNB. Although it is known that livestock will feed on agave stalks, it has not been established that this herbivory affects agave densities or that agave densities are a limiting factor for LLNB.

Under the proposed action grazing will occur during a portion of the agave bolting season in selected pastures in each allotment, although deferment and rest periods proposed will assure that not all pastures are grazed in a given year. The exposure of bolting agaves to livestock will be similar to present levels, but the amount of herbivory on agaves cannot be predicted to be less than 1% of the total plants, which is the threshold for "not likely to adversely affect" in the Guidance Criteria. As noted above, Forest Service monitoring indicates flowering agave densities are well above the threshold specified in the Forest BO. Mitigation is in place to minimize the destruction of agaves as a result of construction activities and will continue under both action alternatives. No effects to roosts are anticipated.

Proposed manzanita treatments on the U-D, O'Donnell and Sawtelle allotments may result in the inadvertent destruction of agaves. However, agaves are uncommon in the vicinity of dense manzanita stands. Heavy canopy cover tends to preclude the germination of agaves, which prefer more open grassland sites and possibly different soil types. In addition, the equipment used can be highly selective. Agaves, if they occur, can be avoided by the equipment operator.

Based on the current condition and trend in resource conditions observed, and mitigation features already in place on the allotments, it is considered unlikely that environmental effects will change significantly in the next ten years. Management appears to be maintaining or improving resource conditions and the proposed action largely continues current management. The proposed action is not expected to result in effects in a manner or to an extent not considered previously.

Mexican spotted owl. Previous consultations determined that ongoing grazing *may affect, not likely to adversely affect* the MSO (PR 24) and its critical habitat (PR 38) on the Miller Canyon Allotment. 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 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 this allotment occurs only during the winter (11/1-2/28) and at lower elevation woodlands and grasslands outside of protected and restricted habitats. The PAC is located in higher elevations where access by grazing livestock is restricted by steep slopes and thick vegetation. Little if any grazing occurs within the PAC. Riparian condition at lower elevations is improving as a result of the change to dormant season use in 2002.

Therefore, none of the four categories of effects are expected to occur as a result of livestock grazing on the allotment.

Based on the current condition and trend in resource conditions observed on the allotment, it is considered unlikely that environmental effects will change significantly in the next ten years. The proposed action largely continues the management already in place on the allotment, and this management appears to have no impact on MSO and MSO habitat. There is no information to indicate that the proposed action will result in effects in a manner or to an extent not considered previously.

Chiricahua leopard frog (CLF). There are historic (1979) records in cattle tank near Canelo Pass on the O'Donnell allotment and more recent records from upper Turkey Creek (1995) on the Sawtelle allotment and Welch Spring and Freeman Spring (2001) on the Post Canyon allotment. Although no CLF were found at these sites in 2005 (A. Dinsmore, AGFD, pers. comm.), they constitute likely to be occupied habitat[13]. The apparent extirpation of CLF from the project area is consistent with the range-wide decline that has been documented throughout the southwest in recent years. Consultation in 2002 determined that ongoing livestock grazing *may affect, likely to adversely affect* the CLF on the O'Donnell, Post Canyon, Sawtelle and U-D allotments based on the fact that livestock use and livestock management activities will occur in likely to be occupied habitat. Terms and conditions to avoid take were issued and are being implemented on the allotments.

Chiricahua leopard frog populations are often small and their habitats are dynamic, resulting in a relatively low probability of long-term population persistence. However, if populations are relatively close together and numerous, extirpated sites can be recolonized. Historically, the project area contained several occupied sites but CLF may be absent from most if not all of these locations. A small breeding population still exists on private land at O'Donnell Creek and its associated cienega. If this population persists (recruitment to the population appears to be limited due to predation by non-native species), it may serve as a source population for colonization of suitable habitat in the nearby allotments. There also exists the possibility that CLF occupy one or more isolated sites in the project area that have gone undetected due to their small population size.

Freeman Spring was fenced in 2000 to protect Huachuca water umbel, and at least a portion of Welch Spring will be fenced under the proposed action. As part of the proposed action, the Forest will continue to implement the terms and conditions of the 2002 BO through the Forest Chiricahua leopard frog habitat maintenance guidelines (PR 33). Continued implementation of these measures should insure detection of any extant frogs and insure maintenance of suitable habitats.

Rangeland vegetation and soil condition are good throughout the project area and are not thought to be contributing adverse effects to CLF habitats. Based on the current condition and trend of resources and mitigation measures in place or proposed, it is unlikely that

[13] Likely to be occupied habitat is defined in the March 31, 2004 Grazing Guidance Criteria as: 1) currently suitable habitat where the frog has been documented within the last 10 years, but is apparently now absent or 2) suitable habitat that is (a) within 1 mi overland of occupied habitat, (b) within 3 mi along an ephemeral or intermittent drainage from occupied habitat, or (c) within 5 mi along a perennial stream from occupied habitat.

environmental effects will change significantly in the next ten years. The proposed action largely continues the management already in place. Proposed improvements are intended to improve livestock distribution and reduce or eliminate use in bottoms where leopard frogs could potentially occur. The proposed action is not expected to result in effects in a manner or to an extent not considered previously.

Sonora tiger salamander (STS). There are no records of this species from the allotments in the project area. However, based on the presence of suitable habitats (stock ponds) and proximity to known occupied habitats, previous consultations have determined that livestock grazing and management on the Sawtelle and U-D Allotments *may affect, likely to adversely affect* the STS. Within the species' range, occupied habitats are restricted to earthen stock tanks maintained for livestock grazing. Stock pond management and maintenance guidelines are being implemented on the Sawtelle and U-D allotments as part of the recovery plan for the species and in compliance with the terms and conditions of the 2002 BO (PR 24). These guidelines will continue to be implemented through the term of the proposal.

Rangeland vegetation and watershed condition is good on the allotments and is not thought to be contributing adverse effects to STS habitats. The only permanent spring on the U-D allotment is already fenced to exclude livestock.

Based on the current condition and trend of resources, mitigation measures in place or proposed, and the apparent ability of the STS to persist in the presence of managed livestock grazing, it is unlikely that environmental effects will change significantly in the next ten years. The proposed action largely continues the management already in place on the allotments, and this management appears to be maintaining or improving resource conditions.

Gila chub. The Gila chub was listed as endangered with critical habitat in November 2005. It occurs in lower O'Donnell Creek and was found historically in Turkey Creek. O'Donnell Creek and Turkey Creek are both designated as critical habitat (PR 39). Occupied habitats in O'Donnell Creek are primarily on private land owned by the Nature Conservancy. On the Forest, occupied habitats are found downstream from the private land on a portion of the Post Canyon allotment. This portion of the allotment was formerly the Z-triangle pasture of the Papago allotment that was transferred to the Post Canyon allotment in early 2006 (PR 26). This transfer was an administrative adjustment with no change in management. The effects of livestock grazing were assessed during conferencing for the Papago allotment.

Effects to the species were assessed through conferencing in 2002 (PR 24) and in 2003 during consultation for the Kunde and Papago allotments (PR 41). These consultations determined that livestock grazing *may affect, likely to adversely* affect the Gila chub as a result of twice-yearly livestock crossings of the O'Donnell exclosure. Under the current proposed action, the Forest anticipates that livestock crossings will be required only once per year rather than twice. It is unlikely that the effects of this change will be discernable.

Other than this minor modification, the proposed action largely continues the management already in place on the allotments, and this management appears to be maintaining or improving resource conditions. The Forest will continue to inspect and maintain the O'Donnell exclosure fence as required by previous consultation (mitigation,

chapter 2). The proposed action is not expected to result in effects in a manner or to an extent not considered previously, or to result in an increase in taking.

Gila topminnow. In November 2003, a population of Gila topminnow was discovered in a portion of O'Donnell Creek that crosses private property owned by the Nature Conservancy, upstream from the Forest boundary. Potential habitats are found downstream from this site on the Forest within the O'Donnell Creek exclosure, but the species has not been found on the Forest. Effects to this species were assessed in the 2003-2004 consultation for the Papago and Kunde allotments (PR 41), resulting in a determination that the proposed action *may affect, likely to adversely affect* the topminnow as a result of twice-yearly livestock crossings of the O'Donnell exclosure, and based on the potential that topminnows may colonize habitats on the Forest over the ten-year term of the permit. Under the current proposed action, the forest anticipates that livestock crossings will be required only once per year rather than twice. It is unlikely that the effects of this change will be discernable.

Other than this minor modification, the proposed action largely continues the management already in place on the allotments, and this management appears to be maintaining or improving resource conditions. The forest will continue to inspect and maintain the O'Donnell exclosure fence as required by the 2004 BO for the Kunde and Papago allotments. The proposed action is not expected to result in effects in a manner or to an extent not considered previously, or to result in an increase in taking.

Sensitive Species

For the following species, a Forest 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*. Possible effects are confined to trampling and herbivory by livestock (for plants) or disturbance by grazing cattle (for animals). Impacts are anticipated to be limited to individuals and are not expected to result in effects to populations. The species-by-species analysis found in the Biological Evaluation (PR 36) is summarized below.

Gould's turkey (*Meleagris gallopavo mexicana*). A growing population is well-established in the Huachuca Mountains and birds are regularly seen and reported from drainages in the project area. Suitable habitats are available in the form of riparian corridors in oak woodlands. The species appears to be able to coexist with well-managed livestock grazing at moderate utilization levels. 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. Proposed utilization levels should retain sufficient herbaceous forage for turkeys across the landscape, although areas of livestock concentration may impact forage resources on a local scale. 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. None of the project alternatives will affect the quantity or quality of roost trees.

Apache northern goshawk (*Accipiter gentilis apache*) A post-fledging family area (PFA) is located in upper Turkey Creek in the Mountain pasture of the Sawtelle 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. The Mountain pasture containing the PFA is rarely used under current management, but use may increase in the future. If use increases, the combination of deferred rotations and moderate 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 and movement of livestock. Mechanical treatment of manzanita is proposed in the allotment, but not within the PFA and should therefore have no effect on the species.

Arizona ridgenosed rattlesnake (*Crotalus willardi willardi*). Heavy grazing could affect the species and potentially its prey base through the removal of cover; however proposed grazing intensities are unlikely to significantly reduce cover. Direct effects potentially include disturbance of individuals during range construction projects or trampling by livestock, which is considered unlikely.

Mexican garter snake (*Thamnophis eques megalops*). This species is usually found in densely vegetated habitat surrounding cienegas and springs. There are records from riparian areas on the Sawtelle and O'Donnell allotments. Potential habitats are found within the fenced exclosure on O'Donnell Creek and in stock tanks and seeps in the project area. Proposed fencing of riparian areas and construction of upland waters should reduce livestock use in riparian areas and improve riparian vegetation cover. Measures proposed to protect Sonora tiger salamander and Chiricahua leopard frog should benefit the species by providing cover in the vicinity of selected stock tanks. Potential effects would be the localized removal of cover in cienegas and springs that remain unfenced. There would be a slight potential for trampling by cattle.

Arizona Giant Skipper (*Agathymus aryxna*), Poling's giant skipper (*Agathymus polingi*) and Ursine giant skipper (*Agathymus ursus ursus*). Possible effects from livestock grazing include the removal or disturbance of food plants (agaves) or the trampling of individual adults in muddy areas. The butterflies and their host plants are widespread in southeastern Arizona.

A tiger beetle (*Amblycheila baroni*). This is a nocturnal tiger beetle that feeds on a variety of insects and other arthropods. By day it burrows in under the bases of rocks. The species is described as widespread and abundant where it is found. Effects from livestock grazing are limited to accidental trampling of individuals.

Arizona metalmark (*Calephelis arizonensis*). The host plant *Bidens* is a plant of riparian affinity and most suitable Arizona metalmark habitats have a source of permanent or semi-permanent water nearby. It is not known whether *Bidens* occurs within the analysis area; and permanent water other than stock tanks is limited. Possible effects to the species would involve removal of the host plant through grazing.

Redflower onion (*Allium rhizomatum, aka A. glanulosum*). This species is found on grassy slopes along streams and in moist rocky places. The one known site in the project area near Canelo pass was surveyed in 1999 and no signs of herbivory were observed. The surveyor concluded that known populations were stable and unthreatened. There is a slight possibility that individuals would be trampled by grazing cattle.

Huachuca milkvetch (*Astragalus hypoxylus*). Monitoring plots have been established in the Huachuca and Patagonia Mountains. Populations appear to undergo large fluctuations in numbers in response to precipitation and habitat degradation caused by livestock trampling and recreation disturbance. There are no known occurrences from the project area, but individuals may be affected if they occur undetected.

Bush violet. (*Browallia eludens*). In the project area, the species is found along shallow drainages often associated with rock outcroppings and under junipers. Because it is an annual, it can become abundant in wet years and very scarce in dry years. Its palatability is unknown, but during wet years, some trampling may occur when plants are abundant.

Smooth babybonnets (*Coursetia glabella*). The species appears to be persisting at the O'Donnell site in the presence of livestock grazing. Surveyors reported herbivory on less than 5 percent of the plants in the population but could not determine what was eating the plants.

Arid throne fleabane (*Erigeron arisolius*). There are no records from the project area, but it occurs nearby on the Audubon Research Ranch near the Sycamore allotment. If it occurs in the project area, individual plants may be grazed by cattle.

Mock pennyroyal (*Hedeoma dentatum*). The total range of the species is southeastern Arizona and northern Sonora, Mexico. However, it is documented from numerous sites on nearly every EMA on the Forest. The species may be sensitive to competition from grasses invading its rocky habitat and individuals may be affected if management results in increases in herbaceous vegetation over current conditions.

Huachuca golden aster (*Heterotheca rutteri*). The species may be susceptible to trampling by livestock. However, the species appears to tolerate some disturbance as it grows adjacent to State Route 82 near Sonoita. It is also found in areas that historically have burned at a high frequency.

Thurber's morning glory (*Ipomea thurberi*). There is a population of the plant on the O'Donnell allotment and suitable habitat elsewhere in the project area. Individual plants might be grazed by cattle.

Wooly fleabane (*Laennecia eriophylla*). Dense perennial grass cover appears to be important in creating suitable site conditions for this species. Populations are typically small and restricted almost entirely to portions of the Forest within Santa Cruz County. It occurs on the Post Canyon allotment. Suitable habitat may be present elsewhere in the project area. Livestock may graze individual plants where they occur, but populations appear to be persisting on the Forest in the presence of livestock grazing.

Milkweed vine (M*etastelma mexicanum*). A population of the species occurs in Middle Canyon on the O'Donnell allotment. It is not known to be palatable to livestock. Trampling is considered unlikely because this vine grows in the middle of woody plants. Mechanical treatment of manzanita is proposed in the Upper Pauline pasture of the O'Donnell allotment where the plant is found. This activity could affect the species if measures are not taken to avoid the known population. Mitigation requiring pre-treatment surveys and avoidance should avoid impacts to the population.

Box canyon muhly (*Muhlenbergia duboides*). This grass grows in riparian areas, often on cliffs and in rocky places with limited access for cattle grazing. It has not been

documented in the project area, but potential riparian habitats are present. If the plant occurs, it would likely be grazed by cattle.

Virlet paspalum (*Paspalum verletti*). Perennial grass found in sandy soils in semi-desert grasslands and woodlands. One population is known from the west base of the Huachuca Mountains, but it has not been documented in the project area. If the plant occurs, it would likely be grazed by cattle. Project design criteria designed to maintain grass plant vigor and cover should also maintain this species.

Beardless cinch weed (*Pectis imberbis*). This species is adapted to disturbance and often grows along road cuts. The species occurs within the Post Canyon allotment. Potentially suitable habitat is present elsewhere in the project area. Individual plants may be grazed by cattle.

Pinos altos flame flower (*Talinum humile*). Two populations occur north of the project area in the Canelo Hills, both on private lands. One of these is the result of a 1985 transplant onto the Audubon Research Ranch and is not exposed to grazing. It has not been documented on the project area. The species is sensitive to trampling by cattle during the summer growing season and individuals could be impacted if they occur undetected in the area.

Tepic flameflower (*Talium marginatum*). This succulent has not been documented in the project area, but occurs nearby in the Huachuca Mountains and Canelo Hills. It grows in open patches of bare soil or bedrock, typically where other plants are absent. The species may be susceptible to trampling by cattle, but because it grows in areas where other plants are absent, livestock use in preferred habitats would be predicted to be minor.

Sonoran noseburn (*Tragia lacianata*). This nettle-like plant is found along streams and canyon bottoms, on shaded hillsides and in open woodland between 3,500 and 5,600 feet. It occurs in the project area. Because of its nettle-like growth form, impacts from herbivory are not anticipated. Individual plants on the allotments could be trampled by livestock.

For the following sensitive species, the proposed action will have *no impact* based on the lack of suitable habitat in the project area or because the species will not be exposed to project activities.

American peregrine falcon (*Falco peregrinus anatum*). No active eyries are known from the project area, but eyries are located in Carr Canyon (Huachuca Mountains) and in the Patagonia Mountains. The project area could be used throughout the year by birds wintering or migrating through the area. The primary threat to the species is disturbance at nest sites, primarily by recreational rock climbers, but also through other ground-disturbing or loud activities that take place during the nesting season (March1 to July 15). Since there are no eyries in the project area, disturbance impacts would be precluded.

Western Yellow-billed cuckoo (*Coccyzus americanus occidentalis*). Suitable cottonwood-willow habitats are restricted to lower O'Donnell Creek within a fenced exclosure and to private land. Forest habitats will not be exposed to grazing livestock.

Western barking frog (*Eluetherodactylus augusti cactorum*). This nocturnal species remains in rock crevices most of the year, emerging only during the summer rains, when males call in groups on rainy nights. Within the CNF, they have been documented in the

Huachuca, Pajarito and Santa Rita Mountains. The species has not been documented in the project area, but occurs on the Coronado National Memorial and suitable habitats may occur in the Miller Canyon allotment. There is no information available on the effects of grazing on the species, but based on the species' tendency to remain in rock crevices, its nocturnal habit and the lack of records in the project area, no impacts are expected.

Mexican meadowfly (*Sympetrum signiferum*) Suitable habitats are not known from the project area. The spring in Sundown Canyon may provide limited suitable habitat, but this spring will be fenced to exclude livestock under the proposed action.

Huachuca springsnail (*Pyrgolopsis thompsoni*) No suitable habitats for the species are known from the project area, but extensive surveys have not been conducted. The spring in Sundown canyon may provide suitable habitat for the species. Under the proposed action, this spring would be fenced to exclude cattle.

Lemmon milkweed (*Asclepias lemmonii*). All records from the Huachuca Mountains are above the elevational range of the allotments in the project area. It is unlikely that the species occurs at elevations where grazing occurs.

Greene milkweed (*Asclepias unicialis*). This species occurs in plains grassland and evergreen woodlands. Two records are known from the Canelo Hills; one of these is on the Forest but not in the project area. The impacts of livestock grazing on this species are not known, but most milkweeds are not grazed by cattle due to low palatability.

Lemmon globe berry (*Margaranthus lemmonii*). This plant is known only from an 1882 collection in the Huachuca Mountains. Surveys were completed in 1977 and 1982, but the plant was not found. The validity of the taxon is in question.

Escoba (*Marina diffusa*). The species is widespread and locally common in Mexico, but the only extant U.S. population is found in the Patagonia Mountains, 10-12 miles from the project area.

Chiricahua mountain brookweed (*Samolus vagans*). This perennial deciduous forb is confined to areas with permanent water in higher elevations of the Huachuca Mountains. The species has not been documented at elevations in the area where grazing would occur. Little is known about this species.

Seeman groundsel (*Senecio carlomasonii*). Populations of this plant occur on the west side of the Huachuca Mountains, but there are no records from the project area. There are no known threats to existing populations.

Nodding blue-eyed grass (*Sisyrinchium cernuum*). This iris grows in wet soil by seeps and springs in desertscrub, desert grassland and oak woodland. Although potential habitats are present, primarily on private land, there are no records from the project area.

Lemon's stevia (S*tevia lemmonii*). The species is known from the EMA based on a single, old (1942) record in the Patagonia Mountains. There are no records from the project area.

Thurber hoarypea (*Tephrosa thurberi*). There are records from the EMA in the Huachuca and Patagonia Mountains, but no known occurrences from near the project area.

Management Indicator Species.

Effects of the proposed action and alternatives are evaluated in the project-level MIS analysis (PR 37) and are summarized below. Of the MIS species that potentially occur in the project area, six species are not identified as indicators for habitat and are therefore not considered in detail in the analysis. For the most part, these species are Threatened, Endangered or Forest Service Sensitive species for which effects are analyzed in the biological assessment (PR 35) and biological evaluation (PR 36) prepared for the project. An additional four species were eliminated from detailed analysis because neither the species nor their habitats are expected to be affected by the proposed action. These ten species are identified and briefly discussed below.

- **Elegant Trogon (*Trogon elegans*).** The species is identified as an indicator for riparian, diversity and cavity nesters in the Forest Plan. Suitable habitats for the species are found only in the Miller Canyon allotment in the Huachuca Mountains. Grazing on this allotment is restricted to the winter season (11/1-2/28) when the birds are not present on the Forest, so nesting birds will not be exposed to the effects of livestock grazing.
- **Sulphur-bellied flycatcher (*Myiodynastes luteiventris*).** The species is identified as an indicator for riparian, diversity and cavity nesters in the Forest Plan. Suitable habitats are found only in the Miller Canyon allotment in the Huachuca Mountains. Grazing on this allotment is restricted to the winter season (11/1-2/28) when the birds are not present, so nesting birds will not be exposed to the effects of livestock grazing.
- **Blue-throated hummingbird (*Lampornis clemenciae*).** This hummingbird is included in the riparian and special interest species indicator groups in the Forest Plan. Suitable habitat is found only in the Miller Canyon allotment in the Huachuca Mountains and the species has been documented here during surveys. Grazing is restricted to the winter and is not affecting riparian canyon bottoms preferred by the hummingbird.
- **Buff-breasted flycatcher (*Empidonax fulvifrons*).** This flycatcher is included in the species needing diversity and special interest species groups in the Forest Plan. Suitable habitats are limited to upper elevation conifer forests in the Huachuca Mountains. These habitats occur within the boundary of the Miller Canyon Allotment, but are found outside of areas that are grazed. Moreover, the species is found on the Forest only during its breeding season (March-September), which is outside of the grazing period on the Miller Canyon allotment.
- **Gould's turkey (*Meleagris gallopavo mexicana*).** This species is on the Forest's MIS list as a "threatened and endangered" species. It is not a listed species, nor is it a habitat indicator. A growing population of Gould's turkeys is well-established in the Huachuca Mountains and birds have been seen and reported from drainages in the project area. Suitable habitats are available in the form of riparian corridors in oak woodlands on the allotments. Effects of the proposed action on the species were considered in the BE for the project and are summarized above.

- **Arizona ridge-nosed rattlesnake (*Crotalus willardi willardi*).** This species is on the Forest's MIS list as a "threatened and endangered" species; it is not a habitat indicator. It is also a Sensitive species and is discussed above.
- **Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*).** This species is on the Forest's MIS list as a "threatened and endangered" species; it is not a habitat indicator. There are no occupied habitats in the project area. Effects have been addressed in the BA for the project and are summarized above.
- **Arizona (Mountain) tree frog (*Hyla wrightorum*).** This species is on the Forest's MIS list as a "threatened and endangered" species; it is not a habitat indicator. Historic locations in Miller Canyon and Turkey Creek near Canelo are protected from grazing by exclosures or management.
- **Gila Topminnow (*Poeciliopsis occidentalis occidentalis*).** This species is on the Forest's MIS list as a "threatened and endangered" species; it is not a habitat indicator. A recently-discovered population in O'Donnell Creek is on private land. Effects are addressed in the BA prepared for the project and are summarized above.
- **Gila chub (*Gila intermedia*).** This species is on the Forest's MIS list as a "threatened and endangered" species; it is not a habitat indicator. A population is found in O'Donnell Creek. Effects are addressed in the BA prepared for the project and are summarized above.

For the following MIS, effects may be anticipated as a result of implementation of the proposed action or alternatives.

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. On the Forest, cavity nesters occur primarily within forested areas including riparian habitats, Madrean evergreen woodlands, coniferous forests, and in Sonoran desert habitats that contain saguaro cactus (*Carniegia gigantea*). Cavity nesters generally benefit from conditions that promote uneven aged forests with older age trees for cavities. Grazing-related activities would affect cavity nesters only if they are of sufficient scale and intensity to change the rate of regeneration of cavity bearing trees. Much of the uplands in the project area are wooded, but no activities are proposed that would change the amount or distribution of cavity bearing trees in upland sites. In riparian areas, grazing potentially reduces the recruitment of trees through trampling or browsing on small trees by livestock. Stream courses in the project area are predominantly on private land and O'Donnell Creek and Freeman Spring on the Forest are already fenced to exclude livestock. Additional fencing in Lyle and Post Canyons is proposed that would further restrict livestock access. Several waters are proposed that are intended to draw livestock into uplands away from riparian bottoms. In addition, pasture rest and deferment will limit the amount of time livestock are in any pasture, allowing for recruitment of riparian vegetation where the potential exists.

The proposed manzanita mowing would be selectively remove woody shrubs, but would leave large trees that provide suitable cavity nesting sites. Effects of this activity would be restricted to short-term disturbance related to the noise of the equipment. Disturbance would not be of sufficient duration, scale or intensity to affect nesting bird populations.

Based on this, the proposed action is not expected to cause a detectable change in cavity-nester 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. White-tailed deer tend to use mixed-oak habitats more than other types, and tend to avoid open, grassy areas used by cattle. The entire project area (approximately 19,800 acres) is considered suitable habitat, and represents less than one percent of the total occupied habitat on the Forest. Habitat and population trends are considered stable, based on AGFD survey data reported in the Forest MIS trends report (PR 25). Widespread heavy grazing prior to and during the fawning period reduces hiding cover and may reduce fawn survival. Overgrazing by livestock may also reduce available grass forage and lead to increased livestock use of browse plants and forbs used by deer. However, grazing as proposed under either of the action alternatives would not be of sufficient intensity or duration to cause large scale reductions in cover or result in competition. Displacement or disturbance during range construction activities and brush treatments may occur, but such effects would be of short duration and localized and would have no effect on population trends. Over time, light to moderate utilization and proposed vegetation treatments should increase herbaceous cover, which would benefit whitetail deer. Grazing as proposed continues management practices that have been in place for several years and that have allowed white-tailed deer to persist. Selection of the no action alternative may result in a slight reduction of available waters because livestock waters would no longer be maintained. This may affect white-tailed deer distribution, but is unlikely to affect deer populations or result in a loss of occupied habitat. 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 wide ranging habitat generalists that prefer areas of dense cover and high vegetative diversity. They are included in the Riparian Species, Species Needing Diversity, and Game Species indicator groups. Black bears could potentially occur throughout all of the allotments; however, the highest quality habitats are restricted to upper elevations in the Miller Canyon allotment. 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). The proposed action includes the mowing of manzanita on portions of the project area, which could result in a localized reduction in potential food and cover for bears. However, the areas proposed for treatment are long ridges dominated by dense, decadent manzanita stands that are of limited habitat value compared to more favorable canyon and mountain habitats nearby. Manzanita and other mast-producing plants are abundant throughout the project area and surrounding mountains. The amount of manzanita removal proposed is not considered sufficient to significantly reduce forage or cover for bears on a local or regional scale. Moreover, treated areas would not lose value as bear habitat as a result of selective manzanita removal. Oaks and other trees and shrubs will be avoided to provide a source of food and cover on treated sites, and manzanita on slopes over 20% would not be treated.

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 under any of the alternatives and localized removal of manzanita are not expected to cause a detectable change in black bear populations or a loss of occupied habitat.

Montezuma (Mearns') Quail (*Crytonyx montezumae*). Montezuma quail is included in the Species Needing Herbaceous Cover, Game Species, and Special Interest Species indicator groups. 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. Forest Service Manual guidance restricts grazing in mapped high density Montezuma quail habitat to 45% by weight, with an objective of providing a minimum of 6 inches residual stubble height. This guidance will be implemented across the landscape through a utilization guideline of 30-45% utilization. The amount of potential habitat has not changed significantly since 1986, but habitat suitability has likely improved as a result of improved livestock management over the past two decades.

Alternative 1 would maximize the amount of herbaceous cover that provides Mearns' quail habitat within the analysis area. 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, so the No Action alternative may not be optimal for Mearns' quail. In addition, Mearns' 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 does not improve livestock distribution and provides less growing season rest than other alternatives. While manual guidance for Mearns' quail would be implemented, the task of retaining sufficient herbaceous cover across the landscape would be complicated by uneven livestock distribution. Current management appears to be achieving Forest Plan objectives for herbaceous cover in most areas, but livestock concentration areas would continue to result in heavier than desirable use in low, flat areas. Under Alternative 3, proposed changes in management that incorporate growing season rest should increase grass plant production and cover. New waters and fences should reduce use in canyon bottoms, which should benefit Mearns' quail and other species found in these areas, but may also result in reduction in herbaceous vegetation in previously little-used areas adjacent to new water developments. For the most part, these increases in utilization will be in uplands, away from optimal Mearns' quail habitats and the limits on grazing utilization should maintain occupied habitats.

Proposed manzanita treatments would be restricted to ridge-top monocultures of manzanita that currently provide little herbaceous cover needed by quail. Over time, treatments should result in an increase of herbaceous cover, but treated areas will be ridgetops that are not optimal as Mearns' quail habitat. Based on the foregoing, grazing as proposed under any of the alternatives and localized removal of manzanita are not expected to cause a detectable change in Mearns' quail populations or a loss of occupied habitat.

Baird's Sparrow (*Ammodramus bairdii*). This sparrow breeds in the mixed grass prairies of the northern Great Plains and winters in the southwest including the San Rafael Valley. It is identified as a species needing herbaceous cover in the Forest MIS list. The San Rafael Valley and the Sonoita Grasslands have been identified as significant wintering areas, but much of this wintering habitat is located off-Forest on private, BLM, state trust and Arizona State Park land south and north of the Canelo Hills. It occurs on the Forest only in the winter and can be sporadic in numbers and distribution. The Forest Plan provides no data for acres of occupied habitat on the Coronado National Forest; however, there is an estimated 49,379 acres of plains grassland on the Forest associated with the San Rafael Valley. A few hundred acres of suitable habitat are found on the U-D allotment at the north end of the San Rafael Valley and on the Sycamore allotment at the south end of the Sonoita Grasslands. Neither allotment is grazed regularly. Since 1986, changes in grazing management from continuous yearlong in many allotments to deferred rotation systems and reductions in utilization levels have resulted in improvements in grassland structure and condition. Based on this, the trend in suitable habitat is considered stable or improving.

Alternative 1 (no grazing) would result in the greatest development of herbaceous cover over the life of the project. This alternative would maximize the amount of residual herbaceous cover in the limited areas of suitable habitat in the project area. These areas are already suitable, so no net change in habitat quantity is anticipated. Alternative 2 would not improve livestock distribution and provides the least growing season rest. Some areas may receive heavier than desirable (for Baird's sparrow) grazing use under this alternative. Alternative 3 would incorporate additional rest, improve distribution and manage for light to moderate use levels, resulting in the maintenance of all suitable habitat on the allotments. Proposed manzanita treatments would occur outside of Baird's sparrow habitat and would have no effect on the species. Considering the limited suitable habitat available in the project area and the limited intensity and duration of grazing in potential habitats, implementation of any of the alternatives would not result in a detectable change in Baird's sparrow populations on the Forest 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". Birds of Conservation Concern are identified by the U.S. Fish and Wildlife Service by Bird Conservation Region (USFWS 2002. Birds of Conservation Concern. Div. of Migratory Bird Management http://www.fws.gov/migratorybirds/reports/bcc2002.pdf). The Project area lies within the Sierra Madre Occidental Region. Thirty-nine birds of conservation concern are identified for this region. Under all alternatives, no effects to migratory birds are anticipated.

The closest Important Bird Areas (IBA) identified by the National Audubon Society are the Appleton-Whittell Audubon Research Ranch adjacent to the Post Canyon and Sycamore allotments and the Huachuca Mountains, which include the Miller Canyon

allotment. Activities within the allotments are not expected to affect the status or integrity of either IBA.

Soil Condition

Affected Environment

Soil condition is the ability of the soil to infiltrate water, resist erosion and recycle nutrients. Previously reported soil condition on the allotments (e.g. the 2002 grazing biological opinion, PR 24) is based on General Ecosystem Survey (GES) data published in 1991. GES data are based on a statistical analysis of soil properties such as soil type, slope and precipitation, which provide an estimate of risk, but are not based on site-specific analysis. A Terrestrial Ecosystem Survey has not been conducted on the Forest. Soil condition has been assessed for allotments in the project by the Forest Watershed Program Manager area using data collected during ecological condition monitoring (PR 42). Vegetation monitoring used to determine ecological condition (PR 12-16) indicates that litter is increasing at nearly all monitoring locations and currently meets or exceeds the expected litter cover in over 50% of the plots (when compared to GES estimates for natural litter cover for the units represented on these allotments) and that the percentage of bare ground has decreased since monitoring began. Native perennial plants are present in the community in proportions that indicate that the community is at or near its ecological potential, indicating that soils are retaining their inherent productivity. No areas of active erosion have been identified and scoping did not identify soil condition as a significant concern in the project area. Soils throughout the project are appear to be functioning properly, based on data collected during condition and trend surveys, but there are likely small areas of impaired soils caused by compaction in areas of historic livestock concentration such as waters and fence lines. The proposed action addresses the need to reduce concentration areas by achieving better distribution.

Environmental Consequences

Change in soil condition class is a long-term process with many influences and actual soil condition class is not expected to change significantly within the ten-year analysis period under any of the alternatives. Under Alternative 1, there will be no direct or indirect effects from livestock grazing. Vegetation groundcover would be expected to increase and contribute to satisfactory nutrient cycling and soil structure. Hydrologic function (runoff) would continue to be satisfactory. Areas of compacted soils would benefit from the elimination of hoof impact and increases in vegetation ground cover, but changes would be slow. The improved soil structure would contribute to the functional hydrologic condition. Under Alternative 2, the range improvements identified in the proposed action would not occur, and livestock distribution would remain similar to current conditions. The lack of distribution would maintain areas of historical concentration. Light to moderate utilization and pasture rest or deferment would be expected to contribute to generally suitable trends in soil condition. Under Alternative 3, allowable use levels are expected to provide sufficient residual cover to protect soils and maintain soil condition. Rest and deferment of grazed areas will allow grazed plant recovery, potentially resulting in gains in plant vigor, forage plant frequency, and recruitment. Flexible stocking rates built into the proposed action should allow management to respond proactively to changing resource conditions before problems occur. Fencing and additional watering

locations should improve livestock distribution over time, which will reduce impacts in historic concentration areas. New waters may increase use in historically underused areas and therefore potentially impact the soil conditions in these areas. Best Management Practices (BMPs) included in the proposed action should mitigate potential negative effects.

Upland Vegetation

Affected Environment

Grazing by domestic livestock can impact vegetation by changing the mix of species in the plant community being grazed (vegetation composition), by changing the density and frequency of perennial herbaceous plants (plant frequency), and by changing the vigor of grazed plants. The combined attributes of plant composition, density and vigor are used to estimate the ecological condition and trend of rangeland plant communities. Ecological condition is an evaluation of the status of the vegetation and soil relative to their combined potential to produce a stable biotic community. For the purposes of determining rangeland condition, permanent vegetation transects were evaluated in 2004 and 2005 (PR 12-16).

The project area falls within the Mexican oak-pine woodland and oak savannah land resource unit (41-1AZ). The reference range sites used to describe the potential natural community include limey slopes, loamy upland, shallow hills and sandyloam upland, all in the 16-20 inch precipitation zone.

O'Donnell Allotment. Ecological condition monitoring (PR 12) indicates that the uplands are in fair to excellent ecological condition with stable or upward trends. Some sites are below potential due to the presence of dense manzanita stands.

Post Canyon and Sycamore Allotments. Data collected on permanent monitoring transects in 2004 indicate that most of the uplands are in fair or good condition with stable or upward trends (PR 13). One transect on the Post Canyon allotment indicates poor condition attributed to soil compaction related to historic and prehistoric human occupation of the site and does not appear to be related to grazing impacts.

Sawtelle Allotment. Data collected at three permanent transects indicates that vegetation condition is good with stable trends. On several ridges within the allotment, vegetation is dominated by dense manzanita stands and is considered to be below potential.

U-D Allotment. Data collected at permanent transects in 2004 indicates uplands are in good ecological condition with stable or upward trends (PR 15). On several ridges, vegetation is below potential because of competition with dense manzanita stands.

Miller Canyon Allotment. Data collected in 2004 indicates that uplands are in good condition with stable trend (PR 16)

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 (PR 27, 28, 29, 30) 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.

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.

Alternative 2 - Livestock distribution would be similar to current conditions, even with reduced stocking. The lack of optimal distribution would maintain areas of historical concentration and would make it difficult to achieve light to moderate use across the landscape. Some areas would continue to be used relatively heavily, and others very little. Vegetation condition would remain static.

Alternative 3 – This alternative would provide additional water sources in the uplands of all allotments. Improved livestock distribution would be expected to occur as new water sources are created, thereby reducing use in riparian bottoms and historical concentration areas. 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.

Reduction of dense manzanita stands would increase herbaceous production and improve ecological condition over time. Recovery of these areas should allow for more even cattle distribution across pastures.

Other Environmental Components

Air

Affected Environment

The project area is in a Class II (rural) air quality management area. 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. Forest Plan Standards and Guidelines for air quality state: “All management practices will be planned so that air quality will meet local, State and Federal standards”. Currently, the air quality in the project area is within the standards and guidelines of the Forest Plan.

Environmental Effects

The Arizona Department of Environmental Quality, Air Quality Division reviewed the proposed action and concluded that a General Conformity Determination is not required because the project is not in a Nonattainment or Maintenance area (PR# 49). Activities

resulting from grazing project will not significantly affect the factors contributing to a high quality air shed. Therefore, grazing will not have direct or indirect effects on the air resources in this Class II airshed. Because there are no measurable effects, there will be no cumulative effects to air quality as a result of any of the alternatives considered here.

Special Management Areas

Wild and Scenic Rivers

There are no rivers within the project area that have been determined to be potentially eligible for designation as Wild and Scenic Rivers. Therefore, the proposed action will have no effects to the eligibility or classification of Wild and Scenic Rivers.

Wilderness

Approximately 50% of the Miller Canyon is located within the Miller Peak Wilderness. This portion of the allotment includes higher elevation areas that are considered not capable for grazing because of steep slopes and thick vegetation. In addition, because the primary water is located on the eastern edge of the allotment on the permittee's private land, livestock use tends to concentrate in lower elevations away from the wilderness. Little or no grazing occurs in the wilderness and no changes in this use pattern are anticipated.

Riparian Areas and Stream Channels

Affected Environment

Several drainages in the analysis area support surface flows for short periods after rains or in the spring as a result of snowmelt off of the Huachuca Mountains. Subsurface flow sustains deciduous riparian vegetation in portions of these drainages. A perennial portion of O'Donnell Creek and Freeman Spring, both on the Post Canyon Allotment, are fenced to exclude livestock and protect riparian resources. Substantial portions of the stream channels and adjacent bottomlands in the project area are in private ownership and are not under the management control of the Forest Service.

Riparian condition is based on information gathered at established riparian area monitoring transects between 1987 and 2000 (PR 50, 56). These transects were assessed using the Riparian Area Survey and Evaluation System (RASES) data collection technique. Vegetation and basic stream morphology data were collected at each of the monitoring locations. These data indicate static to upward trends in bank and channel condition. Riparian tree recruitment is occurring (Table 9).

Table 9. Riparian and stream channel condition.

Allotment	Stream Name	Year Data Collected	Tree Species Recruitment[14]	Percent Tree and Shrub Canopy	Vigor	Channel Condition
O'Donnell	Middle	1987	5 of 7	80%	High	Static

[14]Tree Species Recruitment: Species represented by young or seedling age class compared to total species found.

Allotment	Stream Name	Year Data Collected	Tree Species Recruitment[14]	Percent Tree and Shrub Canopy	Vigor	Channel Condition
		2000	6 of 7	59%	Fair	
	Pauline	1987	4 of 7	20%	Moderate	Static to upward
		2000	5 of 6	25%	No data	
	Western	1987	5 of 5	10%	Good	Static
		2000	4 of 5	No data	Low	
Post Canyon	Post	1987	4 of 6	10%	Moderate	Static to Upward
		1999	4 of 5	25%	Good	
Miller Canyon	Miller	1997	9 of 12	80%	Moderate	Static
		1999	2 of 3	40%	Good	

Environmental Effects

Livestock grazing would be discontinued under Alternative 1; however, this would not necessarily preclude livestock use in riparian areas as many riparian areas in the project area are in private ownership. In the absence of uplands for grazing use, grazing use in privately-owned riparian bottoms may increase. Under Alternative 2, livestock use would occur in riparian areas as part of normal livestock rotations through pastures. Because new upland waters would not be authorized, livestock may concentrate in canyon bottoms during warm and dry periods. Intensity and duration of grazing in any pasture would be limited through annual operating instructions. Implementation of Alternative 2 would essentially continue the management already in place. This management does not appear to be resulting in negative effects to riparian channels or vegetation, based on Forest Service monitoring data. Therefore, the status and trends of riparian vegetation and stream channels would not be expected to change. Existing exclosures on O'Donnell Creek and Freeman Spring would be maintained, so the most sensitive riparian resources would not be exposed to grazing.

Under Alternative 3, additional upland waters would draw cattle away from riparian bottoms and reduce grazing pressure in riparian areas. Although livestock use would occur in riparian areas as part of normal rotations through pastures, concentration in riparian bottoms would be expected to be less than under current management or Alternative 2. The static to upward trends in riparian condition that currently exist would continue. Existing exclosures on O'Donnell Creek and Freeman Spring would be maintained and a portion of Post Canyon would be fenced under this alternative, providing for exclusion of the most sensitive riparian areas.

Manzanita treatments proposed under this alternative would be confined to uplands and would have no direct effect on riparian condition. Over time, increases in upland herbaceous cover resulting from brush removal should contribute to improvements in overall watershed condition.

Water Quantity and Quality

Affected Environment

Water Quality. 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. The general classifications used for surface water quality by ADEQ are 1) attaining, 2) impaired and 3) not assessed. Water quality has been partially assessed in upper Miller Canyon, but monitoring data were inconclusive (PR 56, ADEQ 2004[15]). Water quality has not been assessed elsewhere within the project area, but as noted previously, surface water is limited within the project area. No issues related to water quality have been documented in the project area. The project area is not identified as a Unique Water by the State of Arizona.

Water Quantity. The project analysis area is located within three Fifth Code Watersheds: Banning Creek of the Upper San Pedro River (HUC 1505020204), Babocamari River (HUC 15050020205), and the San Rafael Valley of the Upper Santa Cruz River (HUC 1505030101) (Figure 7 and Table 10).

Table 10. Allotments by Fifth Code Watershed.

Allotment	Banning Creek - Upper San Pedro River (1505020204)		Babocamari River (1505020205)		San Rafael Valley-Upper Santa Cruz River (1505030101)		Total
	Acres	Percent	Acres	Percent	Acres	Percent	Acres
Miller Canyon	3478	100%	0	0%	0	0%	3478
O'Donnell	0	0%	7604	100%	15	0%	7619
Post Canyon	0	0%	3408	100%	0	0%	3408
Sawtelle	0	0%	4993	100%	7	0%	5000
Sycamore	0	0%	489	100%	0	0%	489
U-D	0	0%	13	1%	1011	99%	1024
Total	3,478	17%	16507	79%	1033	5%	21018

Environmental Effects

Surface water quality and quantity are affected by hydrologic function, which is the ability of soil to capture, hold and release water. As soil conditions degrade, the time that water sits on the land decreases, resulting in a reduction of the capability to filter soluble solids and sediments. Surface water quantity (runoff) increases due to a compromised hydrologic function and water quality decreases as more sediments are carried in runoff.

Under *Alternative 1* there would be no direct or indirect effects from livestock grazing on canyon bottoms or uplands on the Forest. The potential increase of vegetation groundcover (VGC) would contribute to maintaining an acceptable nutrient cycling and soil structure thereby promoting a satisfactory hydrologic function and reducing runoff potential. VGC also stabilizes the watershed promoting satisfactory water quality by minimizing soil loss and reducing turbidity. Under this alternative, permittees could

[15] Arizona Department of Environmental Quality, 2004. Status of Water Quality in Arizona.

chose to continue grazing on their private lands, which include much of the riparian bottoms in the project area. The effects of this activity, if any, would be dependant on the frequency, intensity, duration and timing of grazing, and would be outside of the control of the Forest Service.

Under *Alternative 2*, management would maintain the existing conditions of the stream channels and vegetation in the canyon bottoms, riparian areas, and uplands. Water quality appears to be satisfactory with current management, and that should continue. Upland waters would not be developed, so livestock would continue to concentrate in the canyon bottoms and around existing water sources. As a result, improvement in water quality would be limited. Grazing on private land in canyon bottoms would be managed under private land permits.

Under *Alternative 3* (Proposed Action), the proposed range improvements including new pasture fencing and additional upland watering locations are designed to improve livestock distribution which will help minimize impacts in historic concentration areas (canyon bottoms). Incremental improvements in water quality are expected. Water quality will increase from the proposed riparian exclosure fencing which will limit use in a sensitive area. Allowable use levels of 30-45% are expected to provide sufficient residual biomass in the uplands to protect and stabilize soils and therefore not contribute to any water quality problems. Stability contributes to satisfactory hydrologic functions and in turn good water quantity. The use of BMPs is expected to minimize or mitigate any potential negative effects from this alternative.

No new above-ground stock ponds are proposed. New upland waters will be supplied using water from existing wells. Typically, the drinkers and troughs will be filled directly from the well or from a storage tank. There may be short-term draw-down on localized aquifers during the filling of new large storage tanks due to the continuous draw from a well and aquifer, but water quantity in the aquifers should not be impacted over the long term. This conclusion is based on the relatively small quantity of water needed to fill and maintain drinkers compared to the overall size of the respective watersheds and the total volume of precipitation recharging the aquifer in the watersheds above each well.

The effects of proposed developments on surface and subsurface water availability was assessed using a model developed by Peter F. Ffolliott at the University of Arizona for oak woodland watersheds (PR 56). The amount of groundwater necessary to supply the needs of the proposed action is less than one percent of the total volume of water annually recharged from precipitation (PR 56). This level of withdrawal is not expected to result in significant effects to the water table. Several dirt stock tanks throughout the project area capture and retain a small portion of overland water flow that occurs during intense summer storms. This overland flow is water that would otherwise flow off of the watersheds and would not affect stream base flow or groundwater recharge. Wells in the project area tap into ground water, which does not contribute to base flow in streams. Based on this, water availability on watersheds in the project area would not be significantly affected by withdrawal or diversion under any of the alternatives.

Heritage Resources

Affected Environment

Heritage resources (also called cultural resources) include archaeological and historical sites, and properties important to maintaining the traditional beliefs and lifeways of local social groups ("traditional cultural properties"). The Huachuca Management Area (EMA) has a long history. Pithouse villages, temporary campsites and petroglyph sites have been recorded in the Patagonia Mountains, Canelo Hills and Huachuca Mountains. Father Eusebio Kino visited native O'odham communities on Babocomari Creek, immediately north of the project area and in the San Pedro and San Rafael Valleys east and west of the project area. By the 1760s, these areas were largely depopulated, coinciding with an increased presence of Western Chiricahua Apaches. After the threat of Apache attacks abated in the late 19th century, a period of intensive resource use ensued. Large numbers of cattle were stocked throughout the area and extensive woodcutting occurred to meet the demands for charcoal in the mines of Bisbee and Tombstone. Many historical sites date from this period.

A heritage resources report prepared for the project (PR 54) identified 15 heritage resource sites within the project area, including seven Native American sites and eight European American sites. There are no impacts known to be occurring on heritage sites within the project area and no sites known to be at risk under current grazing levels.

Environmental Consequences

Concentration of livestock on archaeological and historical sites can result in damage to artifacts and structures, and alteration of the spatial relationships between artifacts. The latter impact can compromise the ability of the remains to provide historical information. Concentration of livestock generally occurs around range improvements. Construction of those improvements can itself damage artifacts or structures, and alter spatial relationships between artifacts.

Archeological surveys were conducted in areas where proposed range improvement would entail ground-disturbing activities. Based on the results of these surveys, no effects to archeological resources were identified for the O'Donnell, U-D and Miller Canyon allotments. Mitigation measures were recommended to avoid effects to one site each on the Post Canyon and Sawtelle allotments. These mitigation features are included in the mitigation section of the proposed action (page 14, above). Provided these mitigation recommendations are followed, the proposed action is predicted to have No Adverse Effect on heritage resources. Clearance was recommended for the project by the Forest Archeologist and State Historic Preservation Office concurrence was received on January 9, 2007 (PR 54). Consultation with Tribes occurred in December 2006.

Economics

The allotments are located in Santa Cruz and Cochise Counties. For Santa Cruz County, tourism, international trade, manufacturing and services are the foundation of the economy, and the entire county is an Enterprise Zone. In 2000, farm and ranch employment accounted for 1.3% of the total employment in the county. The economy of Cochise County tends to be dominated by Fort Huachuca and business associated with

the growing community of Sierra Vista. Tourism and financial services are a growing segment of the economy. Farm and ranch employment is considered an important segment of the economy, but total farm employment accounted for 3.3% of the economy in 2000[16]. Ranching operations in the area tend to be characterized by small profit margins with the need for off-ranch supplemental income to continue operations.

Livestock grazing can potentially affect the following segments:

- The permittees, who contribute funds for the construction of range improvements, pay grazing fees and receive economic returns on their investments in livestock grazing.
- The Forest Service, which collects grazing fees and expends grazing receipts and appropriated tax dollars to construct improvements and to administer the allotments; and
- Counties, which receive 25% of the grazing fees collected by the Federal Government and benefit from goods and services purchased by ranch operators.

The economic considerations of the proposed action and alternatives can be compared in terms of the costs of implementation, the costs and revenues to the permittees and the return to the Federal and local government through grazing permit receipts.

Environmental Effects

Costs and benefits are incurred by both public and private entities (Federal and State governments, counties, permittees) and not all participants recover their costs.

Costs of Improvements. Table 11 summarizes costs by allotment associated with implementation of the proposed action. Range improvement costs are based on data provided by District personnel and are for Alternative 3 only, since Alternatives 1 and 2 would not authorize new improvements. The projects identified are considered beneficial for optimizing management flexibility and improving livestock distribution. However, using the adaptive management strategy described under the proposed action, monitoring may indicate that the projects are not necessary to achieve desired conditions. In that case, the project would not be implemented.

Table 11. Costs of planned improvements for the proposed action.

Allotment	Proposed improvement	Implementation Date (Fiscal Year)	Forest Service Cost	Permittee Contribution
O'Donnell U-D	Pipeline from East Well (U-D) to Canelo Pass.	2009	$1,250 – pipe $5000 – 10K storage	Solar panels, pump, troughs and plumbing, labor.
O'Donnell	Pipeline from Western Well to uplands in West, Canelo and Lower Pauline pastures.	2008	$5000 – 10K storage $7500 – pipe	Pumps, troughs, labor
O,Donnell	Upland waters in upper and lower Pauline pastures.	2009	$5000 – 10K storage $5000 – pipe	Pumps, troughs, labor
Post	Calloway pasture pipeline	2008	$2500 – 5K storage	Trough, labor,

[16] Source: Socioeconomic Assessment of the Coronado National Forest, Final Report, 2005.

Allotment	Proposed improvement	Implementation Date (Fiscal Year)	Forest Service Cost	Permittee Contribution
Canyon			$1250 – pipe	plumbing
Post Canyon, O'Donnell	Post well to Mountain pasture pipeline	2009	$5000 – 10K storage $2500 – pipe	Pumps, troughs, labor
Post Canyon	Fence Forest Boundary – Calloway pasture	2008	$2000 - 0.75 mi fence	Labor
Post Canyon	Hand removal of invading small junpers Cemetary and Mountain pastures	TBD	$0 – fire crew	None
Post Canyon	Fence Welch Spring	2009	$1200 – 0.5 mi. fence Forest Service labor	
Sawtelle	Realign Bull pasture fence to exclude riparian areas in Algerita and Lyle canyons.	2009	$2000 – 0.75 mi. fence	Labor
Sawtelle	Cross fence Mountain pasture	TBD	$3750 – 1.5 mi fence	Labor
Sawtelle	Pipeline from Korn well to Becker pasture.	2008	$5000 – 10K storage $2500 – pipe	Pumps, troughs, labor
Sawtelle	Pipeline from Rogers well to Howell Pasture	2008	$5000 – 10K storage $2500 – pipe	Pumps, troughs, labor
Sawtelle	Pipeline from Canelo allot. To Highway pasture.	2009	$1250 – pipe	Troughs, labor
Total			$61,600	

Alternative 1 would have the lowest cost as no new improvements would be authorized and only limited maintenance would occur. There would, however, still be costs associated with management of the allotments. Maintenance or removal of existing structural improvements may become necessary and costs would be borne by the Forest Service. Allotment boundary fence maintenance would be shifted from the permittees to the Forest Service or adjacent permittees. Alternative 2 would involve no new improvements, but maintenance costs would occur in order to maintain existing structural improvements. These costs would likely be more than alternative 1, but significantly less than Alternative 3. Maintenance of improvements is typically the responsibility of the permittee. Under Alternative 3, the costs of full implementation are estimated to exceed $60,000. Forest Service funding levels may require these projects to be phased in over a number of years, unless permittees are willing to bear an additional share of the costs.

Revenue. Net ranch income represents gross returns minus operating costs. Specific operating costs and revenue estimates are not available for each ranch, and weather, market conditions and management decisions will affect net revenue on an annual basis. However, various economic studies have calculated a net return of $60-$100 per animal unit per year for ranches in Arizona (Heitschmidt 1990, Gao 1996 reported in Ruyle, et al 2000 (PR 51, 52). Using this range of estimates, annual return on the allotments would be below $16,000 under all alternatives. However, this figure may not be reflective of total ranch income because some ranches (e.g. Post Canyon and Sycamore) may include substantial numbers of livestock grazed on non-forest acreage. Estimates of ranch living expenses cited by Ruyle (PR 52) vary from $11,500 to over $20,000 depending on the size of the ranch, so it is likely that the permittees that rely entirely on the Forest

allotment will be dependant on outside sources on income in order to cover living expenses. This is not uncommon; on average Arizona ranches derive about half of their income from outside (non-ranching) sources. The permittees have maintained their operations for many years and have not indicated that the action alternatives are not economically viable.

Payments to Governments. Annual grazing receipts to the Forest Service would vary from zero under no action to approximately $5,710 under maximum allowable use on all allotments under Alternative 2[17]. Of this, twenty five percent would go to Santa Cruz and Cochise Counties. The remaining 75% of fees (an estimated $30-40,000 over the ten year term of the permits) are returned to the Forest Service, but would likely not be sufficient to cover recurring administrative costs or the costs of proposed improvements.

Under the No Action Alternative, the counties would lose grazing fee payments and ranch revenue that could have been used to purchase goods and services. However, given the economic diversity of the counties and the relatively small contribution that these receipts make, the magnitude of this loss would be negligible on the overall county economic health.

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. In the memorandum to heads of departments and agencies that accompanied the Executive Order, the President specifically recognized the importance of procedures under NEPA for identifying and addressing environmental justice concerns. The memorandum 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 on the border of rural Santa Cruz and Cochise Counties. The area is sparsely populated, primarily by ranchers and a few owners of private inholdings surrounded by 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 health. Therefore, disproportionate direct, indirect or cumulative adverse impacts on low income or minority populations would not occur.

[17] Estimates based on the 2006 grazing fee of $1.56/AM. Actual receipts would vary somewhat based on changes in the grazing fee.

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. Past management activities have contributed to changes in ecological conditions in the project area and may continue to influence resource conditions over the term of the project. It is important to note that the proposed action is designed to address and correct the effects of past activities. Foreseeable future actions are those for which a proposed action has been approved or those proposed for NEPA analysis in the future. Other possible future actions are considered too speculative to include in this analysis.

Past grazing. Livestock grazing has occurred within the analysis area for over 100 years. Continuous yearlong livestock grazing, historically at higher numbers than currently permitted, during the early to mid 20th century likely resulted in soil erosion and the removal of much of the herbaceous fine fuels necessary to support fires. Grazing related reduction in fine fuels, combined with active fire suppression beginning in the early 1900's contributed to a decreased fire frequency and subsequent invasion of many grasslands by woody plants. Evidence of woody plant invasion is pronounced in portions of the project area where dense, decadent stands of manzanita are found. Since the 1960's the Forest has reduced numbers and the intensity of grazing and implemented rest or deferred rotation systems in the project area. These management changes have resulted in improvements in resource condition, but the effects of historic use are still evident.

Human activities. Authorized activities in the project area include hiking, hunting, bird watching and vehicle use on unsurfaced roads. Impacts from these activities are short term and primarily consist of minor ground disturbance in popular camping areas. There are no developed campgrounds, nor are there plans for future development. Portions of the area show 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. 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. These activities result in localized disturbance within the project area, but may have a more severe impact on the permittees' ability to control livestock distribution and use. 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.

Since direct and indirect impacts under all alternatives will be insignificant or beneficial, significant cumulative effects are not anticipated.

CONSULTATION AND COORDINATION

The Forest Service consulted the following Federal, State, and local agencies and non-Forest Service groups during the development of this environmental assessment. Complete mailing lists of individuals and groups consulted with are contained in the project record.

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
Arizona State Historic Preservation Office
USDA Natural Resource Conservation Service
USDI Fish and Wildlife Service

OTHERS:

Sky Island Alliance
Chiricahua-Dragoon Conservation Alliance
The Center for Biological Diversity
Forest Guardians
Arizona People for the USA
National Wild Turkey Federation
Huachuca Audubon

ID TEAM MEMBERS/KEY PREPARERS:

Steven L. Gunzel, District Ranger (Retired) and Douglas D. Hardy, District Ranger, Sierra Vista Ranger District	Responsible Official
Rick Gerhart, Team Leader, Supervisor's Office	Writer/Editor, Wildlife
Bill Edwards, Range and Watershed Staff, Sierra Vista Ranger District	Proposed Actions, Vegetation Analysis
Glenn Frederick, Wildlife Biologist, Sierra Vista Ranger District	Wildlife Analyses
Salek Shafiqullah, Hydrologist, Supervisor's Office	Soils, Water, Air, Riparian Analyses, GIS
Robert Lefevre, Forest Watershed Program Manager	Soils analysis
Chris LeBlanc, Archeologist, Supervisor's Office	Heritage Analysis

LIST OF FIGURES