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Environmental Assessment

Whetstone Mountains Allotments Analysis

Benson, Coal Mine, Knear, Mescal, Middle Canyon and Wakefield Allotments

Sierra Vista Ranger District, Coronado National Forest
Pima 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

This Environmental Assessment (EA) describes a Forest Service proposal to authorize grazing on the Benson, Coal Mine, Knear, Mescal, Middle Canyon and Wakefield allotments in the Whetstone Mountains, Sierra Vista Ranger District, Pima and Cochise Counties, Arizona. The EA discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives.

Federal actions such as the authorization of grazing must be analyzed to determine potential environmental consequences pursuant to the *National Environmental Policy Act of 1969* (NEPA) and Section 504 of the *Rescission Act of 1995* (P.L 104-19, 1995). This EA provides a summary of the analysis completed by the Forest Service for grazing authorizations. Supporting documentation is contained in the project administrative record, which is available for public inspection in the Coronado National Forest Supervisor's Office in Tucson, Arizona. Throughout the document, references to supporting documentation are shown in parentheses. For example, a reference "(PR 54)" would indicate that a specific passage in the EA is linked to information contained in document No. 54 in the project administrative record. A complete index to the analysis record contents is contained in the environmental assessment as Appendix A.

The analysis and public involvement summarized in this EA was initially completed in 2007-2008. On August 28, 2008 Sierra Vista District Ranger Annette Chavez (the Responsible Official) signed a Decision Notice and Finding of No Significant Impact (DN/FONSI) authorizing the proposed action (*Alternative 2* of the EA)(PR 67). This decision was appealed on October 20, 2008 by Western Watersheds Project (PR 69). On November 13, 2008, Coronado National Forest Supervisor Jeanine Derby reversed the Responsible Official's decision with instructions to address sensitive species and Management Indicator Species information relating to the presence or absence of species and effects on habitat and populations in the project area (PR 71). In addition, the Appeal Reviewing Officer identified the need to address the effects of the alternatives on Inventoried Roadless Areas (PR 71). The EA has been revised to address these issues that were identified on appeal. Additional public comment on the revised EA was solicited in January 2009 (PR 79, 80). Public comments received as a result of this solicitation have been incorporated into the EA.

Purpose and Need for Action

The Benson, Coal Mine, Knear, Mescal, Middle Canyon and Wakefield allotments (collectively referred to as the Whetstone Mountain allotments) contain lands identified as suitable for domestic livestock grazing in the Coronado National Forest Land and Resource Management Plan (Forest Plan, PR 1). 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 consistent with Forest Service 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. The analysis and authorization are needed here and now because:

- There is a need to formally 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).
- Rangeland vegetation condition is less than desirable in many areas as a result of poor livestock distribution. There is a need for management to be more responsive to decrease the duration and intensity of use in areas with less than satisfactory vegetation condition.
- Additional waters and fences are needed 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 areas with less than satisfactory vegetation condition.
- Permitted use on some allotments exceeds what is considered sustainable. Forest Plan direction to balance permitted use with capacity is not being met.

Existing Conditions

Location and Setting. The approximately 45,000-acre Whetstone Mountains Ecosystem Management Area (EMA) is within the Sierra Vista Ranger District of the Coronado National Forest and located approximately 40 miles southeast of Tucson, in Pima and Cochise Counties near the developing communities of Benson, Sierra Vista, and Sonoita (Figures 1 and 2). The Bureau of Land Management's Las Cienegas National Conservation Area adjoins the EMA on the west side and Kartchner Caverns State Park is located east of the project area, adjacent to the Middle Canyon allotment. The Whetstone Mountains reach their high point of 7,711 feet on Apache Peak, rising from approximately 4,800 feet at their edges. Steep slopes and rough terrain render much of the higher elevations in the project area unsuitable and incapable for grazing. The majority of suitable and capable rangelands are located on gentler terrain at the base of the mountain range[2].

[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 2200. Forest Service objectives and policies for rangeland management are found in FSM 2202 and 2203.

[2] Determination of rangeland capability and suitability involves the designation of areas that can support domestic livestock grazing (capability) along with an evaluation of the appropriateness (suitability) of

Large areas of the Whetstone Mountains are roadless or are accessible only by the poorest of roads. This is due in part to the steep terrain in the central core of the range, and in part to the fact that most access routes cross private lands and have been gated and locked. Currently, NFSR 4011 (Dry Canyon Road), located on the east side of the range, is the only permanent legal access point to the entire Whetstone Mountains EMA.

Vegetation on the allotments includes Southwest Desertscrub and Semidesert Grassland in lower elevation foothills (Figure 3). These grasslands and scrublands are dominated by Lehman lovegrass (*Eragrostis lehmanniana*), an exotic perennial grass widely seeded in the mid-1900s. Above the grasslands, Madrean Evergreen Woodland interspersed with small patches of chaparral covers most of the mountain range. Highest elevations support several small stands of ponderosa pine (*Pinus ponderosa*).

The Whetstone Mountains are a relatively dry range. A few drainages run seasonally in response to precipitation events, but there are no perennial streams in the area. Vegetation associated with stream courses consists of discontinuous patches of small diameter ash, willow and cottonwood. French Joe Canyon is the only area identified as having deciduous riparian vegetation represented by a mixture of evergreen oaks and sycamore, willow, ash and cottonwood. Watersheds on the eastern side drain into the San Pedro River, while those on the western side feed Cienega Creek and thus flow into the Tucson basin.

Current Resource Condition. Rangeland ecological condition data have been collected periodically since the 1950's and most recently in 2004. Indicators of resource condition such as the amount of bare soil and the amount of plant litter show marked improvements from conditions measured in the mid 1960's. Nevertheless, conditions on some portions of the allotments remain less than desirable. Water distribution and availability is poor in most of the allotments, leading to poor livestock distribution and heavy use by livestock in some areas. During dry years, the lack of available water limits the ability of cattle to graze all or portions of the allotments effectively. This is reflected in reduced stocking in recent years, which have been dryer than average. Production and utilization studies were completed in 2004 and 2005 (PR 17). Recent actual use has been within capacity, but there is a need to modify some of the authorizations to reflect the results of recent production and trend studies.

Recent Management. The Whetstone Mountains have been used for grazing since the 1800s. Recent livestock use is shown in Table 1. Numbers on all of the allotments have remained low in recent years due to the effects of drought on forage production and water availability. Current management on each allotment is described below.

The **Benson** allotment consists of three main pastures grazed under a deferred rotation. Two smaller pastures are used as utility pastures, but are not large enough to be included

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livestock grazing in capable areas relative to all other competing resource values and management objectives. The National Forest Management Act requires the identification of the suitability of lands for resource management (16 USC 1604(g)(2)(a)). Grazing suitability is identified in the Forest Plan by Management Area. Capable rangelands are defined as areas under 40% slope and capable of producing 100 pounds per acre per year of dry forage. In addition to broad suitability designations in the Forest Plan, analysis at the project level may identify additional areas (e.g., campgrounds, wetlands, etc.) considered unsuitable for grazing.

in the rotation. Varied topography and limited water availability result in poor distribution on parts of the allotment.

The **Coal Mine** allotment is managed as part of a larger ranch that also includes private and State lease lands. It is used during the winter dormant period and receives growing season rest every summer.

The **Knear** allotment is managed under a six pasture deferred rotation and is grazed year-round. The lack of reliable waters renders some of the pastures un-usable in dry years and has historically resulted in poor distribution.

The **Mescal** allotment is part of a larger ranch comprised of additional State lease and private lands. It is grazed seasonally during the winter and spring. The allotment is divided into two pastures and the herd is gradually moved from west to east throughout the grazing season.

The **Middle Canyon** allotment consists of eight pastures and has been traditionally grazed with two herds under a deferred rotation. Three northern pastures are grazed by a small herd and five southern pastures are grazed by a larger herd. The main management issue on the allotment is the lack of reliable waters in Guindani, Glenn, Starr and Ricketts pastures, resulting in poor livestock distribution and inability to effectively use the entire allotment. A related resource issue is the need to protect water resources in Middle and Guindani canyons, as these canyons are connected hydrologically to Kartchner Caverns.

The **Wakefield** allotment is currently vacant and has not been grazed in several years. Over half of this allotment is not capable of supporting grazing due to steep slopes. On the remainder of the allotment, shallow soils, brushy vegetation, and a lack of reliable water are a concern.

Table 1. Allotment size, stocking and recent use: Benson, Coal Mine, Knear, Mescal, Middle Canyon and Wakefield Allotments. Use is shown in head-months (number of cattle X the number of months grazed) because cattle numbers may vary throughout the grazing season.

	Benson	Coal Mine	Knear	Mescal	Middle Canyon	Wakefield
Total Acres	4,512	2,911	7,255	17,572	6,990	9453
Capable Acres	3,419	2,106	5,486	9,972	3,756	2465
Permitted Use	120 cow/calf	65-75 cow/calf	120 cow/calf	300-800 cow/calf	107 cow/calf	Vacant
Grazing Season	Yearlong	10/1-3/31	Yearlong	11/1-4/30	Yearlong	
Permitted Use: Head Months	1440	390-450	1440	1800-4800	1284	
Authorized Animal Unit Months (AUMs)	1900	515-594	1900	2376-6336	1695	
Recent Actual Use (Head-months)						
Recent Use (HM)						
2000-2001	666	0	1206	2958	509	0
2001-2002	0	0	1098	2931	591	0
2002-2003	1236	0	1099	2384	664	0
2003-2004	280	0	1183	2716	455	0
2004-2005	360	120	502	3136	0	0
2005-2006	600	450	371	3900	191	0

Management Direction

The Coronado Land and Resource Management Plan identifies the following goals for the range, wildlife, soil, water and lands programs on the Forest:

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

The Whetstone Mountain allotments are located in Forest Plan Management Areas 1, 4 and 7 (Figure 4). Management emphasis for these areas is described below.

Management Area (MA) 1 includes steep, rugged lands that are managed for visual resources and semi-primitive dispersed recreation (Forest Plan p. 47). Slopes are generally in excess of 40% and sites included in this management area are generally considered unsuited for livestock grazing. Although livestock are not physically excluded from these areas, range management standards and guidelines call for no assigned permitted use for livestock. Upper elevation ridges and mountain tops are identified as MA1.

Management Area (MA) 4 comprises a majority of the project area. These lands include a variety of vegetation types on lands with slopes of less than 40%. 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). Lower elevation uplands including most capable acreage are included in this management area.

Management Area (MA) 7b includes lands that have been "identified as supporting flora and fauna associations that are unique enough to require special management practices…includes riparian ecotypes." Emphasis is placed on managing these areas to benefit unique wildlife or vegetative species while producing livestock forage and fuelwood on a sustained basis (Forest Plan p. 71). Portions of several drainages are

identified within this management area, including Guindani, Cottonwood, French Joe, Bear, Wakefield and Montosa canyons.

Desired Condition

Based on Forest Plan guidance and site-specific knowledge of the allotments, the following objectives constitute the desired condition for the analysis area. Monitoring methods to be used to determine achievement of each objective are also identified.

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

Proposed Action

The Sierra Vista Ranger District proposes to continue to authorize managed grazing on the Whetstone Mountain allotments. Grazing would be authorized using an adaptive management strategy. Light to moderate grazing intensities and regular growing season

rest or deferment will be used to provide for grazed plant recovery, increased plant vigor and retention of sufficient vegetation to protect soils and to provide herbaceous cover for wildlife. Existing structural range improvements would be maintained and selected new improvements would be built to the degree necessary to maintain or achieve management objectives. The proposed action is described in detail as *Alternative 2* in Chapter 2.

Decision Framework

The Sierra Vista District Ranger is the official responsible for decisions regarding management of the Whetstone Mountain 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, including permitted number of animals, season of use and allowable utilization standards. Decisions may be made separately for each allotment. That is, the District Ranger may decide to authorize grazing on one or more allotments, and not on others, or may select different alternatives for each allotment.

Public Involvement

The proposal has been listed since January 2006 on the Forest's Schedule of Proposed Actions. In January 2006, 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 June 2006 (PR 25). Four comments were received during scoping. Using comments received during scoping (PR 26-29) the Forest refined the list of issues and concerns to address.

In May 2008, a draft of the EA (PR 54, 55) 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* on May 9, 2008 (PR 56). Five comment letters were received in response to this solicitation (PRs 57-61). A summary of these comments and a Forest Service response is contained in the project record at PR 63.

In January 2009, a revised draft of the EA 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* on January 8, 2009 (PR 80). One additional comment was received in response (PR 81).

Issues

The Forest Service categorized and sorted public scoping comments 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[3]. An analysis of the issues and scoping responses is included in the project record as PR 30.

Key Issues

No issues were identified that could not be addressed through mitigation or project design modifications. Therefore, no additional alternatives were developed.

Other Issues

The following issues were used to define the scope of the analysis. Project design features and mitigation measures have been developed to address these other issues.

Wildlife – Continued grazing in the project area could modify 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, watershed and riparian condition – Continued grazing in the project area could affect soil condition, hydrological function and riparian areas. Management of water resources and watersheds on the Forest could influence hydrological function and water quality and quantity in the vicinity of Kartchner Caverns State Park. Effects can be both positive and negative, depending on the timing, intensity, frequency and duration of grazing.

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

Additional environmental considerations in this EA include potential effects to **air quality, heritage (archeological and historical) resources and economics/social resources**. Effects on these resources are evaluated through specialists' reports and consultation with tribes, regulatory and other resource agencies. Design criteria have been incorporated into the proposed action to avoid or minimize effects to these resources.

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

CHAPTER 2 - ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the management of the Whetstone Mountain 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

Continue Current Management

There would be no change in allotment management. As permits expire, new permits would be issued for the classes and numbers of livestock currently permitted. Annual authorized use would continue to be controlled through annual operating instructions. None of the proposed improvements would be implemented, but existing improvements would be maintained. For the purposes of comparison, this alternative assumes management intensity, utilization and distribution patterns similar to the past five years. This alternative was not analyzed in detail because it does not meet the purpose and need to manage resources in a manner that achieves Forest Plan objectives and desired conditions, nor does it formally incorporate adaptive management to allow for sufficient management flexibility.

Alternatives Considered in Detail

Alternative 1: No Action

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

Alternative 2: The Proposed Action

The Forest Service proposed action is to authorize continued livestock grazing on the Benson, Coal Mine, Knear, Middle Canyon and Mescal allotments. Grazing would not be authorized on Wakefield allotment and the allotment would remain vacant. For the five allotments where grazing would be authorized, the proposed action consists of four components – **authorization, improvements, management practices and monitoring** – all of which would be implemented using an adaptive management strategy.

1. Authorization

No livestock use would be authorized on the **Wakefield** allotment. If livestock use is contemplated in the future, any authorization would be subject to additional analysis under NEPA.

On the **Benson, Knear, Middle Canyon, Mescal** and **Coal Mine** allotments grazing would be authorized under the following terms and conditions.

- **Duration, timing and frequency of grazing.** Use on the **Benson, Knear** and **Middle Canyon** allotments would be authorized year-round using rotational grazing (Table 2). Grazing management would be designed to insure that pastures receive periodic growing season rest or deferment in order to provide for grazed plant recovery. The sequence and timing of pasture moves will be based on monitoring of range readiness, ecological condition, forage and water availability and utilization. Use on the **Coal Mine** and **Mescal** allotments would occur during the winter dormant season. These allotments will receive summer growing season rest each year. The timing of entry and exit from the allotments and the sequence and timing of pasture moves will be based on monitoring of range readiness, ecological condition, forage and water availability and utilization.
- **Intensity of grazing.** Forage utilization will be managed at a level corresponding to light to moderate intensity (30-45%)[4] in order to provide for grazed plant recovery, increased plant vigor, and retention of herbaceous litter to protect soils and provide forage and herbaceous cover for wildlife. Consistent patterns of utilization in excess of 45% of key species in key areas would be used as a basis to modify management practices or take administrative actions necessary to reduce utilization in subsequent grazing seasons.

Administrative actions required to implement the proposed action.

Following the NEPA decision to authorize grazing under the terms and conditions identified above, the following administrative actions would occur in order to implement the decision.

- **Permit issuance.** New ten-year term grazing permits would be issued for each allotment in accordance with Forest Service policy (FSM 2231.03) for the numbers and terms displayed below. The term grazing permits will identify the number, kind and class of livestock authorized and the season of use as required by Forest Service policy (FSM 2231.11). Permits will also identify the total animal unit months [5]

[4] Based on review of numerous grazing intensity studies, Holechek (2004, PR 18) 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 et al, 2004)

[5] An animal unit month (AUM) is a measure of the amount of *forage* required by a 1000 lb cow or its equivalent for one month based on a daily allowance of 26 lbs. of dry forage per day (Society for Range Management 1998, USFS 1997). It is not synonymous with animal month (or head-month), which is an

(AUMs) authorized for each permit. The number and class of livestock and the season of use would be allowed to vary in response to resource conditions and management objectives. Resource conditions that would affect management decisions include but not be limited to precipitation, forage production, water availability and previous annual or seasonal utilization levels. Annual use will not exceed the total AUMs authorized or the season of use identified in the permit. Changes will be documented and authorized annually in the annual operating plans. Grazing permits would be issued within 90 days of final agency action following the NEPA decision to authorize grazing [FSH 2209.13(94) and R3 Supplement 2209.13-2007-1].

  - **Benson:** 100 cow/calf pairs or equivalent, yearlong (Up to 1,584 AUMs).
  - **Coal Mine:** 50 cow/calf pairs or equivalent between October 1 and March 31 (up to 396 AUMs).
  - **Knear:** 100 cow/calf pairs or equivalent, yearlong (up to 1,584 AUMs).
  - **Mescal:** 800 cow/calf pairs or equivalent between November 1 and April 30 (up to 6,336 AUMs).
  - **Middle Canyon:** 100 cow/calf pairs or equivalent, yearlong. (up to 1,584 AUMs).
  - **Wakefield:** No permit issued.

- **Allotment Management Plans.** Consistent with Forest Service manual guidance (FSH 2209.13, 94) new allotment management plans (AMPs) would be developed for each allotment and would be incorporated into any term grazing permits issued. The AMPs will specify the goals and objectives of management, management strategies, range improvements and monitoring requirements and will incorporate an adaptive management strategy described below. The use of coordinated resource management plans[6] (CRMPs) will be encouraged where the coordinated use of intermingled private, state and federal lands is conducive to more effective management.
- **Annual Operating Plans.** On an annual basis, the Forest and permittees will jointly prepare annual operating plans, referred to as Annual Operating Instructions (AOI) prior to each grazing year. The AOI will set forth:
- The maximum permissible grazing use authorized on the allotment for the current grazing season and the numbers, class, type of livestock, and timing and duration of use.
- The planned sequence of grazing on the allotment, or the management prescriptions and monitoring that will be used to make changes.
- Structural and non-structural improvements to be constructed, reconstructed, or maintained and who is responsible for these activities.

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expression of one month's *occupancy* of the range by an animal. Forage production can be variable and stocking is determined on an annual basis in response to actual use monitoring.

[6] Coordinated resource management is the process by which various users and agencies cooperate to manage a variety of resources across multiple jurisdictional boundaries, which allows for a landscape level management and involvement of a variety of stakeholders.

- Allowable use or other standards to be applied and followed by the permittee to properly manage livestock.
- Monitoring for the current season that may include, among other things, documentation demonstrating compliance with the terms and conditions in the grazing permit, AMP and AOI.

Proposed permitted use (Table 2) is based on production and utilization data collected in 2004 and 2005 (PR 17) and monitoring of actual use and resource conditions on the allotment over the past 10-15 years (PRs 11-16). Allotment capacities fluctuate from year to year in response to annual forage production, management objectives and management intensity. Annual stocking rates on the allotments are expected to fluctuate in response to these factors.

Table 2. Proposed grazing management and use compared to current use: Whetstone Mountain allotments.

Allotment	Grazing System	Animal Unit Months	Cow/calf equivalent	Change from Current Authorized Use
Benson	5-pasture rest-rotation	1584	100	Change from 120 CYL
Coal Mine	Single pasture, winter seasonal (10/1-3/31)	396	50	Change from 65-75 CYL
Knear	6-pasture rest rotation	1584	100	Change from 120 CYL
Mescal	2-pasture winter seasonal (11/1-4/30)	6336	800	No change
Middle Canyon	8-pasture deferred rotation	1584	100	Change from 107 CYL.
Wakefield	Leave vacant	N/A	N/A	

2. Improvements

The lack of reliable water has been the limiting factor on all of the allotments and several improvements are proposed to rectify this condition and help to achieve desired conditions (Figure 9). These improvements have been proposed in the context of adaptive management, meaning that they have been identified as possible practices to assist in the achievement of desired conditions if management alone is not sufficient. Future monitoring may indicate that some of the projects are not necessary or feasible, in which case they would not be constructed. Current levels of Forest Service funding are unlikely to be sufficient to fund all projects identified. The permittees may need to pursue outside sources of funding or bear a larger portion of the costs in order to complete all projects.

Maintenance of existing improvements will continue as needed. The responsibility for maintenance of range improvements is assigned to the permittee(s) in the terms and conditions of each grazing permit (FSM 2244.03). On an annual basis, responsibilities for repair and maintenance of existing improvements will be identified in the AOIs.

Benson Allotment

1. Trask Well #2 (Alternate locations Dolphin Well or Sabin Well): Drill a well Lower Trask Pasture (Middle Canyon Allotment) that will service Middle Canyon, Benson and possibly Knear Allotments.
2. Rebuild and bentonite SE Tank. Clean out South Tank. (Canary Pasture)

3. Fence North Tank (0.25 mile fence)(Trask Pasture)
4. Cottonwood Spring Storage and Pipeline: Install Storage at Cottonwood. This storage will also serve a pipeline and trough on the Middle Canyon Allotment.
5. Trask Well Pipeline: Construct Pipeline from Trask Well (Pvt or #2) to Dolphin and Canary Storage Tanks. Install troughs in Dolphin, Canary and Trask Pastures
6. Dolphin East Pipeline: Construct pipeline from Dolphin well to east side of Dolphin Pasture and install trough. This will tie in with Sabin Pipeline.
7. Sabin Pipeline: Construct pipeline from Sabin Well to Dolphin Pasture to tie in with Dolphin Well Pipeline.
8. Canary Pasture division Fence: Construct 1.5 miles of fence to split the Canary Pasture.
9. Trask Pasture Division Fence: Construct 1.5 miles of fence to split the Trask Pasture.

Coal Mine Allotment

1. Willow Spring: Extend pipeline from Willow Spring (Wakefield Allotment) to Boice Pasture (Coal Mine Allotment) and install trough.
2. Bear Spring: Fence Spring (0.25 mile). Install spring box pipeline (0.1 mile) and trough.
3. Trick Tanks: Install two trick tanks in upland areas. NW ¼ Section 6, SW ¼ Section 12.

Knear Allotment

1. Mountain Drill Hole Well and Pipeline: An existing well (old test hole). Equiped with solar pump and trough for test purposes. Install pipeline to tie this in with Four Corners Well and Pipeline.
2. Bathtub Well (test drill hole): In Mountain Pasture. Case well (depth currently unknown). Permittee will supply pump and install trough.
3. South Hole Well (test drill hole): Mountain Pasture. Case well (depth currently unknown). Permittee will supply pump and install trough.
4. Four Corners/Haystack Pipeline: install pipeline from Four Corners Well into Haystack Pasture and North Pasture.
5. North Pasture Boundary Fence: Construct 1.5 miles forest boundary fence along the north and west sides of the north Pasture. This pasture is currently contiguous with private lands outside of forest.
6. Middle Wakefield Spring: Locate and develop.

Middle Canyon Allotment

1. Trask Well #2: Drill new well in Lower Trask Pasture that will the Middle Canyon, Benson and if necessary the Knear Allotments.

2. Star Well Redevelopment: Drill a new well in the Star Pasture to service the southern portion of the Middle Canyon Allotment. Install storage and troughs in Middle, Star, Guindani and Glenn Pastures. Completion of this project would be coordinated with Arizona State Parks to insure protection of Kartchner Caverns water resources (see Mitigation Measures, below).
3. Trask Water system. Storage in SE corner of Lower Trask Pasture and install pipeline to Forest Well. Install trough in middle of Pasture. Also run a pipeline to Artesian Well trough.
4. Cottonwood Spring Storage and Pipeline: Install Storage at Cottonwood Spring and install pipeline to northwest 0.75 miles. This storage will also serve an existing pipeline and trough on the Benson Allotment.
5. Ricketts Pipeline: Install pipeline and trough from Ricketts Well to north 0.25 miles.
6. Guindani Drift Fence: Construct 0.3 miles of fence across the mouth of Guindani Canyon in Middle Pasture.

Mescal Allotment

1. Pump water from a mine in upper Mine Canyon to provide upland water to the ridges between Mine Canyon and Christmas Tank Canyon.
2. Pump water from an existing storage at Cottonwood Spring to supplement the existing Cottonwood trick tank and Christmas dirt tank.
3. Re-drill the Dry Canyon Well, and pump water to Upper Dry Canyon trick tank.

3. Management Practices

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

Soil, Water and Vegetation – the objective is to mitigate effects of livestock grazing and facility construction through the use of Best Management Practices (FSH 2509.22) 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.
- Management practices will be used to achieve proper distribution or lessen the impact on sensitive areas. Practices include herding, salting and controlling access

to waters. Salt will be placed on good feed, one quarter to one half mile from waters and salting locations will be moved annually. Placement of liquid or bulk supplements will require prior approval of the District Ranger.

- No hay will be placed on Forest lands in order to minimize the introduction of weed seeds.

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

- All water developments will include wildlife access and escape ramps. Waters will be kept available to wildlife year round.
- All new and reconstructed fencing will be built to Forest Plan standards (Forest Plan, p. 35) to provide for wildlife passage through the fence. At a minimum, this will be a 4-strand fence with smooth bottom wire 16 inches off of the ground and a total height of 42 inches or less.
- Range construction projects will be designed to avoid the destruction of agaves. If impacts to agaves are unavoidable, the Forest will insure that no more than 1% of agaves within 800 meters of a project are impacted. The objective is to avoid impacts to lesser long-nosed bat food resources.
- All proposed range facilities will be 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.
- Within areas meeting the definition of high quality Montezuma 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 36). The objective is to provide herbaceous vegetation as cover for quail and other wildlife.
- Stockpond maintenance and cleaning will be conducted in accordance with the Forest's Stockpond and Aquatic Habitat Management and Maintenance Guidelines for the Chiricahua Leopard Frog (*Rana chiricahuensis*) (PR 41). The objectives are 1) to minimize short-term impacts to frogs while allowing maintenance activities that maintain occupied habitats, and 2) to protect shoreline and emergent vegetation and to improve water quality.

Heritage Resources – The objective is to protect heritage resources (historic and prehistoric sites) from direct or indirect impacts caused by ground-disturbing activities associated with the construction of range facilities and to monitor the effects of cattle grazing on sites to ensure that adverse effects are not occurring. These measures are consistent with the *Standard Protocol for Rangeland Management* developed pursuant to Stipulation IV.A of the *Region 3 First Amended Programmatic Agreement Regarding Historic Property Protection and Responsibilities* (PR 48). In general, these measures include the following:

- All proposed range facilities will be surveyed by qualified personnel for heritage resources prior to any ground-disturbing activities. Facilities will be built or modified to avoid impacts to sites. The following specific measures have been identified for sites that have been surveyed:

  - The Trask pasture division fence (Benson) would be realigned to avoid impacts to site AR03-05-03-406.
  - The Trask Well #2 (Middle Canyon) would be resurveyed prior to ground disturbance to avoid impacts to heritage resources.
  - The Dry Canyon Well to Upper Dry Canyon trick tank pipeline (Mescal) would be located to avoid disturbance to site AR03-05-03-408.
- If unrecorded sites are discovered during the course of project implementation, activities will cease and the Forest or District Archeologist will be notified.
- Range facilities, if needed, will be located so as to avoid concentrations of livestock on identified heritage resource sites.
- No salting will occur within or adjacent to identified heritage sites.
- If impacts from grazing (e.g. excessive trampling, cattle rubbing against and knocking down standing features) are occurring to heritage sites, measures will be taken (e.g. fencing) to protect them.

Groundwater Resources – The objective is to protect hydrological resources that sustain the moisture budget and dependant resources in Kartchner Caverns. The Arizona State Parks Department (ASP) indicated concern with the possible effects to groundwater resources in Middle Canyon that contribute to the maintenance of the moisture budget within Kartchner Caverns (PRs 26, 49, 51, 60).

- No new water withdrawals or diversion would occur in Guindani Canyon.
- In order to determine whether effects are occurring in Middle Canyon, ASP will install groundwater monitoring equipment in the Star Well. Should monitoring indicate that withdrawals from this well are affecting cave resources, the agencies will jointly determine appropriate actions, including restrictions on use or non-use of the well.

4. Monitoring

The objective of monitoring is to determine whether management is being properly implemented and whether the actions are effective at achieving or moving toward desired conditions (see Chapter 1, p. 6).

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

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

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

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

Implementation monitoring will occur on an ongoing basis and will include but not be limited to such things as inspection reports, forage utilization measurements, livestock counts, Grazing Response Index (Reed, et al 1999, PR 78) and facilities inspections. In the Middle Canyon allotment, groundwater monitoring will also occur as described above under Mitigation Measures.

Utilization measurements are made following procedures found in the Interagency Technical Reference[9] and with consideration of the Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands (Smith et al 2007, PR 32). Utilization will be monitored on key forage species, which are perennial grasses that are palatable to livestock. At a minimum monitoring will include use in key areas[10], but may include monitoring outside of key areas. Utilization on non-grass species (forbs, shrubs and trees) may also be measured if appropriate for the site. Utilization may be monitored both during the grazing season (seasonal use) and at the end of the growing season (annual utilization). The 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

Adaptive management uses the documented results of management actions (monitoring) to continually modify management in order to achieve specific objectives, which are identified under *Desired Condition* in Chapter 1. Adaptive management provides the flexibility to adjust livestock numbers and the timing of grazing so that use is consistent with current productivity and is meeting management objectives. Under the adaptive management strategy proposed, the specific number of livestock authorized, specific dates for grazing, class of animal and modifications in pasture rotations may be

[9] 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.

[10] 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.

administratively modified as determined to be necessary and appropriate, based on implementation and effectiveness monitoring. However, such changes will not exceed the limits for timing, intensity, duration and frequency authorized in the NEPA-based analysis and decision. Administrative changes will be documented and implemented in the AOI, AMP and/or the term grazing permit.

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

Future Review of the Decision

In accordance with Forest Service Handbook direction [FSH 1909.15(18) and 2209.13(96)], an interdisciplinary review of the decision will occur within 10 years, or sooner if conditions warrant. If this review indicates that management is meeting standards and achieving desired condition, the initial management activities would be allowed to continue. If monitoring demonstrates that objectives are not being met and management options beyond the scope of the analysis are warranted, or if new information demonstrates significant effects not previously considered, a new proposed action would be developed and 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 4 summarizes the more detailed effects analysis contained in Section 3.

Table 3. Comparison of the Alternatives

Attribute	Alternative 1	Alternative 2
National Forest Policy and Forest Plan (LRMP) Consistency	Consistent with LRMP. Not consistent with policy (FSM 2202.1, 2203.1).	Consistent with LRMP and policy.
Meets Purpose and Need	Does not authorize grazing, but achieves LRMP resource objectives. Complies with Rescission Act. Adaptive management would be precluded.	Authorizes grazing, balances use with capacity and achieves LRMP objectives. Complies with Rescission Act. Provides for adaptive management to respond to changing conditions or to meet management

Attribute	Alternative 1	Alternative 2
		objectives.
Effects on Wildlife and Plants	No Effects as a result of livestock grazing or management.	Effects mitigated through implementation of Forest Plan standards and guidelines, terms and conditions of biological opinions and project-specific mitigation measures.
Effects on soil and watershed condition	No new effects. Conditions remain stable or continue to improve.	Minor effects, but mitigation and adaptive management contribute to continued improvement.
Effects on upland vegetation	No effects. Vegetation moves toward ecological potential over time, but is constrained by Lehman lovegrass invasion.	Minor localized effects. Vegetation moves toward ecological potential, but is constrained by Lehman lovegrass.

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 (effects) of implementing each alternative.

Wildlife

Affected Environment

The Whetstone Mountains lie at the center of the "sky island" region of southwestern North America. The region is noted for its high level of biodiversity, and while many species of wildlife and plants are likely to occur in the Whetstones, the range has not been well studied by biologists.

Threatened, Endangered and Sensitive Species.

Mexican Spotted Owl (*Strix occidentalis lucida*,). The Mexican Spotted Owl (MSO) is found in a variety of habitats consisting of mature montane forest and woodland, shady, wooded canyons and steep rock-walled canyons, sometimes with little tree cover. Habitat in the Whetstone Mountains occurs mostly at higher elevations on cooler, north-facing aspects and is composed primarily of short-stature evergreen oaks (Emory, Mexican blue, gray, netleaf, and silverleaf oak), border piñon and alligator juniper (Duncan and Klay 1994). Surveys for MSO have been conducted at French Joe Canyon, Middle Canyon and Cottonwood Canyon, but the species has only been recorded in French Joe Canyon. A Protected Activity Center (PAC) is located above French Joe Spring. Nesting was inferred in an area of steep cliffs in French Joe Canyon in 2005 and a pair of MSO was again observed in this area in 2006 (G. Frederick, pers. observation). The riparian bottom of French Joe Canyon is easily accessible by livestock. Other portions of the canyon, where the owl is most likely to nest, and the west side canyons are relatively steep and inaccessible to cattle.

Portions of all six allotments are mapped as MSO critical habitat (Figure 10). The largest amount of critical habitat occurs on the Mescal Allotment. Large areas of mapped critical habitat consist of semidesert grassland and oak woodland that do not provide constituent elements necessary to be considered suitable habitat for MSO.

Lesser Long-nosed Bat (*Leptonycteris curasoae yerbabuenae*, LLNB). Suitable day roosts and suitable concentrations of agave plants are the two resources that are crucial for the LLNB. Red Cave, a primary LLNB roost site in the Wakefield allotment, is inaccessible by road and difficult to reach on foot. Abandoned mines are generally more accessible and therefore more vulnerable to human disturbance. Mines between Middle Canyon and Guindani Canyon in the Middle Canyon allotment are important roosts for

the LLNB and other bats. The Lone Star Mine complex is a "large roost" (i.e., a site with 450 or greater bats). In addition to LLNB, Mexican long-tongued bat (*Choeronycteris mexicana*) Townsend's big-eared (*Corynorhinus townsendii*) and cave myotis (*Myotis velifer*) have also been observed exiting from the Lone Star Mine complex.

Jaguar (*Panthera onca*). There are historic records of Jaguar from several mountain ranges in southeastern Arizona, but the species has not been documented in the Whetstone Mountains. Dense woody vegetation that provides potential cover is abundant throughout the project area.

Chiricahua Leopard Frog (*Rana chiricahuensis*). The Chiricahua leopard frog (CLF) requires permanent water and good riparian conditions. Suitable habitat is limited to isolated springs and stock ponds. There are no records of the species from the mountain range and surveys in 1999 did not detect the species (Turner, et al 1999). The Whetstone Mountains are outside of any Management Area established in the Recovery Plan for the species (USFWS 2007).

Forest Service Sensitive Species.

Forest Service Sensitive animals and plants considered for the analysis are shown in Table 4. Sensitive species considered in the original analysis were those found on the Regional Forester's list of sensitive species dated July 21, 1999 (USDA-FS 1999). This list was revised and updated in October 2007 (USDA-FS 2007). In December 2008, a supplemental Biological Evaluation (BE) (PR 74) was prepared to analyze effects to species included in the 2007 list, but not in the 1999 list. These species are identified at the bottom of Table 4. Distribution and habitat requirements for several species are not well documented. 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 and effects have been analyzed accordingly.

Table 4. Forest Service Sensitive Species considered in this analysis.

Species	Evaluation for Analysis
Arizona shrew *Sorex arizonae*	Madrean evergreen woodlands and conifer forests at >5600 ft., usually near perennial or seasonal surface water sources, with dense leaf litter and forest debris. Potential habitat near French Joe Spring. Not detected during surveys in 1993 (PR 46).
American peregrine falcon *Falco peregrinus anatum*	No historic or active eyries are known, although suitable nesting ledges occur at upper elevations. Allotments may be used throughout the year by wintering or migrating birds or by birds from active eyries in the geographic area for hunting. Documented from project area (Mescal allotment). Species is also MIS.
Apache Northern goshawk *Accipiter gentilis apache*	Closed canopied Madrean oak and Mexican pine-oak woodlands. Nest sites generally contain large trees with dense canopies. Woodlands of mixed age classes are used for foraging and post-fledging. Suitable habitat in French Joe, Wild Cow, Death Trap, Schellenberger canyons. Not documented from project area.

Species	Evaluation for Analysis
Lowland leopard frog *Rana yavapaiensis*	Reported from one location on west slope (Turner et al. 1999). They probably occupy the densely overgrown stream from Nogales Spring to its junction with Wakefield Canyon, perennial reaches form Little Nogales Spring to its junction with Wakefield Canyon, and perennial reaches of Wakefield from Silver Spring to below its tributary from Little Nogales Spring.
Western barking frog *Eleutherodactylus cactorum*	Associated with porous outcroppings of rhyolite or limestone in Madrean evergreen woodland. Not documented in project area but suitable habitats present. Species is also MIS.
Giant spotted whiptail *Cnedmidophorus burti stictogrammus*	Occurs in xeroriparian corridors and semidesert grassland. Common on alluvial plain at north end of range (Turner et al. 1999).
Arizona ridge-nosed rattlesnake *Crotalus willardi willardi*	Woodland canyon bottoms and slopes 4600 to 8500 ft. from edges of Madrean oak to above pine forests. Often near water sources in areas with abundant ground cover of perennial grasses, downed trees, rock crevices. Documented from project area (Mescal allotment). Also MIS.
Aryxna giant skipper *Agathymus aryxna* Poling's giant skipper *Agathymus polingi* Ursine giant skipper *Agathymus ursus ursus*	Most colonies found on open hillsides, in grasslands and in rocky canyons with host plant, *Agave palmeri* for *A. aryxna*, *Agave schottii* for *A. polingi* and various species of *Yucca* for *A. Ursus.*
Bartram stonecrop *Graptopetalum bartramii*	Rocky outcrops in shrub live oak-grassland, usually with heavy litter cover and shade, at 3,900 to 6,700 feet elevation. Not documented from project area.
Catalina beardtongue *Penstemon discolor*	Rocky outcrops, pine-oak, oak and manzanita, 4,120-7600'. Not documented from project area.
Huachuca golden aster *Heterotheca rutteri*	Occurs on roadcuts and disturbed sites, 4,500-6,500'. Not documented from project area; suitable habitat present.
Mock pennyroyal *Hedeoma dentatum*	Primary habitat is Madrean evergreen woodland but also found in semidesert grassland communities. Within these communities it can be found on open roadcuts, steep rocky outcrops, and gravelly slopes with open to full sunlight. Documented from project area (Middle Canyon).
Needle-spined pineapple cactus *Echinomastus erectocentrus* var. *erectocentrus*	Occurs on alluvial fans and hills, near disturbed areas, at 3,000-4,500'. Not documented from project area; suitable habitat is found in lower elevations.
Species identified in the October 2007 Regional Foresters Sensitive Species List	
Mexican long-tongued bat *Choeronycteris mexicana*	Feeds on nectar of agaves. Suitable habitats available throughout the project area in the form of mines for roosting and agaves for food. Summer resident only.
Pale townsend's big-eared bat (*Corynorhinus townsendii pallescens*) and other bats.	Roosts in caves and abandoned mines. Widespread in a variety of habitats from desertscrub to coniferous forests. Threats associated with disturbance of roosts.
Plains harvest mouse *Reithrodontomys montanus*	Requires well-developed grasslands. One 1967 record from Cottonwood Canyon.
White-nosed coati *Nasua narica*	Suitable riparian and woodland habitats in project area. Widespread distribution in southern Arizona and south to the tropics.
Northern Gray Hawk *Asturina nitida maximus*	Nests on San Pedro River and Cienega Creek within 10 miles of project area. Suitable habitats (tall dense riparian gallery forests containing cottonwood, willow and mesquite) are not found in the project area. Species is also MIS.

Species	Evaluation for Analysis
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	Nests on San Pedro River and Cienega Creek within 10 miles of project area. Suitable habitats (tall dense riparian gallery forests containing cottonwood, willow and mesquite) are not found in the project area. Federal Candidate species.
Whiskered Screech-owl *Megascops trichopis*	Associated with dense Madrean woodlands. Suitable habitat present but no records from mountain range.
Violet-crowned hummingbird *Amazilia violiceps*	Confirmed nesting in French Joe Canyon (Corman 2005). Mescal allotment.
Lucifer hummingbird *Calothorax lucifer*	Observed in French Joe Canyon (Corman 2005). Nesting not confirmed. Mescal allotment.
Northern Beardless-tyrannulet *Camptostoma imberbe*	Inhabits open riparian woodlands, foothills drainages and wooded dry washes with hackberry and mesquite. Nests in San Pedro River. Suitable habitats found in lower elevation washes in project area.
Abert's towhee *Pipilo aberti*	Common in lowland riparian areas, urban and agricultural settings with thick cover. Nests along San Pedro River.
Varied bunting *Passerina versicolor*	Locally common nester in brushy arid slopes and dry washes. Increasing in AZ, but considered imperiled in NM.
Reticulate Gila monster *Heloderma suspectum*	Rare in the Whetstones. Much of the range is above the elevational limit for the species. Semidesert grassland habitat.
Slevins bunchgrass lizard *Sceloporus slevini*	Rare, documented only from the highest ridges in the range outside of capable range. Found in bunchgrass meadows. Wakefield, Mescal.
Huachuca giant skipper *Agathymus evansi*	Only known from Huachuca Mountains, but suitable habitats present in the Whetstones. Associated with *Agave parryii*.
Arizona coralroot *Hexalectris spicata*	A rare orchid that occurs under oaks. Possibly threatened by collecting. One record from French Joe Canyon (Mescal).
Saiya *Amoreuxia gonzalezii*	Found on rocky limestone hillsides. Suitable habitats present, but not documented from the Whetstones. Plants are palatable to livestock.

Management Indicator Species (MIS).

Forest Plan direction for Management Indicator Species (MIS) is to maintain or improve occupied habitat (PR 1, 31). Forest-wide trends of all MIS have been assessed and are reported in the Forest-wide Status Report for Management Indicator Species (PR 31). The background information and conclusions of this report are incorporated by reference. Six species and the group of cavity nesters were initially considered for the analysis based on their known occurrence or the presence of suitable habitat (Table 5). A description of the selection criteria and in-depth evaluations of project-level impacts are contained in separate reports (PR 34, 75) in the project record.

Table 5. Forest Service Management Indicator Species on the Coronado National Forest. Species considered in the analysis are shown in bold.

Species	Indicator Group	Evaluation for Analysis
Desert Bighorn Sheep	Not a habitat indicator	Outside of the known range of the species.
Pronghorn antelope	Herbaceous cover	Does not occur within analysis area; no suitable habitat
Mt. Graham Red Squirrel	Not a habitat indicator	Outside of the known range of the species.
White-tailed deer	**Diversity Herbaceous cover**	**Occurs within analysis area, primarily above 5,000 feet; widespread suitable habitat. Monitored annually by Arizona Game and Fish Department (AGFD).**

Species	Indicator Group	Evaluation for Analysis
Black bear	**Riparian Diversity**	**Suitable but limited habitats.**
Elegant trogon	Cavity nesters Riparian Diversity	Does not occur in analysis area; no suitable habitat, no records.
Sulphur-bellied flycatcher	Cavity nesters Riparian Diversity	Does not occur in analysis area; no suitable habitat, no records.
Gray hawk	Riparian	Does not occur within analysis area; no suitable habitat. (riparian woodlands with large trees (cottonwoods), usually near mesquite). Recorded from the San Pedro River and Cienega Creek within 10 miles. No suitable habitat corridors exist between these areas and the Whetstone EMA. Also FS Sensitive.
Blue-throated hummingbird	Riparian	Does not occur in analysis area; no suitable habitat, no records.
Rose-throated becard	Riparian	Does not occur within analysis area; no suitable habitat (low elevation cottonwood/willow/sycamore near flowing water)
Thick-billed kingbird	Riparian	Does not occur within analysis area; no suitable habitat (low elevation deciduous woodland)
Northern beardless tyrannulet	**Riparian Dense canopy**	**Suitable vegetation but elevations are above the known range for the species in SE AZ (2200-4600 ft.)**
Bell's vireo	Riparian Dense canopy	Does not occur within analysis area; no suitable habitat, project area is above elevation range of the species.
Buff-breasted flycatcher	**Diversity**	**Single 1994 record in French Joe Canyon during breeding season. Suitable habitat (mostly pinyon stands) is found in the upper portions of some canyons. These sites as well as most of the suitable habitat in French Joe Canyon are relatively inaccessible to livestock.**
Montezuma quail	**Herbaceous cover**	**Indicator for herbaceous cover. "High density habitat" occurs in the upper portions of French Joe and Mine Canyons and almost all of Death Trap, Wild Cow and Schellenberger Canyons. Areas around Bear and Simpson Springs also should be included.**
Merriam's turkey	Diversity	Does not occur in analysis area; no suitable habitat.
Five-striped sparrow	Not a habitat indicator	Outside of the known range of the species.
Peregrine falcon	Not a habitat indicator	No records of individuals or nests; apparently suitable habitat present in project area. Also FS Sensitive.
Baird's sparrow	Herbaceous cover	Non-breeding winter resident in SE AZ...
Gould's turkey	Not a habitat indicator	No suitable habitat.
Primary and secondary cavity nesters	**Cavity Nesters**	**Occur within analysis area; suitable habitat available.**
Desert Massassagua	Herbaceous cover	Outside of the known range of the species.
Twin-spotted rattlesnake	Not a habitat indicator	Outside of the known range of the species.

Species	Indicator Group	Evaluation for Analysis
Arizona ridge-nosed rattlesnake	Not a habitat indicator	Woodland canyon bottoms and slopes 4600 to 8500 ft. from edges of Madrean oak to above pine forests. Often near water sources in areas with abundant ground cover of perennial grasses, downed trees, rock crevices. 3 specimens recorded from a canyon on the Mescal Allotment in the 1990s. Not a habitat indicator.
Sonora tiger salamander	Not a habitat indicator	Outside of the known range of the species.
Tarahumara frog	Not a habitat indicator	Outside of the known range of the species.
Western barking frog	Not a habitat indicator	Porous outcroppings of rhyolite or limestone in Madrean Evergreen Woodland; Turner el al. (1999) failed to locate the species during intensive surveys. Not a habitat indicator and not known to be affected by grazing.
Arizona (Mountain) tree frog	Not a habitat indicator	Outside of the known range of the species.
Mexican stoneroller	Not a habitat indicator	Outside of the known range of the species.
Arizona (Apache) trout	Not a habitat indicator	Does not occur within analysis area; outside of species' range.
Gila topminnow	Not a habitat indicator	Does not occur in the project area; no suitable aquatic habitat. Nearest population is in Cienega Creek approximately 5 miles west of project area and upstream of project area drainages.
Gila chub	Not a habitat indicator	Not documented from project area or in downstream watersheds.
Sonora chub	Not a habitat indicator	Does not occur within analysis area; outside of known range.
Spikedace	Not a habitat indicator	Does not occur within analysis area; outside of known range

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 (USDA 1998, 2002) and in the associated Biological Opinions from the U.S. Fish and Wildlife Service (USDI 1998, 2002). These assessments were based on management practices in place on the allotments at the time. Based on changes in proposed management, updated information on resource conditions and the need to extend the term of the consultation to coincide with the term of the proposed grazing permits, project level consultation was reinitiated for the proposal in 2007 using Guidance Criteria established by the Forest Service and the U.S. Fish and Wildlife Service in 2004 (USDA-FS 2004b) and site specific information on the project area. 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 37). Consultation on the proposal was concluded on October 25, 2008 (PR 64).

Mexican Spotted Owl (MSO). Grazing in spotted owl habitat can affect habitat structure and composition, as well as the availability and diversity of food for the owl (USDI-FWS 1995). Grazing that significantly reduces herbaceous ground cover and increases shrubs and small trees can decrease the potential for beneficial low-intensity ground fires while increasing the potential for destructive high-intensity vertical fires. Excessive grazing in riparian areas can reduce or eliminate important shrub, tree, forb, and grass cover, all of which in some capacity support the owl or its prey. Livestock grazing in protected and restricted owl habitats should be managed for levels that provide the woody and herbaceous vegetation necessary for cover for rodent prey species, the residual biomass that would support prescribed natural and ignited fires that would reduce the risk of catastrophic wildfire in the Forest, and regeneration of riparian trees.

Livestock grazing and livestock management activities are proposed to occur seasonally (November 1through April 30) within protected and restricted habitats on the Mescal allotment. Forage utilization by livestock was measured at two key areas in French Joe Canyon in 2001 and 2005 (PR 11). The upper key area is located within the PAC and the lower key area is below French Joe Spring. Utilization levels were less than 25 percent in the PAC key area and 15-25 percent in the lower key area. French Joe spring is heavily shaded and, while occasionally used by livestock, does not produce forage for livestock. Most livestock use occurs in the lower elevations of the allotment, and on south-facing slopes outside of protected and restricted habitats. The proposed action would continue current management. Based on monitoring to date, current management appears to have no adverse effect on MSO. Grazing use is light and occurs outside of the MSO nesting season. Based on this, the Forest has determined that the proposed action *may affect, but is not likely to adversely affect* the MSO on the Mescal allotment and will have *no effect* to MSO on the Benson, Coal Mine, Knear, Middle Canyon and Wakefield allotments.

The effects of ongoing livestock grazing on **MSO critical habitat** were evaluated in 2004 (PR 40) and were determined to be *not likely to adversely affect* critical habitat because management provides for recruitment of vegetation to provide rodent prey cover and reduce the risk of catastrophic wildfires. This determination has not changed based on site-specific analysis.

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

Use of agave stalks by livestock was measured in an agave stand near the mouth of French Joe Canyon in 1995 (Forest Service files). The stand had been partially burned in a 1987 prescribed burn. Based on the age class distribution, the stand appeared to be healthy and responding more to the past fire than to livestock grazing. Livestock impacts were also noted for agaves near Mescal Spring, an area that receives heavy use by livestock in some years. In 1995, the area received over 70 percent use. This level of use was negatively affecting agave vigor (T. Deeken, USFS Ret., personal observation).

Under *Alternative 1*, no effects are anticipated as livestock will be removed from the allotments and agaves will not be exposed to grazing. Herbivory on bolting agaves by native wildlife would continue. Under *Alternative 2*, grazing on the Coal Mine and Mescal allotments would be limited to the winter season. Cattle would not be on these allotments during the agave bolting season. The Wakefield allotment would remain vacant. Thus approximately 65% of the project area would not be grazed during the agave bolting season. The other allotments (Benson, Knear and Middle Canyon) would be permitted year-long. 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 duration of exposure would be short and grazing intensity would be light to moderate (30-45%). Moreover, grazing is often deferred during the April-June period because water is often limited during this driest part of the year. If grazing occurs during the bolting period, the effects of livestock herbivory on agaves are likely to be discernable only within .75 mile of the few available waters. Over time, the construction of new waters is expected to increase year-long water (and pasture) reliability, potentially increasing bolting season use. Mitigation is in place to avoid or minimize the destruction of agaves as a result of construction activities. No effects to known roosts are anticipated. Red Cave is on a steep slope (>35 percent) on the vacant Wakefield allotment and the Lone Star Mine is protected by an 8-foot-tall chain-link fence (although nearby unfenced adits are also used by LLB). Based on this, the Forest has determined that the proposed action *may affect, but is not likely to adversely affect* the lesser long-nosed bat on the Benson, Knear, Middle Canyon, Coal Mine and Mescal allotments.

Chiricahua Leopard Frog (*Rana chiricahuensis,* CLF). The 2002 consultation arrived at a determination that ongoing grazing *may affect, not likely to adversely affect* the CLF on all six allotments based on the presence of apparently suitable habitat (i.e., stock tanks and springs) within the historic range of the species. However, there are no records for CLF from the Whetstone Mountains (Turner et al. 1999). The nearest known populations occur in the Bureau of Land Management's (BLM) Las Cienegas National Conservation Area (Empire Cienega/Cienega Creek), approximately 3-5 miles west of the Wakefield, Coal Mine and Mescal allotments. Lowland leopard frogs (*Rana yavapaiensis*) also occur on BLM land at Nogales Spring adjacent to the Wakefield allotment (Turner et al. 1999). Several areas in the Whetstone Mountains appear capable of supporting CLF, including Montosa Canyon, Simpson Spring, Guindani Canyon, and French Joe Canyon. These areas may have held leopard frog populations in the past and lost them due to episodes of severe drought, abetted in the case of Montosa Canyon by an intense fire (Turner et al. 1999). There also exists the remote possibility that CLF occupy one or more isolated sites in the project area that have gone undetected due to their small population size.

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 41). 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 much of the project area and are not thought to be contributing adverse effects to CLF habitats. Where vegetation and soil conditions are less than desirable in areas of historic livestock use, actions are proposed to reduce livestock impacts. The proposed action would fence at least a portion of lower Bear Spring and the fence around Simpson Spring would be rebuilt. Wakefield allotment would remain vacant. Based on this, the Forest determined that the proposed action *may affect, not likely to adversely affect* for all six allotments.

Sensitive Species

All of the sensitive species identified in Table 6 may occur within or near the proposed project area. Occurrence has not been confirmed for several species, but the species are included in the analysis because 1) potentially suitable habitat exists, 2) the analysis area is within the range of the species, and/or 3) it is currently unclear what comprises their preferred habitats. A more detailed analysis found in the Biological Evaluations (PRs 38, 74) is summarized below.

The proposed action is anticipated to have *no impact* on the following species.

- **Arizona shrew** – Suitable habitats are limited to French Joe Canyon. Surveys in suitable habitats in French Joe Canyon (PR 46) did not detect the species and it is unlikely to occur elsewhere in the Whetstone EMA due to the lack of suitable habitat.
- **Allen's lappet-browed bat, Townsend's big-eared bat, Greater western mastiff bat, Western yellow bat.** Populations of the four species of bats potentially occurring in the project area are affected primarily by disturbance or destruction of roost sites, which are primarily caves, crevices, abandoned mines or, in the case of the western yellow bat, riparian trees. Bat roosts are found in the project area, but these are not affected by grazing. The proposed action includes mitigation that would avoid disturbance of bat roosts. Grazing in riparian areas would not be of sufficient intensity or duration to alter the composition or recruitment of mature riparian trees where they occur.
- **White-nosed coati.** This species is common in oak woodlands and riparian habitats throughout the Forest, including the Whetstone EMA. The species is considered imperiled in New Mexico, but is relatively abundant and well distributed in Arizona. Identified threats include indiscriminate killing and predator control. The Arizona Game and Fish Department restricts the take of this species through an annual bag limit. No predator control is proposed as part of the proposed action. Managed grazing does not affect woodland habitats for this species.
- **Plains harvest mouse**. There is a single record for the species from the northern edge of the project area. The species is found throughout the Great Plains into southern Arizona. In Arizona, the species live in xeric conditions (sandy soils), often where there is mesquite, creosote bush, tumbleweeds, some grass, and usually in desertscrub

or chaparral (Hoffmeister 1986). Suitable habitats are very limited in the Whetstone EMA, but are more common in foothill bajadas and grasslands off the Forest.

- **American Peregrine Falcon** – There are no eyries in the project area, so disturbance impacts would be precluded.
- **Apache Northern Goshawk** - The species has not been recorded in the Whetstones and is unlikely to occur in the planning area. Potential habitat is strictly limited to higher elevations of major drainages where grazing impacts are negligible.
- **Northern Gray Hawk.** This species nests almost exclusively in dense lowland riparian woodlands dominated by tall cottonwood, willow and sycamore. Suitable habitats are found on the San Pedro River 10 miles east of the project area and in Cienega Creek five miles west of the area. Suitable habitats are not found in the Whetstone Mountains and there are no records of the species from the Whetstone EMA (Corman and Wise-Gervais 2005). Riparian monitoring conducted by the Forest in 1987 and 2000 did not record large trees or contiguous stands of riparian vegetation sufficient to provide nesting habitat. Riparian vegetation in the project area consists of isolated patches and stringers of small diameter ash, willow, cottonwood and hackberry. The seasonally dry washes connecting the project are with the San Pedro River and Cienega Creek do not provide suitable habitat or migration corridors for the Gray Hawk.
- **Northern Beardless-tyrannulet.** This small flycatcher is fairly common in riparian deciduous forest and woodlands composed of willow, cottonwood, mesquite, and canyon hackberry; less common in mesquite scrublands and in sycamore –live oak– mesquite associations (Taylor 1995). This vegetation is found only along the lower 0.75 miles of French Joe Canyon (PRs 42, 45). Light to moderate intensity (30-45%) dormant season grazing would not likely result in measurable effects to the composition and structure of woody riparian vegetation.
- **Western Yellow-billed Cuckoo.** Habitat preferences for this species are similar to those of the Gray Hawk. There are no records of the species in the project area and the area does not contain suitable habitat.
- **Whiskered Screech-owl.** This is a Mexican and Central American species typically found in habitats containing extensive stands of Madrean evergreen oaks. There are no records from the project area, but limited suitable habitats are available. The proposed action would not affect the density or distribution of woodland habitats.
- **Violet-crowned Hummingbird and Lucifer Hummingbird.** There is one nesting record for the Violet-crowned hummingbird from French Joe Canyon in the Mescal allotment. The Lucifer Hummingbird has been observed in French Joe Canyon, but nesting has not been confirmed (Corman and Wise-Gervais 2005). Grazing on the Mescal allotment will occur in the winter, outside of the nesting season for these two species. The proposed action will not affect the tree and shrub canopy preferred by the hummingbirds for nesting.
- **Abert's Towhee.** This species is widely distributed throughout southern Arizona, nesting in dense vegetation ranging from riparian thickets to suburban back yards

(Corman 2006). The species' range is restricted almost entirely to Arizona. Towhees tend to prefer native dense riparian habitat, but adapt readily to agricultural and urban settings, provided sufficient cover is present. Suitable habitats are abundant in the project area. The proposed action should not affect the density or distribution of woody vegetation preferred by this species. It appears tolerate disturbance, as evidenced by its ability to nest in urban and agricultural settings.

- **Varied Bunting.** These birds typically inhabit brush arid slopes and canyons, nesting in mesquite, hackberry and other low trees. Varied Buntings appear to be increasing in distribution and abundance in Arizona (Corman and Wise-Gervais 2005). There are no nesting records from the project area, but it is a regular nester along the upper San Pedro River and in canyons of nearby mountain ranges. The proposed action would not change the amount or distribution of trees used for nesting.
- **Western barking frog** - 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.
- **Lowland leopard frog** – The species has not been detected on the Forest, but is found downstream in lower Wakefield Canyon on BLM property. The Wakefield allotment would remain vacant, so downstream effects to this population would be precluded.
- **Reticulate gila monster.** This subspecies is found in desertscrub habitats, desert grasslands and the lower reaches of Madrean evergreen woodlands. The species is threatened by over-collection and loss of habitat near urban areas like Tucson, but populations and habitats in remote locations like the Whetstone Mountains are secure. Livestock grazing is not known to be a threat. The species spends the majority of the year underground where it is not affected by surface activities.
- **Huachuca giant skipper.** This species is known only from the Huachuca Mountains. It feeds on *Agave parryi,* which is widespread in southeastern Arizona. Cattle do typically not eat agave leaves and mitigation in place for the LLNB should maintain existing agaves in place.
- **Arizona giant skipper**, **Poling's giant skipper, and Ursine giant skipper** – Possible effects from livestock grazing include the removal or disturbance of food plants. The butterflies and their host plant are widespread in southeastern Arizona. Cattle do typically not eat agave leaves and mitigation in place for the LLNB should maintain existing agaves in place.
- **Catalina beardtongue *(Penstemon discolor).*** This perennial herbaceous shrub grows on bare soil, cliff faces and rock outcrops in chaparral and pine-oak woodland at elevations between 4,000 and 7,600 feet. There are no records from the Whetstone Mountains. This plant is an early colonizer, often occupying disturbed areas. It is unlikely that any populations, if they occur, would be accessible to grazing cattle.

For the following species, the proposed action *may impact individuals, but would not result in a trend toward federal listing or a loss of viability*. Detailed surveys to determine presence or absence on the allotments and life history studies to determine specific habitat needs are, in many cases, lacking. Where impacts are anticipated, these

are expected to be short term and minor, limited mainly to disturbance or damage to individuals.

- **Mexican long-tongued bat.** The Mexican long-tongued bat is an agave nectar-feeding bat that is ecologically similar to the endangered lesser long-nosed bat. They are found in mesic areas of canyons of mixed oak-conifer forests and most records are from over 4,000 feet elevation. Caves and abandoned mines are favored as roosts. Population trends are unknown (AGFD 2006). Threats include recreational caving, mining, mine reclamation and loss of riparian habitat. The proposed action includes mitigation that would avoid disturbance of bat roosts. Therefore, the proposed action would not affect caves or mines. Activities that remove significant numbers of agaves could affect the bat's food source. Studies of the effects of livestock grazing on agaves are inconclusive (see Lesser long-nosed bat, above). Mitigation in place for the LLNB should minimize effects to existing agaves. Based on the likelihood that grazing may affect agaves in localized areas, the proposed action *may impact individuals, but is unlikely to result in a trend toward federal listing or a loss of viability.*
- **Arizona ridge-nosed rattlesnake.** The species is found in broadleaf evergreen woodland, deciduous and evergreen riparian and mixed coniferous forest in leaf litter, rock crevices and bunchgrasses. There are three records from a canyon on the Mescal Allotment. The loss of cover could affect the species and potentially its prey base. Grazing at light to moderate levels as proposed is unlikely to significantly reduce cover. Direct effects potentially include disturbance of individuals during range construction projects or trampling by livestock, which is considered unlikely.
- **Giant spotted whiptail.** This subspecies of whiptail lizard inhabits dense shrubby vegetation and bunch grasses, often among rocks near permanent and intermittent streams. This lizard can be locally abundant. The loss of cover could affect the species and potentially its prey base. However, grazing as proposed is unlikely to significantly reduce cover. Direct effects potentially include disturbance of individuals during range construction projects or trampling by livestock, which is considered unlikely.
- **Slevins bunchgrass lizard.** This lizard is found in several mountain ranges in southeastern Arizona, including the Whetstone range, mainly above 6,000 feet elevation in sunny patches of bunchgrass in open coniferous forests. All known locations in the Whetstones are high elevation sites where grazing does not occur. Grazing as proposed would result in minor modification of bunchgrass communities, but light to moderate utilization and regular growing season rest would allow for retention of herbaceous bunchgrasses. Based on the limited potential for grazing in known habitats, there is a low potential for effects.
- **Bartram stonecrop (*Graptopetalum bartramii*).** The species has not been recorded in the Whetstone Mountains, although potential habitat occurs in the higher elevations of major drainages. Plants may be susceptible to trampling by livestock. However these impacts would be unlikely to occur with the level of utilization under the proposed action.

- **Huachuca golden aster (*Heterotheca rutteri*).** Potential habitat occurs in the project area but the species has not been recorded on the allotments. The species may be susceptible to trampling by livestock. However, the species appears to tolerate some disturbance, as it grows adjacent to roadways. It is also found in areas that historically have burned at a high frequency.
- **Mock pennyroyal (*Hedeoma dentatum*).** The total range of the species is southeastern Arizona and northern Sonora, Mexico. It is documented from numerous sites on nearly every EMA on the Forest. There is one record for the species on the Middle Canyon allotment. 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.
- **Needle-spined pineapple cactus (*Echinomastus erectocentrus* var. *erectocentrus*).** Potential habitat occurs on alluvial fans on all of the allotments. Primary threats are collection for cactus trade. There is some potential for the species to be trampled by cattle or disturbed during range construction projects but this is considered unlikely.
- **Arizona coralroot (*Hexalectris spicata*).** This orchid is rare and sporadic throughout its range, mostly growing under oaks. There is one record from French Joe Canyon on the Mescal allotment. Threats include collection by hobbyists. The plant's response to disturbance is unknown. The known site is on the Mescal allotment, which is not grazed during the summer when the plant is actively growing. Some trampling of dormant plants may occur during the spring when cattle are in French Joe Canyon.
- **Saiya (*Amoreuxia gonzalezii*).** This herbaceous perennial plant grows on limestone outcrops and fine granitic soil. Only one population is known from the Santa Rita Mountains. Soils are suitable in the Whetstone Mountains and the area has not been extensively surveyed. Populations are generally found below 4,600 feet in elevation. The lowest elevations in the project area are approximately 4,600 feet, so the project area may be largely above the elevational range of the species. If the species occurs in the Whetstone EMA, individual plants could be grazed.

Management Indicator Species

Effects of the proposed action and alternatives are evaluated in the project-level analysis (PR 34, 75) and are summarized below. For all Management Indicator Species considered, the alternatives are not expected to cause a detectable change in species population trends or a loss of occupied habitat.

Cavity Nesters. Habitat for cavity nesters (mature trees and snags) is widespread across the Forest and is estimated to be increasing as a result of several large fires and insect infestations that have killed thousands of trees over the past decade. Grazing-related activities in the project area would affect cavity nesters only if they are of sufficient scale and intensity to change the rate of regeneration of cavity bearing trees. No removal of trees is proposed and existing riparian protection measures should maintain cavity bearing trees.

White-tailed deer. Coues white-tailed deer is included in the *Species Needing Diversity*, *Species Needing Herbaceous Cover*, and *Game Species* indicator groups. The species seems to favor rugged and steep slopes of the mountains but are also found in lower

desert areas. 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 48,700 acres) is considered suitable habitat and represents 4.4 percent of the total occupied habitat on the Forest. The project area is within Game Management Unit 34B. According to Arizona Game and Fish survey and harvest data (PR 31), fawn survival has been slightly above average over the past two years and harvest trends have been stable.

Heavy grazing may reduce fawn survival and recruitment by eliminating hiding cover. Overuse of available grass forage may also lead to increased livestock use of browse plants and forbs used by deer. However, grazing as proposed would not be of sufficient intensity or duration to affect large scale reductions in cover or result in competition. Rotation grazing systems and utilization limits should assure retention of sufficient herbaceous cover. Moreover, steep slopes throughout much of the analysis area restrict the movement of livestock into many areas that are readily used by white-tailed deer. Water developments proposed would likely be used by whitetail deer and may result in changes in seasonal distribution. New waters are unlikely to have significant effects on deer population trends. Neither alternative would cause a detectable change in population trends or a loss of occupied habitats for white-tailed deer.

Montezuma (Mearns') Quail. Montezuma quail is included in the *Species Needing Herbaceous Cover, Game Species*, and *Special Interest Species* indicator groups. The Forest Plan identified 225,410 acres of occupied habitat within several vegetation types. This species is identified as a priority bird species in the Arizona Partners in Flight Bird Conservation Plan (Latta, et al 1999). The Arizona Game and Fish Department identifies the Whetstone Mountains as both primary and secondary range. Overgrazing, especially during the growing season 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. The majority of the project area is identified as primary range or secondary range Montezuma Quail habitat by the AGFD (PR 35). Within this area many sites are not suitable as quail habitat because adequate overstory (tree) canopy is lacking. Forest Plan and Forest Service Manual (FSM 2631.1, PR 36) guidance limits grazing utilization to 45% with 35-40% as the target in high density Montezuma Quail habitat areas. Throughout the Forest, the amount of potential habitat has not changed significantly since 1986, but habitat suitability has likely improved as a result of improved livestock management over the past two decades.

Alternative 1 (*No Action/No Grazing*) would maximize the amount of residual herbaceous cover that provides Montezuma quail habitat within the analysis area and would be expected to meet Forest Plan standards and guidelines for the quail. 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 optimum for Montezuma quail. In addition, Montezuma quail populations are highly correlated to the amount and timing of summer precipitation and its effect on food and cover resources. Intuitively, elimination of grazing would increase residual herbaceous cover for quail, but without sufficient precipitation the effects of grazing changes alone on long-term trends for quail populations are difficult to predict. Light to moderate utilization and adequate pasture rest proposed under *Alternative 2* should maintain or increase grass plant production and

herbaceous cover. Design features that provides for suitable stubble height will be used to maintain cover. During years of poor grass production, even light grazing may reduce grass height necessary for quail cover. The adaptive management strategy proposed should allow for responsive changes in grazing use in order to minimize effects to quail cover. Neither of the alternatives is likely to cause a detectable change in Montezuma' quail populations or a loss of occupied habitat.

Black Bear. 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. Because of the "sky island" nature of the CNF, black bear populations tend to be isolated from each other by wide expanses of non-suitable habitat between the mountain ranges. Some movement between ranges is known to occur, but is not common. Forage consists of a variety of items including juniper berries, acorns, grapes, raspberries, manzanita berries, carrion, and prickly pear fruit. Individual home ranges may vary from 7 to 50 miles. The Forest Plan identified 641,113 acres of occupied habitat in all vegetation types except plains grassland and dry desert riparian. Black bears potentially occur in low densities throughout all of the allotments.

Black bear populations are highly correlated to annual precipitation and its effect on the production of preferred foods. Neither of the alternatives would have any effect on mast production. Grass has been shown to be an important component of bear diets in the spring (April-June), which may force both bears and livestock to use the same areas to meet nutritional requirements. Given the moderate use levels 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 either of the alternatives is not expected to cause a detectable change in black bear populations or a loss of occupied habitat.

Buff-breasted Flycatcher. Habitats on the Forest are at the extreme northern edge of this species' range and the species is found on the Forest only during the March-September breeding season. Habitat often includes an open under story of grasses and small trees or burned forest with patches of living pines (Latta et al. 1999). The Forest Plan identified 90 acres of occupied mixed conifer habitat for the Coronado National Forest located in the Huachuca Mountains. Populations of buff-breasted flycatcher appear to be influenced by events such as fire that create or maintain an open grass understory in the bird's pine-oak woodland habitat.

There is a single 1994 record of the species in French Joe Canyon. Suitable habitat (mostly pinyon stands) is found in the upper portions of canyons in the Mescal, Coal Mine and Wakefield allotments. These sites as well as most of the suitable habitat in French Joe Canyon are relatively inaccessible to livestock. Under the proposed action, the Wakefield allotment would not be grazed and grazing on the Mescal and Coal Mine allotments would be restricted to the winter months outside of the species nesting season.

Based on this information, the implementation of either of the alternatives would have no effect on occupied habitats for buff-breasted flycatcher and would not contribute significantly to changes in Forest-wide populations for the species.

Northern Beardless-tyrannulet. See discussion under Sensitive Species, above. Occupied habitats have not been identified in the project area and neither alternative would alter the structure or extent of suitable habitats. Based on this, neither alternative would be expected to cause a detectable change in Northern Beardless-tyrannulet populations or a loss of occupied habitat.

Neotropical Migratory Birds and Important Bird Areas

Executive Order 13186 (January 10, 2001) directs Federal agencies to support migratory bird conservation and to "ensure that environmental analyses of Federal actions required by the NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern". Advice from the Forest Service Southwestern Regional Office is to analyze effects in the following manner: (1) effects to Species of Concern listed in the Arizona Partners in Flight Bird Conservation Plan; (2) effects to Important Bird Areas (IBAs) identified by the National Audubon Society; and (3) effects to important overwintering areas.

Species of Concern. The Arizona State Partners in Flight Bird Conservation Plan (Latta 1999) lists priority bird species of concern by vegetation type. Species that potentially occur in the project area are shown in Table 6 by habitat type. Proposed light to moderate grazing intensities and regular growing season rest are predicted to maintain habitat quality for all species listed in Table 6.

Table 6. Summary of effects of the proposed action on migratory bird species of concern and habitat types in the project area.

Species	Habitat Type	Habitat Description	Effects
Eastern (Azure) Bluebird	Madrean Pine-Oak Woodland	Mixed oak and pines with open canopy and herbaceous understory. Cavity nester.	Light seasonal grazing should maintain herbaceous understory. Proposed action will not change the distribution of mature cavity-producing trees.
Montezuma (Mearns') Quail	Madrean Pine-Oak Woodland	Oak canopy of greater than 20% with understory of perennial grass greater than 6".	Light seasonal grazing will retain herbaceous understory. (See MIS analysis).
Band-tailed Pigeon	Madrean Pine-Oak Woodland	Mixture of acorn-producing trees and a shrubby component.	No actions are proposed that would change the abundance or distribution of oaks.
Mexican Spotted Owl	Madrean Pine-Oak Woodland	Mature pine-oak stands with high stem and canopy density and downed woody material.	No actions would modify habitat structure or create disturbance (see discussion above).
Buff-breasted Flycatcher	Madrean Pine-Oak Woodland	open under story of grasses and small trees or burned forest with patches of living pines.	No effects (see discussion under MIS, above).
Botteri's Sparrow	Desert Grassland	Sacaton bottoms bordered by grassy hillsides. Also upland grasslands with mesquite and acacia. Best habitats are off the Forest in the Sonoita grasslands.	The species is tolerant of moderate cattle grazing. Light seasonal grazing should maintain herbaceous understory.

Species	Habitat Type	Habitat Description	Effects
Cassisn's Sparrow	Desert Grassland	Tall native grassland with scattered woody shrubs. Less abundant in grasslands dominated by exotic lovegrass.	Light seasonal grazing should maintain herbaceous understory. The extensive presence of Lehmann lovegrass may impact abundance.
Grasshopper Sparrow	Desert Grassland	Large expanses of intermediate height grasses with few shrubs.	The species is tolerant of moderate cattle grazing. Light seasonal grazing should maintain herbaceous understory.
Baird's Sparrow	Desert Grassland	Non-breeding winter resident. Prefers ungrazed or lightly grazed mid-grasses. Best habitats are off-Forest in the Sonoita grasslands.	Light to moderate seasonal grazing should maintain preferred habitats.
Lucy's Warbler	Riparian	Nests in dense xero-riparian washes and mesquite bosques.	Management should retain existing levels of riparian vegetation.

Important Bird Areas. No Important Bird Areas are found in the project area. The closest identified IBA is the San Pedro River east of the Whetstone Mountains. The proposed action will have no effect on the status or characteristics of the San Pedro IBA.

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

Soil and Watershed Condition

Affected Environment

The geology underlying the Whetstone Mountains is highly diverse. In general, the north end of the range is dominated by granites while the middle and southern ends of the range are composed of sedimentary limestones and sandstones. As a consequence, soils in the project area are also quite diverse.

Soil condition field monitoring was completed in 2007 using Forest Service Handbook protocols. Field data collection consisted of visiting key areas, monitoring transects and other generally representative areas. Soil quality is evaluated based on an interpretation of factors that affect three interrelated primary soil functions: soil stability, soil hydrology and nutrient cycling. Livestock grazing may impact soil function by compacting the soil surface, removing plant material or changing the plant community composition, thereby affecting hydrologic function, soil stability and nutrient cycling. Watershed condition is based on percent of ground with effective cover present. Effective ground cover is rock, plants, or plant material that is capable of continuously intercepting falling raindrops and dissipating their potential erosive energy before they encounter bare soil. Approximately 99% of the project area is in satisfactory soil condition (Table 7 and Figure 8). Two areas comprising a total of 226 acres in the Mescal allotment are considered impaired due to poor ground cover, soil compaction and the loss of the A-horizon through erosion. These areas are vulnerable to further degredation, but have not lost their inherent productivity and can be improved through changes in management.

Table 7. Soil condition ratings by allotment on the Whetstone Mountains allotments.

Allotment	Satisfactory Soil Condition		Impaired Soil Condition		Unsatisfactory Soil Condition		Total
	Acres	Percent	Acres	Percent	Acres	Percent	Acres
Benson	3,941	100					3,941
Coal Mine	2,926	100					2,926
Knear	7,255	100					7,255
Mescal	17,345	98.7	226	1.3			17,571
Middle Canyon	6,990	100					6,990
Wakefield	6,304	100					6,304
Note: Percents are rounded and may not add up to 100%							

Environmental Consequences

Change in soil condition class is a long-term process with many influences, so actual soil condition is not expected to change significantly within the ten-year analysis period, regardless of alternative selected. This analysis reflects the direction that is expected under each of the alternatives and provides a way to compare alternatives. Because of similarities in soil condition and projected effects across the analysis area, effects are discussed for the six allotments combined.

Under *Alternative 1* (No Grazing), soil condition would be expected to remain satisfactory on the 99% of the project area where satisfactory soils occur. Areas that are currently grazed would show a slight increase in vegetation ground cover (VGC) that would help to maintain soil structure and nutrient cycling. Hydrologic function and runoff would continue to be satisfactory. In areas with impaired soils, the rate of soil improvement would be faster than under the proposed action because VGC would increase and livestock related soil compaction would not occur. Over time, improved soil structure and increasing cover would contribute to functional hydrologic condition.

Under the proposed action, maximum forage utilization of 45% or less is expected to provide sufficient residual biomass to protect soils and maintain soil conditions. Winter seasonal use (Mescal and Coal Mine allotments) and a rest-rotation system elsewhere will allow for vegetation growth and recovery, resulting in potentially positive gains in plant vigor, plant frequency and recruitment which in turn promote watershed functions. Flexible stocking rates built into the proposed action should allow management to respond proactively to changing resource conditions before problems occur. On the Mescal allotment, the areas of impaired soil are in flat areas near watering facilities. Proposed range improvements including fencing to divide existing pastures and additional watering locations designed to improve livestock distribution, which will help minimize impacts in these traditional concentration areas. However, changing livestock distribution is expected to affect soil condition in historically underused areas, and may result in small zones of heavy use around new waters. The use of Best Management Practices (BMPs) identified in the proposed action and adaptive management is expected to minimize or mitigate any potential negative effects from this alternative.

Upland Vegetation

Grazing by domestic livestock may impact vegetation by changing the mix of species in the plant community being grazed (vegetation composition); by changing the density and frequency of perennial forage plants (forage frequency); and by changing the vigor of the grazed plants. These three vegetation effects are combined into vegetation condition classes that reflect the relative effects of grazing on vegetation. The condition ratings are based on comparisons to an undisturbed plant community. Thus, ecological condition is an expression of the health of the vegetation and soil relative to their combined potential to produce a sound and stable biotic community[11]. Trend is an expression of the plant community's movement toward or away from the potential natural community and is based on a comparison of change over time. The Coronado Forest Plan goal for rangeland condition is to restore rangeland to at least moderately high ecological condition with stable soil and a static to upward trend.

Affected Environment

Upland vegetation condition on the allotments was assessed in 2004 (PRs 12-16, 19-24). Monitoring data indicate that upland vegetation condition is improving over conditions measured in the 1960's and 1970's and is largely meeting or moving toward Forest Plan standards. However, areas of lower condition persist. Monitoring results are summarized below by allotment.

Benson. In general, uplands are in fair to good ecological condition; however, portions of Trask, Sabin and Naegle pastures are in poor to fair condition due to a combination of heavy use and the presence of Lehmann lovegrass. Soil cover is increasing where lovegrass is present and contributing to watershed protection.

Coal Mine. Two transects monitored in 2004 indicate excellent condition at one site and poor condition at the second. Poor conditions are related to the presence of Lehmann lovegrass and poor livestock distribution. Nevertheless, indicators of watershed health such as litter and percentage of bare soil show positive trends compared to previous measurements.

Knear. In general uplands are in poor to fair ecological condition, except in the little-used Wakefield pasture where conditions are rated as excellent. Lehmann lovegrass is a significant component of the vegetation community, which contributes to lower condition ratings. Indicators of watershed health such as litter and percentage of bare soil show positive trends compared to previous measurements.

Mescal. In general, uplands are in fair to good condition, although Lehmann lovegrass is a significant portion of the vegetative composition at lower elevations. Soil cover (litter) tends to be greatest where lovegrass is dominant. Production-utilization data indicate that actual use is balanced with capacity.

[11] The Coronado National Forest has not completed a Terrestrial Ecosystem Survey to identify the potential natural community. Therefore, Natural Resource Conservation Service (NRCS) Land Resource Unit Descriptions are used to determine condition. Major units in the project area are 41-3AZ Southern Arizona Semidesert Grassland in the 12-16 inch precipitation zone and 41-1AZ Mexican Pine Oak Woodland in the 16-20 inch precipitation zone.

Middle Canyon. In general, uplands are in poor to fair ecological condition. The allotment has a history of heavier than desirable use and poor distribution, especially in the northern pastures, and Lehmann lovegrass is dominant on many sites.

Wakefield. Ecological condition has not been assessed recently, but the allotment has been vacant for several years and is not affected by grazing.

Environmental Consequences

Factors other than grazing also affect rangeland vegetation condition. In the Whetstone Mountains, foremost among these is the widespread occurrence of Lehman lovegrass, a non-native species. Rangeland condition is estimated based on the composition of native grasses; the presence of non-native species will lower vegetation condition ratings because non-native species are not included in condition scores. The presence of Lehman lovegrass will likely continue to suppress condition scores regardless of grazing management. It should be noted that Lehmann lovegrass can contribute positively to actual rangeland condition through accumulations of litter on the soil. Fluctuations in rainfall patterns also affect vegetation condition. In general, cool season moisture will favor the establishment of shrubby vegetation, and summer monsoonal storms will favor the establishment and growth of warm season grasses. Long term drought will favor the persistence of deep rooted shrubs over shallow rooted bunchgrasses.

Alternative 1 would allow for vegetation recovery in low condition areas. Because a shift in species composition is needed for some areas to reach moderately high condition, some areas will probably remain in fair or poor condition for the duration of the analysis period. This is particularly true in areas where the presence of Lehmann lovegrass contributes to low range condition. Other parameters of range condition such as plant vigor and density are expected to improve more rapidly. This would result in increased accumulation of residual plant material, both standing and in the form of litter. Additional organic material is expected to provide soil protection, increase soil water holding capacity and decrease evaporation. In terms of indirect effects, additional herbaceous material in the understory will provide fine fuels that will allow fire to play a more natural role in the area. The re-establishment of a more natural fire regime is expected to reduce the density of woody species such as mesquite and sandpaper bush (*Mortonia sempervirens*) that have invaded formerly more open areas.

Alternative 2 will reduce stocking and provide flexibility to adjust to changing forage conditions. Relatively conservative utilization limits should result in increasing plant density and improved vigor over the term of the analysis. Because of limited water distribution in some years and the tendency of cattle to concentrate in canyon bottoms, management will be necessary to assure more even forage utilization. Over time, the development of additional waters and better control of existing waters is projected to improve livestock distribution and reduce use in historically overused areas. Provided management and monitoring are sufficient to achieve proper distribution, Alternative 2 should result in movement toward the desired conditions. Areas where Lehman lovegrass dominates the plant community are likely to remain in lower condition, because a shift in species composition would be required to achieve significant change in ecological condition scores.

Riparian Condition

Affected Environment

Numerous canyons or washes dissect the area. Most of the drainages within the project area have surface water flowing only after rains (ephemeral) or intermittently for short durations. Major drainages supporting stands of riparian vegetation include Cottonwood, Guindani, Middle, French Joe, Bear Spring, Shellenberger, Apache, Montosa and Wakefield canyons. Vegetation associated with these stream coursed is a mixture of evergreen oaks and deciduous riparian trees such as sycamore, willow, ash and cottonwood. Riparian vegetation is sustained primarily by subsurface flow rather than surface flow. The project area does not include any mapped wetlands. Permanent surface water is restricted to a few springs and seeps scattered across the project area and man-made water developments, primarily windmills and troughs.

Specific riparian standards found in the Forest Plan include:

- Vegetation standards are: 3 riparian species present, each with 3 age classes; 60% or more of the woody stems are in riparian tree species; and riparian tree reproduction is present.
- 80% of natural bank protection is present. Assume "natural" is 78%, the largest potential for vegetation cover on the forest (Capability Area 4); therefore 60% bank protection is required.
- 60% of natural shade is present. The average canopy of all riparian areas with "satisfactory" vegetation is about 50%; this is considered "natural" -- therefore 30% canopy closure is required.
- Vigor must be rated "good" or "excellent"

Riparian condition was assessed at established riparian monitoring locations in 1987 and again in 2000 using the Riparian Area Survey and Evaluation System (RASES, USDA 1989)(PR 42). Riparian vegetation potential is limited in some allotments and not all allotments support sufficient riparian vegetation for monitoring to be effective. Monitoring data for several drainages in the Mescal and Middle Canyon allotments are summarized in Table 8. By and large, riparian conditions are meeting Forest Plan standards. Tree recruitment is occurring, plant vigor is good and bank protection is high.

Table 8. Summary of RASES data for stream channels in the project area.

Allotment	Stream Name	Year	Tree Species Recruitment*	Percent Canopy	Vigor	% Bank Protection **	Width to Depth Ratio ***
Mescal	Bear Spring Canyon	2000	5 of 8	12%	Good	53%	18.7
	Death Trap Canyon	2000	6 of 7	54%	Good	54%	19.7
	Dry Canyon	1987	11 of 14	15%	Moderate		

Allotment	Stream Name	Year	Tree Species Recruitment*	Percent Canopy	Vigor	% Bank Protection **	Width to Depth Ratio ***
		2000	6 of 7	24%	No Data	55%	34.8
	French Joe Canyon	1987	17 of 17	100%	High		
		2000	9 of 10	42%	Good	28%	30.2
	Shellenberger Canyon	2000	7 of 7	47%	Good	48%	22.3
Middle Canyon	Cottonwood Canyon	1987	6 of 8	10%	Low		
		2000	5 of 5	No Data	Very Good	65%	13.8
	Guindani Canyon	1987	8 of 11	70%	Low		
		2000	5 of 5	28%	Good	98%	7
	Middle Canyon	1987	7 of 9	60%	High		
		2000	5 of 8	26%	Good	66%	55
	Mine Canyon	1987	7 of 11	15%	High		
		2000	5 of 5	31%	Very Good	58%	43.9

* Number of species represented in the young or seeding age class compared to the total number of species found.
** Percent of the bank covered by vegetation.
*** Channels in this landform are expected to have a width/depth ration >12.

Environmental Consequences

Livestock grazing may impact riparian area condition by compacting or altering the soil surface or by removing plant material, thereby affecting bank stability; or by grazing on individual plants, thereby changing the vegetation composition and affecting the vigor and recruitment of the grazed plants. The effects of livestock grazing are related to the timing, intensity and frequency of grazing on individual plants. An important consideration is limiting grazing on woody plants to allow for regrowth prior to dormancy. Grazing on herbaceous species needs to be of limited intensity so that they can function to protect soils and capture sediments during flow events.

Under *Alternative 1*, increases in herbaceous riparian cover would be anticipated as cattle would no longer graze in canyon bottoms. Bulk density and soil structure would return to natural levels over time. Where trails and roads occur in drainage bottoms, traffic would continue to effect soils. In the absence of grazing livestock, a reduction in stream bank alteration and increases in vegetative groundcover would contribute to bank stability. Elimination of browsing on riparian vegetation would be expected to increase riparian plant vigor and recruitment of young trees.

Under the proposed action (*Alternative 2*), annual growing season rest on the Mescal and Coal Mine allotments will continue to promote riparian tree recruitment. Soils and herbaceous vegetation would continue to be affected especially later in the grazing season

when cattle seek shade in riparian bottoms. Since current management is maintaining riparian condition, continued use is not expected to result in significant new effects. Proposed new waters are intended to pull cattle out of the bottoms and reduce use in these areas. On the Benson, Knear and Middle Canyon allotments, light to moderate allowable use levels and pasture rotations are expected to be sufficient to promote riparian tree production, although riparian plants may be grazed in the growing season in some years and cattle will tend to concentrate in bottoms during the warmer months. New watering locations should help to distribute cattle out of bottoms and reduce grazing intensity in riparian corridors. Effects on the Wakefield allotment will be similar under both alternatives.

Air Quality

The 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." The project area is in a Class II air shed. 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. Currently, the air quality in the project area is within the standards and guidelines of the Forest Plan. Activities resulting from this grazing project will not significantly affect the factors contributing to a high quality air shed. Therefore, grazing will not have direct, indirect or cumulative effects on the air resources in this air shed.

Water Quality and Quantity

Affected Environment

The analysis area is located within the headwaters of four Fifth Code Watersheds: Ash Creek - Upper San Pedro River (HUC 1505020209), Bobocamari River (HUC 1505020205), Cienega Creek (HUC 1505030201), and Clifford Wash - Upper San Pedro River (HUC 1505020207) (Figure 7). The four watersheds are large in overall size totaling approximately 897,636 acres and the six allotments make up approximately 5% of the total acres of the four watersheds. There are no perennial streams or wetlands in the project area, nor are there surface water gauging stations. Kartchner Caverns State Park monitors several wells east of the Forest boundary. Data from these wells indicate that water tables have dropped since 1991 when monitoring began. Drainages in the area flow intermittently for brief periods after precipitation. Thus, there is no base surface flow in streams. Subsurface (underground) flow in drainages is occasionally forced to the surface by geologic features, creating small springs or seeps that may run above ground for short distances. Several dirt stock tanks throughout the project area capture and retain overland water flow during heavy summer rains. Existing stock tanks have the capacity to capture and hold less than on tenth of one percent (0.01%) of annual precipitation in the project area. This overland flow is water that would otherwise flow off of the watersheds and would not affect stream base flow. Wells in the project area tap into ground water, which does not contribute to base flow in streams. Spring developments capture subsurface and surface flows that could contribute to base flows.

Scoping comments indicated a concern about the effects of the proposal on surface and subsurface hydrology. Kartchner Caverns State Park is located on the eastern boundary of the project area adjacent to the Middle Canyon. Guindani Canyon (and its tributary Saddle Wash) has been identified as the major source of recharge water in the cave (PR 26). Therefore, activities that affect the quantity or quality of water recharge in the Guindani watershed could directly affect resources in Kartchner Caverns.

Water quality standards are set by the Arizona Department of Environmental Quality under authority of the Clean Water Act. Water quality has not been assessed in the project area. Typically surface water quality is negatively affected by high rates of erosion or contaminates in the watershed. Neither of these conditions is present in the project area and no issues with existing water quality have been identified.

Environmental Consequences

Surface water quality and quantity are affected by hydrologic function, which is the ability of soil to capture, hold and release water. Hydrologic function is strongly influenced by soil condition. As soil conditions degrade, the time that water sits on the land (water residence time) decreases and runoff increases. This limits the ability of the soil to absorb water and filter soluble solids and sediments and increases peak flow discharges.

Under *Alternative 1* (No Action), herbaceous vegetation otherwise consumed by cattle would remain in place in the form of live plants or litter. This cover would contribute to acceptable nutrient cycling and improved soil structure. Soil loss and turbidity would be controlled by natural processes. As soil cover builds, water residence time will increase, resulting in greater infiltration into the ground. In Guindani Canyon, flows that support recharge into Kartchner Caverns would continue.

Under *Alternative 2*, proposed range improvements are designed to improve livestock distribution which would minimize impacts in historic concentration areas, thereby increasing soil cover. Allowable use levels of 30-45% are expected to provide sufficient residual biomass in the uplands to protect and stabilize soils and maintain water quality. Stability contributes to satisfactory hydrologic functions and in turn good water quantity. The rest-rotation system will allow the vegetation to regrown for a complete growing season resulting in positive 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. The use of Best Management Practices (BMPs) is expected to minimize or mitigate any potential negative effects from this alternative.

Proposed new upland waters would be supplied from existing wells. A generalized water budget prepared for the analysis (PR 45) indicates that the total water stored for and consumed by livestock in this manner (assuming all new water developments are completed) would be less than one percent of the volume of water recharged annually in the watersheds. Thus water quantities in the aquifer and subflow should not be significantly impacted by these actions. No water diversions or developments are proposed in Guindani Canyon, so there would be no effects to this aquifer. Groundwater monitoring would occur at Starr well in Middle Canyon to determine whether the use of

this well is affecting hydrological resources connected to Kartchner Caverns. Future use of the well would be determined through monitoring results using adaptive management.

Special Management Areas

Affected Environment

The project area does not contain designated wilderness, eligible wild and scenic river segments, research natural areas, zoological botanical areas or other areas that would require special management by regulation or Forest Plan direction. Portions of the project area fall within mapped an inventoried roadless area (Figure 11). Roadless areas largely consist of steep slopes at higher elevations throughout the range.

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

Environmental Consequences

The construction of new roads or the maintenance or reconstruction of existing roads is not proposed or anticipated. Several livestock watering facilities are proposed in order to improve livestock distribution (EA pp. 13-14 and Figure 9). These facilities will be located outside of the IRA with the following exceptions:

- Guindani pasture trough (T18S, R19E, Sec. 27)
- Upper Mine Canyon storage (T19S, R19E, Sec. 20)
- Coal Mine allotment trick tanks (T19S, R19E, Sec. 6 and T19S, R18E Sec. 13)

Proposed facilities outside of the IRA will be accessed using existing roads. For facilities (both inside and outside the IRA) that cannot be accessed on existing roads, the transportation and placement of materials would be accomplished using a helicopter (James Heitholt, Sierra Vista District Range Conservationist, pers. com., 12/08/08). Neither road construction nor cross-country travel would be required or permitted in order to access sites within the IRA. Because no road construction or maintenance would occur, there would be no effect to the *roadless status* of the IRA.

Soil and vegetation disturbance associated with facility construction would occur in the immediate vicinity of new developments. Additional effects would be limited to short-term noise disturbance associated with the transportation of the materials and construction of the improvements. Managed seasonal livestock grazing will continue within portions of the IRA at moderate levels under the proposed action (30-45% utilization, primarily winter seasonal use). As documented elsewhere in this EA, the limited intensity and duration of grazing is not expected to result in adverse effects to

soil, air, water, wildlife and plants, or traditional cultural properties. Therefore, no effects to the *roadless characteristics* of the area are anticipated.

Based on the above discussion, there will be no direct or indirect effects on the roadless status or characteristics of the IRA in the Whetstone Mountains. Because there are no direct or indirect effects, cumulative effects are precluded. No other activities have been identified that would contribute cumulatively to the effects of the action.

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"). Previous archeological investigations resulted in the identification of some 31 archeological and historical sites on National Forest lands in the project area, but the mountain range has not been extensively surveyed.

Native American sites that pre-date European contact include artifact scatters that represent temporary campsites or resource processing locations, a cave shrine, rock rings and rock piles. Historic Euroamerican sites include two mines, an ore processing mill and a cabin. A large Hohokam village is located on private land at the north end of the Whetstone Mountains. The most important historic-period use of the area has been mining, which began in the late 1800s and continued into the 1960s. Fuelwood cutting expanded in response to the needs of the mining industry and the southeastern sloped of the range were heavily cut over in the late 19th and early 20th centuries. Ranching has had limited significance from an archeological perspective. Few of the heritage resources documented within the allotments have been formally evaluated for National Register eligibility, but all will be treated as eligible for management purposes.

Archeological surveys were completed for 10 of the proposed range improvement projects that have the potential to affect heritage resources (two additional projects had been surveyed previously and were determined to meet current standards). As a result, approximately 500 acres were surveyed and five new sites were identified.

Environmental Consequences

Under *Alternative 1*, no direct or indirect effects from livestock grazing on heritage resources would occur following removal of cattle from the allotments. Although the potential for impacts exists under *Alternative 2*, surveys conducted as part of this analysis did not identify ongoing impacts related to current or proposed grazing. There have been no reports of cattle congregating in heritage sites or disturbing artifacts. Three proposed improvements were determined to be near an archeological site or potential site and specific mitigation measures for these sites have been added to the proposed action in Chapter 2.

Not all proposed improvements have been surveyed. However, under the proposed action, administration of rangeland resources and implementation of structural improvements will only occur in conformance with the *Standard Protocol for Rangeland Management* developed pursuant to Stipulation IV.A of the Region's programmatic

Agreement (PR 48)[12]. Under this protocol, range improvements and other ground-disturbing activities will be analyzed for effects to heritage resources prior to implementation. This process is included as a management practice in the proposed action in Chapter 2. Implementation of these mitigation measures would insure that there would be no adverse effects to heritage resources as the result of new range improvements.

A heritage resources report was prepared and submitted for consultation with affected tribes and the Arizona State Historic Preservation Officers (SHPO) with a finding of No Adverse Effect. Arizona SHPO concurrence was received on November 8, 2007.

Economics

Affected Environment

The economic effects of the proposal were not identified as a key issue during scoping, and specific operating costs and revenue estimates are not available for each ranch. Therefore a detailed economic analysis was not conducted. However, the generalized effects of the alternatives can be compared in the context of the local economy. The allotments are located primarily in Cochise County, Arizona. The western edge of the project area is located just across the county line in Eastern Pima County. Tourism and financial services are a growing segment of the economy of Cochise County. Farm and ranch employment is considered an important segment of the county's economy, but total farm employment accounted for 3.3% of the economy in 2000 (USDA Forest Service 2005, Headwaters Economics 2007). Ranching operations in the area tend to be characterized by small profit margins with the need for off-ranch supplemental income to continue operations. The economy of Pima County is dominated by educational, health and social services, retail trade, professional, scientific and management services, food services, manufacturing and construction. Agriculture, including ranching, comprises less than one percent of the county's employment.

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

The analysis does not include certain costs or benefits incurred by the alternatives, such as costs and benefits relating to recreation opportunities, environmental quality, etc. Data to analyze these costs and benefits are not available at the allotment level; analysis at the District or Forest level is beyond the scope of the analysis.

[12] First Amended Programmatic Agreement Regarding Historic Property Protection and Responsibilities Among New Mexico Historic Preservation Officer and Arizona Historic Preservation Officer and Texas Historic Preservation Officer and Oklahoma Historic Preservation Officer and the Advisory Council on Historic Preservation and United States Department of Agriculture Forest Service Region3.

Environmental Consequences

Decisions relative to livestock grazing on individual allotments primarily affect 1) the permittees, who pay grazing fees and receive economic returns on their investments in livestock grazing and who contribute funds for the construction of range improvements, and 2) the Forest Service, which collects grazing fees and expends grazing receipts and appropriated tax dollars to construct improvements and to administer the allotments. Local communities may also benefit from the sale of goods and services associated with ranch operations, but given the size and economic diversity of Pima and Cochise counties, these effects are considered insignificant in this case.

Revenues. 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. Various economic studies have calculated a net return of $60-$100 per animal unit per year for ranches in Arizona (Gao 1996 reported in Ruyle, et al 2000) (PR 47). Combined, the allotments are permitted for 785 animal unit years ($47,000-78,500 in net income). Termination of the grazing authorizations is therefore likely to have significant economic effects on the individual permittees. Annual grazing receipts to the Forest Service would vary from zero under *Alternative 1* to approximately $11,745 under maximum allowable use on all allotments under *Alternative 2*.[13] Typically, 25% of these receipts are returned to the Forest in the form of Range Betterment Funds used to construct range improvements. These funds (approximately $3,000/year) would not be available under *Alternative 1*.

Costs. In general, *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 and maintenance of facilities. Maintenance of improvements is typically the responsibility of the permittee. In the absence of a permittee, maintenance or removal of existing structural improvements may become necessary and costs would be borne by the Forest Service. Under *Alternative 2*, several structural range improvements have been identified as possible practices to improve livestock distribution and optimize management. Although not all improvements may be constructed, the costs would clearly be greater than under *Alternative 1*. Forest Service funding levels would require these projects to be phased in over a number of years, unless permittees are willing to bear an additional share of the costs or pursue alternative funding such as grants.

Environmental Justice

Environmental justice (EJ) 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. Toward attaining EJ for all communities and persons in the United States, 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.

[13] Estimate based on the 2009 grazing fee of $1.35 per AUM.

In the memorandum to heads of departments and agencies that accompanied Executive Order 12898, 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]."

Implementation of either of the alternatives evaluated in this EA would not result in adverse impacts to environmental resources and socioeconomic conditions. Therefore, disproportionate direct, indirect or cumulative adverse impacts on low income or minority populations would not occur.

Cumulative Effects

Cumulative effects are the past, present and reasonably foreseeable future actions that add to the direct and indirect effects considered in this EA. The following activities have been identified as potentially contributing to the effects analyzed herein. Past activities have contributed incrementally to changes in ecological conditions in the project area and may continue to influence conditions in the project area over the term of the project. Foreseeable future actions are those for which a proposed action has been approved or those proposed for NEPA analysis in the future. Other possible future actions or occurrences are considered too speculative to include in the analysis.

Grazing has occurred in the project area for over 100 years and historically at intensities that resulted in effects to soils and vegetation. Grazing-related losses of herbaceous cover and litter early in the 20th century resulted in increased erosion, soil compaction and increases in woody vegetation throughout the southwest. The reduction in fine fuels (grasses), 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. The effects of these actions are evident in portions of the project area in the form of compacted soils and increased woody vegetation. The proposed action has been designed to correct practices that resulted in historic effects to soils and vegetation.

Non-native invasive plant species occurrences are limited to the presence of Lehman lovegrass. This species was actively seeded in the mid 1900's and is now widespread throughout lower elevations in the project area. The persistence of this species will likely suppress ecological condition scores in some sites, regardless of management. Cattle can contribute to the distribution of invasive plant seeds and can disturb soils, thereby creating conditions conducive to the growth of invasive plants. However, except for Lehmann lovegrass, invasive plant infestations in the project are not known to occur. The potential presence of invasive plant species off of the Forest may serve as a source of weed seeds that are transported by wind or livestock on to the allotments. Monitoring of rangeland by the Forest Service and the permittee will lead to early identification of invasive exotic plant populations. Grazing under the proposed action would not preclude projects designed to eliminate invasive plants.

The Coronado National Forest, in cooperation with two other Federal agencies, has prepared a broad scale programmatic strategy called the Huachuca FireScape Project (HFP) to manage fire and fuels across a variety of jurisdictional boundaries

(http://www.fs.fed.us/r3/coronado/documents/Huachuca_EA_final.pdf). The planning area for this project includes the Whetstone Mountains. The HFP includes both prescribed fire and non-fire treatments that are designed to address vegetation and fuel conditions in specific ecological units within the project area. The HFP also includes numerous design criteria that would be applied during site specific treatments, including measures to minimize effects to range vegetation resources and range facilities and measures to coordinate grazing activities with HFP implementation when it occurs. Moderate grazing intensities proposed for the grazing authorizations combined with pre- and post-fire grazing deferrals described in the HFP would preclude the occurrence of potentially significant cumulative effects.

Authorized activities in the project area include hiking, hunting and vehicle use on unsurfaced roads. Impacts from these activities are short term and primarily consist of minor ground disturbance. Legal public access into the Whetstone Mountains is limited and there are few interior roads accessible to the public. There are no developed campgrounds, nor are there plans for future development. Cattle use on existing roads and trails should not lead to adverse cumulative effects.

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, especially fences. These activities result in localized disturbance within the project area, but the proposed action is not expected to contribute adversely to the existing level of effects resulting from these activities. Smuggling may have an 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.

Rural and urban development on private lands adjacent to the Forest north of the project area has resulted and will continue to result in the loss or fragmentation of wildlife habitats. Movement corridors between mountain ranges have been disrupted or reduced as a result of off-Forest developments. Either alternative would contribute cumulatively to off-forest habitat fragmentation since no large developments or vegetation removal are planned.

The Guindani Canyon watershed has been proposed for withdrawal from mineral entry to protect geologic and hydrologic resources above Kartchner Caverns. This would be an administrative action that would have no direct, indirect or cumulative effects on project area resources.

In summary, past and ongoing activities have contributed to changes in plant composition and soil disturbance and may continue to influence conditions in the project area over the term of the authorizations. However, no significant direct or indirect effects are anticipated as a result of the alternatives. Therefore, no significant cumulative effects are anticipated.

CONSULTATION AND COORDINATION

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

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 Parks Department
USDA Natural Resource Conservation Service
USDI Fish and Wildlife Service

TRIBES:

Fort Sill Apache Tribe
Mescalero Apache Tribe
San Carlos Apache Tribe
White Mountain Apache Tribe
Hopi Tribe
Pueblo of Zuni
Tohono O'odham Nation
Yavapai Apache Nation

OTHERS:

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

LIST OF KEY PREPARERS, TEAM MEMBERS:

Stephen Gunzel, District Ranger, Retired Annette Chavez, District Ranger	Responsible Official
Richard Gerhart, Team Leader	Writer/Editor, Wildlife
Tom Lorenz and Bill Edwards, Range and Watershed Staff, Sierra Vista Ranger District Sharon Beidenbender and James Heitholt, Range Conservationists, Sierra Vista Ranger District	Proposed Action, Vegetation analysis
Glenn Frederick, Wildlife Biologist	Wildlife Analyses
Salek Shafiqullah, Soils Scientist/ Hydrologist, Supervisor's Office	Soils/Watershed/Riparian/Air/Water Analyses
Christopher LeBlanc, Archeologist, Supervisor's Office	Heritage Effects Analysis

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LIST OF FIGURES

APPENDIX A.

PROJECT RECORD INDEX
Whetstone Mountains Allotments Analysis

Doc. No.	Description	Author	Recipient	Date
1	Coronado National Forest Plan (CD)			
2	Rescission Act of 1995, PL 104-19, Section 504			
3	Final Biological Opinion, Continuation of Livestock Grazing on the Coronado National Forest (separate volume)	USFWS		10/25/02
4	EA for grazing permit issuance on the Mescal allotment.	District Ranger	Mailing list	06/29/95
5	Term Grazing Permit, Benson Allotment	District Ranger		02/22/02
6	Term Grazing Permit, Coal Mine Allotment	District Ranger		04/06/00
7	Term Grazing Permit, Knear Allotment	District Ranger		01/20/04
8	Term Grazing Permit, Mescal Allotment	District Ranger		11/13/97
9	Term Grazing Permit, Middle Canyon Allotment	District Ranger		03/05/04
10	Knear Allotment Boundary Adjustment memo	Wildlife Biologist	R&W Staff	12/16/03
11	Allotment Inspection Records: All allotments 2000-2006	Rangeland Management Specialist	DR, Range Staff, Permittee	Various
12	Vegetation Condition Monitoring data, Benson Allotment			10/2004
13	Vegetation Transect Data, Coal Mine Allotment			09/2004
14	Vegetation Transect Data, Knear Allotment			10/2004
15	Vegetation Transect Data, Mescal Allotment			10/2004
16	Vegetation Transect Data, Middle Canyon Allotment			10/2004
17	Production-Utilization Studies, all allotments 2004-2005			
18	Paper: Impacts of Controlled Grazing Versus Grazing Exclusion on Rangeland Ecosystems: What We Have Learned	Holechek, Baker, Boren		
19	Benson Allotment NEPA Proposal	R&W Staff	District Ranger, ID Team	01/31/06

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Whetstone Mountains Allotments Analysis

Doc. No.	Description	Author	Recipient	Date
20	Coal Mine Allotment NEPA Proposal	R&W Staff	District Ranger, ID Team	01/31/06
21	Knear Allotment NEPA Proposal	R&W Staff	District Ranger, IDT	01/31/06
22	Mescal Allotment NEPA Proposal	R&W Staff	District Ranger, IDT	01/31/06
23	Middle Canyon NEPA Proposal	R&W Staff	District Ranger, IDT	01/31/06
24	Wakefield NEPA Proposed Action	R&W Staff	District Ranger, IDT	01/17/06
25	Scoping Notice and mailing list	Forest Supervisor	Various	06/13/06
26	Scoping Comments	Arizona State Parks	Gerhart	07/11/06
27	Scoping Comments	Thomas R. Fischer	Gerhart	07/03/06
28	Scoping Comments	Center for Biological Diversity	Gerhart	06/23/06
29	Scoping Comments	Jeff Burgess	Gerhart	07/16/06
30	Scoping Comment Analysis	Gerhart	District Ranger, IDT	08/18/06
31	Forest MIS Report (Separate volume)	Gerhart	Record	2005
32	Paper: Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands	Lamar Smith, *et al.*	Record	10/2005
33	Wildlife Specialist Report	District Wildlife Biologist	Record	02/26/07
34	MIS, Neotropical Migratory Birds, and Important Bird Areas – Specialist Report	District Wildlife Biologist	Record	10/07
35	Mearns' Quail Habitat Management Guidelines	AGFD		03/25/05
36	FSM 2600, Chapter 2630 Management of Wildlife and Fish Habitat			05/01/94
37	Supplemental BA, Authorization of Grazing	Gerhart/Frederick	Record	
38	Biological Evaluation, Authorization of Grazing on Whetstone Mountains Allotments	Gerhart/Frederick	Record	
39				
40	BA of On-going and Long Term Grazing on Proposed MSO Critical Habitat on the CNF			03/2004
41	Transmittal and review of CNF 's	Forest Supervisor	USFWS	12/15/05,

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Whetstone Mountains Allotments Analysis

Doc. No.	Description	Author	Recipient	Date
	Chiricahua Leopard Frog Management Guidelines			12/21/05
42	Riparian Data Report	Shafiqullah	Record	08/2007
43	Heritage Resource Assessment and SHPO clearance	LeBlanc	Record	11/8/07
44	Soil Condition Assessment: Whetstone Mountains Allotments	S. Shafiqullah	Record	2/2008
45	Soil, Water and Air Specialist's Report: Whetstone Mountains Allotments	S. Shafiqullah	Record	2/2008
46	Status Review of the Arizona Shrew	AGFD		5/1994
47	Paper: Commercial Livestock Operations in Arizona	Ruyle, et al		2000
48	Region 3 Standard Consultation Protocol for Heritage Resources	USFS, R3		2007
49	Correspondence with Kartchner Caverns SP re water issues on park.	R Casavant	Shafiqullah/ Gerhart	3/28/08
50	District Response re: PR 49	T. Lorenz	Gerhart	3/28/08
51	Kartchner well monitoring information.	R. Casavant	R. Gerhart	4/9/08
52	Addendum to BA for lesser long-nosed bat	J. Derby	S. Spangle	5/9/08
53	Map of proposed mineral withdrawal in Guindani watershed	R. Ahern	Record	5/10/08
54	Public review copy of EA.	Gerhart	Mailing list	5/6/08
55	Cover letter and mailing list for PR 54	J. Derby	Record	5/6/08
56	Affidavit of publication: Sierra Vista Herald	Sierra Vista Herald	Record	5/9/08
57	Comments on proposed action	Clyne Ranch	R. Gerhart	6/5/08
58	Comments on proposed action	E. Ryberg	R. Gerhart	6/9/08
59	Comments on proposed action	J. Burgess	R. Gerhart	6/5/08
60	Comments on proposed action	AZ State Parks	R. Gerhart	6/9/08
61	Comments on proposed action	ADEQ	R. Gerhart	5/27/08
62	Agave Monitoring Five-Year Report	S. Biedenbender	Files/USFWS	9/4/07
63	Comment Analysis	R. Gerhart	A. Chevez	6/16/08
64	USFWS concurrence letter – Consultation	S. Spangle	J. Derby	6/25/08

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Whetstone Mountains Allotments Analysis

Doc. No.	Description	Author	Recipient	Date
65	Allotment Maps			
66	Final Environmental Assessment	CNF		8/11/08
67	Decision Notice/Finding of No Significant Impact	Ranger (A. Chavez)		8/28/08
68	Legal Notice affidavit of publication	Sierra Vista Herald	Record	9/4/08
69	Appeal: Western Watersheds Project	E. Ryberg	J. Derby	10/20/08
70	Record of attempt at informal resolution	A. Chavez	J. Derby	10/23/08
71	Appeal review and decision	J.Derby	E. Ryberg	11/13/08
72	Western Watersheds Project news release	WWP		11/25/08
73	Regional Forester's sensitive species list and regional direction letter.	H. Forsgren	Forest Supervisors	10/1/07
74	Updated Biological Evaluation incorporating 2007 sensitive species update	R. Gerhart B. Frederick	Record	12/10/08
75	Supplemental Management Indicator Species Analysis	G. Frederick	Record	12/2008
76	Whetstone Mountains Inventoried Roadless Area Analysis	R. Gerhart	Record	12/8/08
77	Records of bat species in Kartchner Caverns	Glenn Frederick	S. Willsey, ASP	12/19/08
78	Paper: Grazing Response Index. Rangelands publication.	Reed, Reath and Bradford	Record	8/1999
79	Public Review Copy of EA	CNF	Mailing list	1/6/09
80	Afficavit of Publication	Sierra Vista Herald	CNF	1/8/09
81	Comment on draft	Center for Biological Diversity	R. Gerhart	2/9/09
82	Correspondence with CBD re: review of draft	Gerhart	Lininger	2/11/09
83	Analysis of public comments	Gerhart	Ranger	3/16/09