



United States
Department of
Agriculture

Forest
Service

January 2009



Environmental Assessment

**Last Chance, Barney, Fresno, Happy Valley,
Cumero, Keith, Rock Pile, Rincon and Agua
Verde Allotments**

Authorization of Livestock Grazing

**Santa Catalina Ranger District, Coronado National Forest
Pima and Cochise Counties, Arizona**

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Table of Contents

1. Purpose and Need	4
Background.....	4
Purpose and Need for Action.....	4
Proposed Action.....	11
Decision Framework.....	11
Public Involvement.....	12
Issues	12
2. Alternatives, including the Proposed Action	14
Alternatives.....	14
Comparison of Alternatives	21
3. Environmental Consequences.....	23
Wildlife.....	24
Upland Vegetation Condition	39
Riparian Condition.....	41
Soils and Watershed	44
Water Quality and Quantity.....	46
Air Quality	47
Special Management Areas	48
Heritage Resources	50
Socio-economics.....	51
Environmental Justice.....	52
4. Consultation and Coordination.....	54
References and Literature Cited	55
List of Figures	59

1. PURPOSE AND NEED

Background

This Environmental Assessment (EA) describes a Forest Service proposal to authorize grazing on the Last Chance, Barney, Fresno, Happy Valley, Cumero, Keith, Rock Pile, Rincon and Agua Verde grazing allotments in the Rincon Mountains, Santa Catalina 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 one alternative.

Federal actions such as authorization of grazing must be analyzed to determine potential environmental consequences (*National Environmental Policy Act (NEPA) of 1969; Rescission Act of 1995, P.L. 104*). Supporting documentation, including more detailed analyses of project area resources and records of public participation, is on file in the project planning record in the Coronado National Forest Supervisor's Office in Tucson, Arizona. Throughout this EA, references to supporting documentation are shown in parentheses. For example, a reference "(PR 43)" would indicate that a specific passage in the EA is linked to information contained in document No. 43 in the project record.

Purpose and Need for Action

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

The Last Chance, Barney, Fresno, Happy Valley, Cumero, Rock Pile, Rincon and Agua Verde grazing allotments (collectively referred to as the Rincon Mountain Allotments) include land identified as suitable for grazing in the Coronado National Forest Land and Resource Management Plan (Forest Plan, PR 1). The Rincon Mountain Allotments are currently authorized for livestock grazing and have been so authorized for many years. The environmental impacts analysis of the grazing authorizations has been completed in compliance with the requirements of NEPA and Section 504 of the *Rescission Act of 1995 (P.L. 104, 1995)*.¹

¹ A NEPA analysis of the authorization of grazing on the Happy Valley allotment was completed in 2001 with the signing of a Decision Notice and Finding of No Significant Impact. This decision was reversed on appeal with instructions to conduct additional analysis, but the analysis was never completed and a new decision was never issued (PR 10). Records of previous NEPA based analyses and decisions for the Barney

The purpose of the proposed action is to authorize livestock grazing on suitable rangelands 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*).
- Additional water sources may be necessary on the Rincon allotment to improve livestock distribution and improve the reliability of pastures.

To address the purpose and need, a Forest Service interdisciplinary team developed proposed actions for each allotment based on a comparison of existing resource conditions in the project area with desired conditions identified in the Forest Plan and through site-specific evaluation of the project area resources. Existing and desired conditions are described briefly below. The proposed action is described in Chapter 2 of this EA.

Existing Conditions

Location and Setting. The project area includes nine grazing allotments located on the south and east sides of the Rincon Mountains in Pima and Cochise Counties in the Santa Catalina Ecosystem Management Area (EMA) (Figures 1 and 2). Elevations range from approximately 3,800 feet at the south end of the project area to over 7,000 feet at the southern crest of the Rincon Mountains. The majority of suitable and capable² rangelands are located on the gentler terrain at the base of the mountain range. Steep slopes and rough topography render higher elevations in the project area unsuited and not capable for grazing. All of the allotments are located within or adjacent to the Rincon Mountain Wilderness. Several large drainages are found in the project area; portions of three of these (Ash, Paige and Turkey creeks) are fenced to protect riparian resources.

The most common vegetation type is Madrean evergreen woodland (Figure 3). Arizona oak/side-oats grama associations occur along canyon bottoms where soils are deeper and slopes more gradual, giving the area an open savannah quality. Typical tree species in this association are Arizona oak (*Quercus arizonica*), alligator juniper (*Juniperus deppeana*), and pinon pine (*Pinus cembroides*). Understory grasses include side-oats grama (*Bouteloua curtipendula*), three awn (*Aristida ternipes*) and plains lovegrass (*Eragrostis intermedia*). Shrubs include mountain mahogany (*Cercocarpus spp.*), shrub

(1993) and Rincon/Agua Verde allotments (1996) are also found in Forest files. Due to changed circumstances and the availability of new information, the Forest has decided to review these allotments and issue new NEPA-based decisions at this time.

² Capable rangelands are defined as lands under 40% slope capable of producing 100 pounds or more of forage per year.

live-oak (*Quercus turbinella*), beargrass (*Nolina microcarpa*), Palmer's agave (*Agave palmeri*), and squawberry (*Rhus trilobata*). On steeper slope with shallower granitic soils this woodland type is expressed in the form of a dense association of Emory oak (*Quercus emoryi*) and manzanita (*Arctostaphylos spp.*). In this association grasses are poorly represented and shrubs dominate the middlestory with trees such as Emory oak, alligator juniper, and an occasional Arizona madrone (*Arbutus arizonica*) in the overstory.

Lower and middle elevations support Semidesert grassland composed of Texas bluestem (*Andropogon cirratus*), tobosa (*Hilaria mutica*), curlymesquite (*Hilaria belangeri*), black grama (*Bouteloua eripoda*), sideoats grama, and hairy grama (*Bouteloua hirsute*). Shrub and tree species have increased in unburned areas including mesquite (*Prosopis spp.*), catclaw mimosa (*Mimosa biuncifera*), and whitethorn acacia (*Acacia constricta*). The exotic Lehmann lovegrass (*Eragrostis lehmanniana*) also is common on some sites. Middle elevations on certain aspects support Interior Chaparral. In its pure form, this biotic community is represented by a manzanita, Fendler's ceonothus (*Ceanothus fendleri*)-shrub live-oak vegetation association. Along with these shrubs, alligator junipers rise above the shrub canopy.

Interior Deciduous Riparian Woodland is found along several drainages including Ash, Miller, Deer, Turkey, Paige, and Posta Quemada Canyons. The best development of this habitat is along Paige Creek. This vegetation type includes riparian obligate tree species such as Fremont cottonwood (*Populus fremontii*), Arizona sycamore (*Plantanus wrightii*), and a variety of willows (*Salix spp.*). Dryer riparian sites support Arizona walnut (*Juglans major*), mesquite and netleaf hackberry (*Celtis reticulata*).

Current Management. Allotment size, current management and permitted use are summarized in Table 1. Forest Service monitoring data indicate that the allotments are generally meeting or moving toward Forest Plan standards for rangeland condition. Utilization monitoring indicates that annual utilization on all allotments does not exceed allowable use levels. Existing resource conditions, recent management practices and management issues on the allotments are summarized by allotment following Table 1.

Table 1. Allotment size and current management: Rincon Mountains Allotments. Permitted use is shown in both numbers of cattle and animal unit months (AUMs) for comparison with the proposed action described in Chapter 2.

Allotment	Total Acres	Capable Acres	Permitted Use	Permitted Use (AUMs)	Current Management
Last Chance	6,204	2,941	80 cow/calf yearlong	1267	Seven pasture deferred rest rotation with adjacent state and private land.
Barney	3,380	925	65 cow/calf, year-long	1030	Three-pasture deferred rest rotation with adjacent state land.
Happy Valley	11,900	8646	140 cow/calf and 4 horses, yearlong	2218	Five-pasture deferred rest rotation with adjacent state land
Fresno	1,640	1,500	20 cow/calf yearlong	317	Non-use since 1995.
Cumero	13,085	7,128	125 cow/calf	1980	Six pasture "best pasture"

Allotment	Total Acres	Capable Acres	Permitted Use	Permitted Use (AUMs)	Current Management
			and 4 horses yearlong		rotation.
Rock Pile	2,170	1,630	25 cow/calf, 10/1-3/31	198	Used irregularly in winter with adjacent private land. Seasonal water on Forest.
Rincon	4,186	3,000	52 cow/calf, 10/1-3/31	412	Two pasture seasonal use with adjacent state and private land.
Agua Verde	7,815	5,400	100 cow/calf yearlong	1584	Three Forest and one state/private pasture used in a deferred rest rotation.

Last Chance Allotment. The Last Chance allotment is located at the north end of the project area within the Rincon Mountain Wilderness. The allotment is managed under a coordinated resource management plan (CRMP)³ in combination with adjacent state and private lands. The Forest portion is divided into three pastures and four additional pastures are located off-forest. Since 1995 the ranch has used a deferred-rest rotation that allows up to 18 months of rest in each pasture between periods of use. Rangeland condition was evaluated in 2007 and was determined to be in good condition with stable trends (PRs 18, 25). No significant resource or management issues have been identified with current management.

Barney Allotment. This allotment is located immediately south of the Last Chance allotment on the east side of the Rincon Mountains. It is located entirely within the Rincon Mountain Wilderness. There are two pastures on the forest that are used in rotation with a third pasture on adjacent state land. The small size of the allotment and small number of pastures limits the ability to provide full growing season rest each year. Rangeland condition, as determined in 2007, is fair to good with stable trends and meeting Forest Plan standards (PRs 19, 27).

Fresno Allotment. This is a small allotment located south of the Barney allotment. Historically, the allotment was used by both horses and cattle, which led to degraded resource conditions. The allotment has been in non-use for 12 years and has recovered well. Rangeland conditions are determined to be good with upward trend (PR 28). The current permittee has elected to continue non-use and this is likely to continue for the foreseeable future.

Happy Valley Allotment. This allotment is located south of the Barney allotment. Approximately 25% of the allotment lies within the Rincon Mountain Wilderness. The allotment is divided into four pastures, used in combination with a fifth pasture on adjacent state land and managed under a deferred rest rotation. Each individual pasture can be rested for a minimum of 24 consecutive months before being grazed again. The

³ Coordinated Resource Management is the process whereby various user groups and agencies collectively diagnose management problems, establish goals and objectives and evaluate and implement multiple use resource management (SRM 1998). It is often used where the presence of intermingled land ownership results in the involvement of a number of stakeholders that can contribute to more efficient and effective resource management.

allotment includes one riparian management area (Paige Creek) and one riparian enclosure (Turkey Creek) that are fenced. The Paige Creek riparian management areas is used only for short periods while moving cattle between pastures. The Turkey Creek enclosure is excluded from grazing yearlong. Rangeland condition was assessed in 2005 and determined to be largely good (PRs 20, 29). The presence of Lehman lovegrass (*Eragrostis lehmanniana*), a non-native perennial grass, tends to reduce condition in some areas. There are no identified issues related to existing resource condition or current livestock management. However, the allotment receives a substantial amount of recreational use and private inholdings within the allotment have the potential of being subdivided for development.

Cumero Allotment. This allotment is located in the southeast corner of the Rincon Mountains. The allotment contains three main pastures with drift fences that create three smaller interior pastures within the main pastures. The allotment is managed under a “next best pasture” rotation. This means that there is no set rotation, but cattle are moved from pasture to pasture based on resource condition. The allotment contains the Ash Creek riparian management area which is fenced. Use of the riparian area is restricted to periods when cattle are being moved between pastures. Current monitoring indicates that the allotment is in fair to good condition with stable or upward trends (PRs 22, 30). The increasing presence of Lehmann lovegrass tends to suppress vegetation condition scores in some areas. There are no identified issues related to existing resource condition or management. Upper elevations west of Ash Creek were burned in wildfires in June 2008.

Keith Allotment. This small allotment is located on the east side of the Little Rincon Mountains east of the Cumero allotment. The permit was waived to the Forest Service in the early 1990s and the allotment has been in non-use since that time. The Permittee on the Cumero Allotment has requested this area be added to the Cumero Allotment as an additional pasture. The Forest Service has agreed to this management concept but with no obligation in permitted numbers.

Rockpile Allotment. This small winter-seasonal allotment is located at the south end of the Rincon Mountains. As its name implies, much of the allotment is steep and rocky, and grazing use is restricted mostly to the southern margin of the allotment near the forest boundary. The allotment is used to supplement adjacent private land on an occasional basis. There is no developed water on the allotment, so cattle do not distribute far from the forest boundary except when seasonal water is available in seeps and drainages in wet winters. Where grazing occurs, vegetation is fair to good (PR 23, 31). Over the last ten years, the allotment has been used approximately 50% of the permitted time. All of this allotment burned in a wildfire in June 2008.

Agua Verde Allotment. This small allotment is located at the south end of the Rincon Mountains and is located entirely within the Rincon Mountain Wilderness. The allotment is divided into three pastures used in conjunction with a fourth pasture on adjacent state and private land. State and private lands have been only moderately used in the past due to lack of permanent water. The permittee is currently working with the Forest Service, NRCS and the State of Arizona to develop permanent water sources within this area which will improve the overall management of the entire range area. All pastures have

been managed under a deferred-rest rotation since 2001. Each year, one pasture is rested and cattle are rotated through the other three. A different pasture is rested each year. Monitoring completed in 2007 indicates that range conditions are fair to good with stable or upward trends (PR 25, 33). Many of the structural improvements on the allotment are in disrepair and require maintenance before management can be fully implemented. In June 2008, much of this allotment burned in the Distillery Fire.

Rincon Allotment. The Rincon allotment is located adjacent to the south boundary of Saguaro National Park on the western edge of the project area. All of the allotment is located within the Rincon Mountain Wilderness except for a road corridor leading to Papago well. There are two pastures that are used during the winter season. Cattle are moved off-forest onto state and private land during the summer growing season. Rangeland condition is good based on monitoring conducted in 2007 (PR 24, 32). During wet winters, livestock readily distribute across the allotment, but distribution can be problematic in dry years when cattle are dependant on the lone reliable water at Papago well. The district has identified the need for additional water sources in uplands on this allotment in order to avoid heavy use in the vicinity of Papago Well during dry years.

Management Direction

The Forest Plan (pp. 9-11) 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 allotments include lands designated within Management Areas 1, 4, 7 and 9 (Figure 4). Management emphasis for these areas is described below.

Management Area (MA) 1 includes steep, rugged lands that are managed for visual resources and semi-primitive dispersed recreation. Slopes are generally in excess of 40% and sites included in this management area are generally considered unsuited and not capable for livestock grazing. Range management standards and guidelines (Forest Plan pp. 47-49) call for no assigned permitted use for livestock. Upper elevations in several of the allotments contain areas with this designation. These areas are not physically excluded from grazing, but topography generally limits access and use by grazing cattle.

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

Management Area (MA) 7 includes lands that have been "identified as supporting flora and fauna associations that are unique enough to require special management practices... includes riparian ecotypes." Management emphasis is to manage these areas to benefit riparian dependant resources (Forest Plan pp. 64-74). Several of the larger drainages in the project area are included within this designation.

Management Area (MA) 9 includes vegetative and landform types that have been determined to be suitable for wilderness designation. Management emphasizes wilderness values while providing livestock grazing and recreational opportunities that are compatible with maintaining wilderness values and protecting resources (Forest Plan p. 79). Forest Plan standards and guidelines generally limit utilization to 35%, but allow for this guideline to be exceeded on allotments that provide a high percentage of rest or winter-only grazing (Forest Plan p. 116). All of the allotments are located within or adjacent to the Rincon Mountain Wilderness.

Desired Conditions

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

- Livestock stocking is consistent with annual forage production and use is monitored annually. Management plans provide sufficient flexibility to allow management to adapt to changing resource conditions. Management controls livestock use and distribution so that sufficient herbaceous vegetation is retained to protect soils and provide herbaceous wildlife cover; zones of heavy use are minimized. Achievement will be monitored through implementation monitoring described under the proposed action.
- Ecological sites within the allotments have stable soils, functional hydrology and support functional biotic communities. All areas are at or moving toward their ecological potential. Achievement will be monitored through effectiveness monitoring described under the proposed action.
- Grasslands and woodland understories are dominated by warm season native 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. Trees and shrubs show no evidence of high-lining or heavy browsing resulting in hedging and recruitment is occurring. Riparian bottoms throughout the allotments provide suitable year-round habitat for wildlife species dependant on herbaceous and riparian canopy cover. Achievement will be monitored through implementation and effectiveness monitoring described under the proposed action and monitoring at established riparian monitoring transects.
- Areas of historic heavy livestock use have increasing ground cover and litter and stable soils. Achievement will be monitored through implementation and effectiveness monitoring described under the proposed action.
- 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 Santa Catalina Ranger District proposes to authorize continued grazing on suitable rangelands in the Rincon 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 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 Santa Catalina District Ranger is the official responsible for decisions regarding management of the Rincon Mountains 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 livestock grazing will continue to be authorized. If grazing continues to be authorized, the Ranger will determine which management actions, mitigation measures and monitoring requirements would be prescribed in the AMP, including permitted number of animals, season of use, allowable utilization guidelines and the terms of the permits. These decisions may be made separately for each allotment. That is, the District Ranger may select different alternatives for different allotments.

Public Involvement

The Forest met with the permittees during 2007 to identify issues and develop and refine proposed management actions on the allotments. The proposal has been listed since October 2007 on the Forest's Schedule of Proposed Actions. In October 2007, 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 25 individuals, groups and other agencies for comment during scoping in December 2007 (PR 35). Using comments received during scoping (PRs 36-42) the Forest refined the list of issues and concerns to address.

In October 2008, a draft of the EA (PR 69) 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 *Arizona Daily Star* on October 10, 2008 (PR 70). Two comment letters were received in response to this solicitation (PRs 71-72). A summary of these comments and a Forest Service response is contained in the project record at PR 75.

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 evidence⁴. An analysis of the issues and scoping responses is included in the project record as PR 42.

⁴ 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)..."

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

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

Soil, watershed and riparian condition – Continued grazing in the project area could affect soil condition, hydrological function and riparian areas. 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.

Wilderness – Construction of new livestock facilities within the Rincon Mountain Wilderness may impact wilderness values and may not comply with the Wilderness Act (PR 38, 39).

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

2. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the management of the Rincon Mountains 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. Because monitoring indicates that the allotments currently meet or are moving toward Forest Plan objectives, and because no key issues were identified that could not be addressed through the design of the proposed action, only two alternatives were analyzed in detail.

Alternatives

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 and riparian fencing, 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 possible, maintenance of allotment boundary fences would be reassigned to adjacent permittees with the understanding that livestock are to be kept off of the allotment.

Alternative 2

The Proposed Action

The following proposed action has been developed to meet the purpose and need of the project. The proposed action consists of four components: 1) authorization, 2) improvements, 3) management practices, and 4) monitoring. In keeping with the purpose and need, the proposed action incorporates an adaptive management strategy described on page 20, below in order to provide sufficient flexibility to adapt management to changing circumstances.

1. Authorization

Grazing would be authorized on the Last Chance, Barney, Fresno, Happy Valley, Cumero, Rock Pile, Rincon and Agua Verde allotments under the following terms and conditions.

Duration, timing and frequency of grazing.

Use on the Rincon and Rock Pile allotments would be authorized during the winter dormant season (October 1 through March 31). Use on the Last Chance, Happy Valley, Barney, Agua Verde, Cumero and Fresno allotments would be authorized year-long using rotational grazing. Although authorized year-long, grazing may be limited to seasonal use on some allotments and in some years. Grazing management would be designed to insure that pastures receive periodic summer 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, and utilization. On all allotments, the timing and duration of grazing would remain similar to current practices.

Intensity of grazing.

Forage utilization will be managed at a level corresponding to light to moderate intensity (30-45%)⁵ 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. Within the Rincon Mountain Wilderness, an annual utilization guideline of 35% would apply in accordance with Forest Plan direction. On wilderness allotments with a high percentage of rest or winter-only use, annual utilization will be allowed up to 45%.

Administrative actions required to implement the decision.

Following the NEPA-based decision to authorize grazing under the terms and conditions identified above, the following actions would be necessary to implement the decision.

Grazing Permits. New ten-year term grazing permits would be issued for each allotment for the numbers and under the terms described below. The term grazing permit will identify the number, kind and class of livestock authorized and the season of use as required by Forest Service policy (FSM 2231.11). Permits will also identify the total AUMs⁶ authorized for each permit. The number and class of livestock would be allowed

⁵ Based on review of numerous grazing intensity studies, Holechek (2004) 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, PR 47).

⁶ 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

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

- **Last Chance.** 80 cow/calf pairs or equivalent yearlong, up to 1267 AUMs.
- **Barney.** 65 cow/calf pairs or equivalent yearlong, up to 1030 AUMs.
- **Fresno.** 20 cow/calf pairs or equivalent yearlong, up to 317 AUMs. The allotment would stay in non-use status for the foreseeable future.
- **Happy Valley.** 140 cow/calf pairs or equivalent yearlong, up to 2218 AUMs.
- **Cumero.** 125 cow/calf pairs and four horses or equivalent yearlong, up to 2038 AUMs.
- **Rock Pile.** 25 cow/calf pairs or equivalent, 10/1-3/31, up to 198 AUMs.
- **Rincon.** 52 cow/calf pairs or equivalent, 10/1-3/31, up to 412 AUMs.
- **Agua Verde.** 100 cow/calf pairs or equivalent yearlong, up to 1584 AUMs.

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. The use of coordinated resource management plans (CRMPs) will continue where in place and such management will be encouraged where the coordinated use of intermingled private or state lands is conducive to more effective management.

Annual Operating Plans. On an annual basis, the Forest and permittees will jointly prepare annual plans, referred to as Annual Operating Instructions (AOI), prior to each grazing year. The AOI will set forth:

- The maximum permissible grazing use authorized on the allotment for the current grazing season and the numbers, class, type of livestock, and timing and duration of use.

expression of one month's *occupancy* of the range by an animal. Range capacity can be variable and stocking is determined on an annual basis in response to actual use monitoring and current forage conditions using adaptive management.

- The planned sequence of grazing in pastures on the allotment, or the management prescriptions and monitoring that will be used to make changes.
- Structural and non-structural improvements to be constructed, reconstructed, or maintained and who is responsible for these activities.
- Allowable use or other guidelines to be applied and followed by the permittee to properly manage livestock.
- Monitoring for the current season that may include, among other things, documentation demonstrating compliance with the terms and conditions in the grazing permit, AMP and AOI.

Cumero/Keith allotment boundary adjustment. The Forest proposes an administrative adjustment to the eastern boundary of the Cumero allotment. Approximately 820 acres of National Forest, comprising the former Keith allotment, will be added to the Cumero allotment, bringing the Cumero allotment boundary to the Forest boundary in sections 17, 20 and 29 of Township 15 south, Range 19 east. No additional capacity will be assigned with this acreage.

2. Improvements

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

Existing infrastructure (waters, fences and other facilities) is considered sufficient to meet the needs of management on all but the Rincon allotment. On this allotment, there is a need to develop reliable water in the uplands in order to address poor distribution at lower elevations. This project would entail extending a pipeline from Papago Well in Section 35, T16S, R17E, approximately 1 mile northeast and uphill to a storage tank and drinker located in Section 26. The purpose of the proposed water is for resource protection. An additional water source would reduce livestock concentrations in the vicinity of Papago Well by pulling cattle up out of the bottom away from the well. Improved distribution would reduce seasonal utilization near Papago Well and contribute to improved vegetation and soil condition. No increase in the permitted number of livestock is proposed (see Authorization, above). The use of a helicopter in the Rincon Wilderness may be required to transport equipment and supplies to the site. The use of motorized equipment would be subject to prior approval by the Regional Forester.

3. Management Practices

To mitigate resource impacts, the following measures would be implemented. 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 and Best Management Practices. 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 would 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 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, if implemented, 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.
- New 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.
- Utilization of herbaceous forage will be maintained at 45% or less in order to maintain sufficient herbaceous stubble to provide cover for Montezuma quail and other wildlife that require herbaceous cover.

Heritage Resources – The objective is to protect heritage resources (historic and prehistoric sites) from direct or indirect impacts caused by ground-disturbing activities associated with the construction of range facilities and to monitor the effects of cattle

grazing on sites to ensure that adverse effects are not occurring. In general, these measures include the following:

- All 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. 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.

Wilderness Resources – Facilities within the Rincon Wilderness would be constructed to harmonize with the natural features in the area as required by Forest Service policy (FSM 2323.26a). Prior to implementation of this project, the Forest will conduct a minimum tool analysis using the Minimum Requirement Decision Guide (USDA-FS 2006) to ensure that wilderness values are protected. If the use of motorized equipment is deemed necessary to accomplish the project, the action will require prior approval of the Regional Forester.

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 identified for the project area (see Chapter 1, pp. 10-11).

Effectiveness monitoring includes measurements to track the long term condition and trend of upland and riparian vegetation, soil, and watersheds. Monitoring will be done following procedures described in the Interagency Technical Reference (1996)⁷ and the Region 3 Rangeland Analysis and Training Guide (USDA-FS 1997). These data are interpreted to determine whether management is achieving desired resource conditions, whether changes in resource condition are related to management, and to determine whether modifications in management are necessary. Effectiveness monitoring will occur at five to ten year intervals, or more frequently if deemed necessary. Examples of effectiveness monitoring include, but are not limited to dry weight rank, pace transects, pace quadrat frequency, Parker 3-step, riparian evaluations (RASES or proper functioning condition), soil and watershed condition assessments and repeat photography. Monitoring will occur at established permanent monitoring points.

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.

Implementation monitoring will occur on an ongoing basis and may include such things as inspection reports, seasonal and annual forage utilization measurements, livestock counts and facilities inspections. Utilization measurements are made following procedures found in the Interagency Technical Reference⁸ and with consideration of the Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands (Smith, et al 2007, PR 61).

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 areas⁹, 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. The Santa Catalina District Range Staff Officer and the permittees will be responsible for monitoring livestock grazing utilization. Over time, changes in resource conditions or management may result in changes in livestock use patterns. As livestock use patterns change, new key areas may be established and existing key areas may be modified or abandoned in cooperation with the permittees.

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

Adaptive Management

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

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

⁸ 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.

⁹ 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.

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 2. Comparison of the Alternatives.

Attribute	Alternative 1	Alternative 2
National Forest Policy and Forest Plan Consistency	Consistent with Forest Plan. Not consistent with policy (FSM 2202.1, 2203.1)	Consistent with Forest Plan and policy. Consistent with standards and guidelines.
Meets purpose and need	N/A	Yes. Balances use with capacity. Provides management flexibility. Provides for necessary infrastructure.
Effect on Wildlife and Plants	No Effects from grazing.	Effects mitigated. Light to moderate utilization and high percentage of rest reduces localized effects to habitats.
Effects on soil and watershed condition	No effects from grazing. Improvement in soil and watershed cover over time.	Moderate use contributes to watershed stability. Concentrations of cattle may contribute to localized soil impairment.
Effects on upland vegetation	No effects from grazing. Increasing plant cover and litter over time.	Moderate use levels and emphasis on winter use maintain satisfactory conditions.
Effects on Wilderness	No effects from grazing or facility development.	No increase in grazing use. Use levels consistent with Forest Plan guidance. Effects on wilderness mitigated through minimum tool use.

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. 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.

Past, present and future activities identified for consideration of cumulative effects.

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

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

Human Activities. There are no developed recreational facilities (campgrounds and picnic areas) in the project area; however, the area is popular for dispersed camping. In addition to camping, activities in the project area include hiking, hunting, wildlife watching and vehicle use on surfaced and unsurfaced roads. During holiday weekends, significant all terrain vehicle (ATV) use occurs in the vicinity of Happy Valley. Impacts from these activities are short term and primarily consist of minor ground disturbance in popular camping areas and short term wildlife disturbance. Private land inholdings are found in Happy Valley. Uses on these lands are largely rural and many are managed as part of ongoing grazing operations. However, there is potential for residential development on these inholdings. Much of the area is roadless, but the Happy Valley Road (FR 35) provides access to popular trailheads and camping sites on the east side of

the Rincon Mountains. Parts of this road cross or lie adjacent to the Paige Creek and Ash Creek drainages and ongoing vehicle use may affect riparian channel conditions.

Invasive Species – Lehmann lovegrass is found in many sites at lower elevations in the project area. This grass provides acceptable forage and ground cover, but its presence in the community will tend to suppress vegetation condition estimates because non-native plants are not counted in Forest Service estimates of vegetation condition. Buffelgrass (*Pennisetum ciillare*) is an introduced African perennial grass that has invaded much of southern Arizona and is beginning to infest lower elevations in Saguaro National Park and the Coronado National Forest. It has dispersed along roads and trails and seeds are easily carried by the wind. Nearly all infestations are found in ungrazed sites, and grazing does not appear to be a significant or necessary dispersal mechanism in the Tucson area. One small patch of buffelgrass is found in the project area on the Agua Verde allotment, and the Forest will likely propose to treat this and any new infestations in order to control the spread of the species. Treatments would involve the spot application of herbicides and/or hand grubbing.

Wildlife

Affected Environment

The Rincon Mountains lie at the northern edge of the “sky island” region of southwestern North America (McGlaughlin 1995). The region is noted for its high level of biodiversity. The allotments are located within Arizona Game Management Unit 33. Broadleaf woodland, chaparral, desert grassland and riparian vegetation provide habitat for a variety of native wildlife. Larger species found in the area include white-tailed deer, mule deer, javelina, mountain lion and black bear. Other smaller species that may occur within the project area include coyote, gray fox, bobcat, coati, striped, hooded and spotted skunks, raccoon, badger, and ringtail. The area is used for foraging and roosting by a wide variety of bat species (Sidner 1995). The mountains are located in an important migratory corridor for numerous birds and supports high avian diversity. There are numerous drainages in the area but aquatic habitats are limited because streams do not flow year round.

Threatened and Endangered Species.

Three species listed or proposed for listing under the Endangered Species Act were identified in previous consultations as occurring within the project area or for which suitable habitats may be present. In addition to the three species identified below, the Cactus ferruginous pygmy owl (*Glaucidium brasilianum cactorum*) was also identified in previous consultations. On April 14, 2006, the U.S. Fish and Wildlife Service removed the Arizona distinct population segment of the cactus ferruginous pygmy owl from the Federal List of Endangered and Threatened Wildlife (71 FR 19452, PR 44). Effects of the current proposed action on this species are considered in a separate Biological Evaluation prepared for Forest Service Sensitive Species in the project area (see below).

Lesser Long-nosed Bat (*Leptonycteris curasoae yerbabuenae*) (LLNB). The LLNB roosts and forages throughout suitable habitats on the Coronado National Forest between

July and September each year. The species feeds on the nectar and pollen of paniculate agaves, primarily *Agave palmeri*, and the nectar, pollen and fruit of columnar cactus such as saguaros.

No reliable historic records of this bat are known from the project area (R. Sidner pers. comm. 2007). Mist netting at 7 localities in the Rincon Mountains over 10 nights in 1993 and 1994 did not detect the species (Sidner 1995). Known roosts in the vicinity of the Rincon Mountains include a small roost at Youtcy Cave in the eastern Redington Pass Area, last known to be active in 1994. Additionally, there is a roost on Saguaro National Park in Box Canyon, north and west of the project area (USDI-FWS 2002). A third roost is located in the Rincon Gold mine, 3 miles east of the project area.

The analysis area does not support large numbers of saguaro cacti, although a few are found in isolated areas in the lowest elevations where elements of Sonoran desertscrub vegetation occurs. Agaves are patchily distributed throughout the allotments. Isolated plants or small clusters of plants are spread across the landscape, and many of these are found in steep rocky areas that are not grazed. Because the LLNB readily flies long distances from roosts to forage, it has been postulated that such low density, widely dispersed agave populations provide connectivity for bats between and within mountain ranges (USDA-FS 2004b). Ober et al (2000) reported LLNB commuting distances between roosts and foraging areas ranging from 2.8 to 28.2 km (1.7-17.5 miles), with an average commute of 18.9 km (11.7 miles). Because agaves and a few saguaros are found throughout the project area and at least two active roosts are within foraging distance of the allotments, the project area is considered potential habitat.

Mexican spotted owl (*Strix occidentalis lucida*). The Mexican spotted owl (MSO) was listed as threatened in 1993 (58 FR 14248) and critical habitat was designated in 2004 (68 FR 65020). No MSO protected activity centers (PACs) occur on the Rincon Mountains allotments. The nearest PACs are on USDI Park Service managed lands on the East Unit of the Saguaro National Park. No grazing occurs on the Park.

Portions of the allotments fall within mapped critical habitat (Figure 9), but constituent elements necessary for MSO habitat are very limited in the project area. In general, constituent elements¹⁰ are found at higher elevations in mixed conifer and ponderosa pine forests inside of Saguaro National Park. Small areas of suitable canyon habitats are found in upper elevations of some of the larger canyons in the project area, but these are largely inaccessible to grazing livestock due to natural features. Within the project area, grazing occurs in desert grasslands and open woodlands that do not include the necessary biological or physical features to support nesting, roosting or foraging by MSO.

Southwestern willow flycatcher (*Empidonax traillii extimus*) The Southwestern willow flycatcher was listed as Endangered on February 27th, 1995. Critical habitat was designated on October 19th 2005 and includes a portion of the San Pedro River some twenty miles from any portion of these allotments. The species is not known to occur on

¹⁰ Primary constituent elements are the physical and biological features of the habitat that support nesting, roosting and foraging. Primary constituent elements for the MSO are identified in the final rule listing critical habitat for the species (USDI 2004).

the Forest. In 2002, a determination of *likely to adversely affect* was included for this species on the Happy Valley Allotment primarily because of riparian habitat along Paige Creek was considered to have the potential to develop into suitable flycatcher habitat, although Paige Creek was not considered suitable at the time. Habitat along Paige Creek remains unsuitable for willow flycatcher nesting based current understanding of the species habitat needs (PR 54, 62). The extent and density of tree canopy is not adequate to provide suitable nesting habitat and hydrological conditions are not conducive to development of dense multi-storied riparian canopy required by the flycatcher.

Sensitive Species

Forest Service Sensitive species are those species that have been identified by the Regional Forester as of concern for reduction in population viability as evidenced by 1) significant current or predicted downward trends in population numbers or density, or 2) significant current or predicted downward trends in habitat capability that would reduce a species' distribution (FSM 2670.5). Sources used to identify these species included 1) 2007 Regional Foresters list¹¹, 2) records available through the Arizona Game and Fish Department's Heritage Data Management System, and 3) Forest Service project files. Many species are on the Forest Service's Regional Sensitive Species list because their distribution and habitat requirements are poorly known, but are thought to be rare. Their presence or absence within the project area is inferred because suitable habitats are present. Sensitive species potentially occurring in the project area are identified in the effects analysis section, below.

Management Indicator Species

Forest Plan direction for Management Indicator Species (MIS) is to maintain or improve occupied habitat (PR 1, 63). Forest-wide trends of all MIS have been assessed and are reported in the Forest-wide Status Report for Management Indicator Species (USDA-FS 2006, PR 63). The background information and conclusions of this report are incorporated by reference. Five species and the group of cavity nesters are known to occur or potentially occur within the project area. A description of the selection criteria and in-depth evaluations of project-level impacts are contained in a separate report (PR 52).

Primary and Secondary Cavity Nesters. Primary cavity nesters are those species that excavate and nest in cavities, whereas secondary cavity nesters use cavities excavated by primary cavity nesters. On the Forest, cavity nesters occur primarily within forested areas including riparian habitats, Madrean evergreen woodlands, coniferous forests, and in Sonoran desert habitats that contain saguaro cactus (*Carnegiea gigantea*). Within the project area, woodland and riparian vegetation types comprise suitable habitat for cavity nesters. Severe drought, insect activity, and wildfires are the leading causes of tree mortality. Dead trees remain standing and continue to provide suitable substrate for cavity nesters to excavate holes. These causes of tree mortality have occurred and continue to occur in the Rincon Mountains therefore, the trends in the quantity and

¹¹ Regional Forester's Sensitive Species List of Plants and Animals, October 1, 2007.

quality of cavity nester habitat are considered stable or upward. Suitable habitats are not considered limiting for cavity nesters.

In general, cavity nesters require large, older age class trees and snags to provide a suitable substrate for cavities. Although the species in this group specifically nest in cavities, some of them make use of many other habitats in completing their life cycles. For example, the American kestrel and eastern bluebird often forage in open grasslands, and many members of the group winter in Mexico or Central America.

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

Bell's Vireo (*Vireo bellii arizonae*). Bell's vireo is included in the *Species Needing Dense Canopy* and *Threatened and Endangered Species* indicator groups in the Coronado Forest Plan. The species was selected to represent riparian understory condition at elevations below 4,400 feet. It could be potentially impacted by activities that result in the loss of dense low elevation riparian habitats. Although Bell's Vireo numbers have declined in parts of the species' range, notably California, they are common and widespread in Arizona (Corman and Wise-Gervais 2006). This species occurs near rivers and desert washes with thick understory vegetation. Most high quality habitat for the species occurs off of the Forest at lower elevation river valleys between the mountains. Suitable habitats are limited in the project area, primarily because most of the project area is above the normal elevational range of the species. The Arizona Breeding Bird Atlas characterized the statewide population as stable or slightly increasing (Corman and Wise-Gervais 2006). Using only data from the Sonoran desert, Bell's vireo populations show an upward trend of 3.4%, based on a smaller sample.

Northern Beardless-Tyrannulet (*Camptostoma imberbe*). Northern beardless tyrannulet is included in the *Riparian Species*, *Species Needing Dense Canopy*, and *Special Interest Species* indicator groups. It is a tropical species that reaches its northern extent in southeastern Arizona. The species was selected as an indicator for the Forest Plan because it inhabits dense riparian mesquite understory and it could be an indicator for activities such as grazing and fuelwood harvest that alter that habitat. It is also a Forest Service sensitive species. The general breeding distribution of the species has changed little since the mid-1990s (Corman and Wise-Gervais 2006).

Montezuma (Mearns') Quail (*Cyrtonyx montezumae*). Montezuma quail is included in the *Species Needing Herbaceous Cover*, *Game Species*, and *Special Interest Species* indicator groups. This species is identified as a priority bird species in the Arizona Partners in Flight Bird Conservation Plan (Latta 1999). Across the Forest, the amount of potential habitat has not changed significantly since 1986, but habitat suitability has likely improved as a result of improved livestock management and reductions in utilization over the past two decades. Harvest data provide an index to population trends. Data collected by the Arizona Game and Fish Department (AGFD) indicate that

populations have fluctuated over time, but are currently similar to mid-1980's levels (PR 52, 63).

The Rincon Mountains are identified as secondary range for Montezuma' quail by AGFD (AGFD 2005, PR 49). The species potentially occurs in low densities throughout suitable broadleaf evergreen woodland, deciduous and evergreen riparian forest habitats in the project area. Corman and Wise-Gervais (2006) reported that the species was encountered in the Rincon Mountains during the compilation of the Arizona Breeding Bird Atlas.

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

The Coronado National Forest Plan identifies 1,430,071 acres of occupied habitat for the species in all vegetation types on the Forest (USDA-FS 1986, PR 1). The amount of occupied habitat has not changed significantly since 1986. Several large fires have occurred on the Forest and within the project area; these fires have likely improved deer habitats by creating a variety of seral stages that benefit deer. The quantity and quality of white-tailed deer habitat is considered similar to that available in 1986. The entire project area is considered suitable habitat, and represents approximately four percent of the total occupied habitat on the Forest.

Survey data are collected by the Arizona Game and Fish Department (AGFD) on the basis of Game Management Units. The project area is included in Game Management Unit 33. AGFD does not typically estimate populations, but monitors trends based on fawn survival and recruitment. Fawn survival over the past five years (2002-2007) in Unit 33 has averaged 27%, somewhat below the southeast Arizona average of 37%. Southeast Arizona whitetail harvest trends have remained relatively stable over the past 5 years (2002-2007).

Black Bear (*Ursus americanus*). Black bears are wide ranging habitat generalists that prefer areas of dense cover and high vegetative diversity. They are included in the *Riparian Species*, *Species Needing Diversity*, and *Game Species* indicator groups. Because of the "sky island" nature of the CNF, black bear populations tend to be isolated from each other by wide expanses of non-suitable habitat between the mountain ranges. Some movement between ranges is known to occur, but is not common. The Forest Plan identified 641,113 acres of occupied habitat in all vegetation types except plains grassland and dry desert riparian. Nearly all of the project area could be considered suitable as bear habitat. Because of their secretive and solitary nature, bears are difficult to census, and there have been no recent attempts to census bear on the Forest (USDA-FS 2006). AGFD estimates populations based on qualitative analyses of habitat carrying capacity. There is currently no hunting season for bear in Unit 33.

Environmental Consequences - Wildlife

Threatened and Endangered Species

Effects of the ongoing and long-term grazing activities on the allotments were previously evaluated through consultation in 1998 and 2002 (USDI-FWS 2002, PR 43) (Table 3). Effects of Forest Plan implementation were evaluated in the 2005 consultation on (USDA-FS 2004a, USDI/FWS 2005). Effects of livestock grazing on Mexican Spotted Owl critical habitat were evaluated through consultation in 2004 (USDA-FS 2004c, PR 45). Livestock grazing in the project area is currently managed to comply with biological and conference opinions from the U.S. Fish and Wildlife Service associated with these consultations. Based on 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 2008 (PR 54, 62). Informal consultation was concluded on July 15, 2008 (PR 64).

Previous effects determinations have been developed using various versions of Regional Guidance Criteria. The criteria were developed originally in the late 1990s to provide consistent analysis for species that occur on more than one Forest in the Southwest Region of the Forest Service. The Guidance Criteria have been revised periodically, most recently in 2004; these are now known as the Regional Framework for Streamlining Informal Consultation for Livestock Grazing Activities (USDA-FS 2004b). In the following evaluations, the 2004 framework criteria were applied to the effects analysis, in combination with knowledge of on-site resource conditions, to assess the effects of the proposed action. Because of the similarities in plant and animal communities on the allotments, the allotments are treated together. Information on the natural history, distribution, status and potential effects of grazing on the species considered below is contained in the 2002 Biological Assessment of Ongoing and Long-term Grazing on the Forest (USDA-FS 2002) and the associated Biological Opinion on the continuation of livestock grazing on the Forest (USDI-FWS 2002). This information is incorporated by reference.

Table 3. 2002 Consultation determinations for threatened and endangered species occurring or potentially occurring in the Rincon Mountains allotments. NE=No Effect; NLAA= Not Likely to Adversely Affect; LAA= Likely to Adversely Affect.

Allotment	Lesser Long-nosed Bat	Mexican Spotted Owl	Mexican Spotted Owl Critical Habitat	Southwest Willow Flycatcher
Last Chance	LAA	NE	NLAA	NE
Barney	LAA	NE	NLAA	NE
Fresno	NE	NE	NLAA	NE
Happy Valley	LAA	NE	NLAA	LAA
Cumero	LAA	NE	NLAA	NE
Rock Pile	NLAA	NE	NLAA	NE
Agua Verde	LAA	NE	NLAA	NE
Rincon	NLAA	NE	NLAA	NE

Lesser long-nosed bat. Direct effects would be related to disturbance of known roost sites. No roosts are known to occur on the allotments, so no direct effects to the LLNB are anticipated as a result of the proposed action. If a roost is discovered, it will not be disturbed or modified pursuant to conservation measures already in place (USDI 2002) and mitigation measures in the proposed action.

Indirect effects may be associated with damage to agaves or saguaros either as a result of ground-disturbing livestock management activities or through herbivory by livestock on agave stalks (USDI-FWS 2002). Construction activities will be minimal and restricted to the potential placement of one water facility on the Rincon allotment. Mitigation is in place to avoid the destruction of agaves as a result of construction activities. Grazing during the May-June agave bolting (flowering) season has been inferred to increase the susceptibility of flowering agaves to livestock herbivory (USDI-FWS 2002). However, over the course of a two-year study, Widmer (2002) found no significant difference between areas grazed by livestock during the agave flowering season and ungrazed areas. Because bolting agaves are often heavily used by wildlife, especially deer, she concluded that removing cattle during the bolting season does not necessarily ensure a significantly lower level of herbivory. Other studies and monitoring have produced similar inconclusive results (Bowers and McGlaughlin 2001, USDA/FS 2007). Livestock use on agaves appears to be correlated to forage abundance. Thus, grazing on agaves by both livestock and wildlife increases in dry years (Widmer 2002, USDA-FS 2007). During drought, the Forest implements drought policies (PR 65) that serve to reduce stocking when forage is limited. Livestock herbivory on agaves diminishes significantly at distances greater than 1.21 km (0.75 mi) from water (Widmer 2002). Thus, many remote (from water) agave populations are likely to be unaffected by livestock grazing, regardless of the season of use. All of the allotments are relatively poorly watered and include substantial acreage that is both not grazed greater than 0.75 mile from water. Thus, many agaves are not exposed to livestock use.

As proposed, grazing on the Rockpile and Rincon allotments would occur entirely outside of the agave flowering season and the Fresno allotment would remain in non-use for the foreseeable future. The other five allotments would be authorized for grazing year-round, but management would involve the deferment of several pastures each year. These management strategies, combined with the presence of high quantities of grass and browse in this project area suggests that cattle are unlikely to cause significant damage to agave plants.

In summary, there are no known roosts in the project area and the species appears to be rare or absent from the allotments. Project design features and mitigation measures should limit the indirect effects of the proposed action on agaves to a small number of individual plants. The prescribed season of use and pasture deferments should assure that the majority of the project area is not grazed during the agave flowering season. Livestock herbivory is predicted to affect a small number of agave stalks, especially in the vicinity of waters. However, the intensity of livestock herbivory in grazed pastures is not expected to be discernable from herbivory associated with wildlife across the allotments. The determination is *may affect, not likely to adversely affect* for all eight allotments.

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

No PACs are located on any of the allotments. Adjacent Park Service land where PACs are located is excluded from livestock grazing by the Park boundary fence. Grazing may occur in mapped critical habitat, but areas that include appropriate habitat characteristics to comprise suitable habitat are small in size and largely inaccessible. Primary constituent elements¹² are located in steep, inaccessible sites where livestock grazing is limited by topography. Moreover, the proposed light to moderate utilization of 30-45% should be sufficient to provide residual herbaceous and woody vegetation to provide mammal prey cover and to support prescribed and natural fires necessary to reduce the risk of catastrophic wildfires.

Based on this analysis, neither alternative will affect Mexican spotted owl. No protected or restricted habitats are found in the project area. The proposed action *may affect, but is not likely to adversely affect* designated critical habitat on the Last Chance, Barney, Happy Valley, Cumero, Rock Pile, Rincon and Agua Verde allotments because grazing occurs within designated critical habitat, but outside of suitable habitats. The effects of limited grazing are considered insignificant and discountable. The Fresno allotment is outside of mapped critical habitat. There will be *no effect* to MSO critical habitat on this allotment.

Southwestern Willow Flycatcher. (Happy Valley allotment only). Paige Creek has been fenced for over ten years and, while riparian tree recruitment and density have improved, existing conditions are well short of those considered necessary for the flycatcher. There is very limited, if any, potential for the Paige Creek riparian area to develop into suitable habitat for flycatchers.

Based on the above, implementation of the proposed action will have *no effect* on Southwestern Willow Flycatcher for the following reasons:

- Southwestern willow flycatchers are not present in the action area during any time of the year.
- The Paige Creek riparian area does not possess the foliage and canopy characteristics to comprise suitable habitat for the flycatcher and does not appear to have the hydrological or botanical potential to develop such characteristics (PR 62).
- Grazing activities do not affect riparian characteristics because Paige Creek is fenced to exclude livestock.

¹² Primary constituent elements are the physical and biological features of the habitat that support nesting, roosting and foraging. Primary constituent elements for the MSO are identified in the final rule listing critical habitat for the species (USDI 2004).

Sensitive Species

Effects to sensitive species have been analyzed in a biological evaluation prepared for this project (PR 51) and are summarized below.

For the following species, a Forest Service Biologist has determined that the proposed action may affect individuals, but is unlikely to result in a trend toward federal listing or a loss of viability.

Common Black Hawk (*Buteogallus anthracinus*). This is a riparian obligate species nesting along perennial drainages with mature broadleaf gallery forests. There is one nesting record from the project area in Paige Creek. Suitable habitats are limited due to the lack of permanent water. The known nest site and much of the suitable habitat occurs within a fenced livestock enclosure, but the territory did not appear to be occupied during a field visit in May 2008. Within the limited suitable habitats, effects would be confined to minor disturbance associated with livestock grazing outside the enclosure.

Northern Gray Hawk (*Asturina nitida maxima*). Gray Hawks breed in Sonoran Riparian Deciduous Forest and woodland in southern Arizona beginning from about mid-March. There is a breeding record from Turkey Creek on the Happy Valley Allotment. Gray Hawks nest regularly in San Pedro River mainstream riparian areas some 15 miles from the project area. Potential habitat exists within the project area in Ash and Paige creeks. These areas are fenced to exclude cattle. Within the limited suitable habitats, effects would be limited to minor disturbance associated with grazing livestock.

Lowland leopard frog (*Rana yavapaiensis*). Populations of Lowland leopard frogs are known from Turkey Creek Spring on the Saguaro National Park and from Buckhorn Spring on the eastern portion of the Happy Valley Allotment. These populations were apparently extirpated during the drought of 2002. In addition to drought, threats facing this species include disease (especially chytridiomycosis), predation by bullfrogs, crayfish, and nonnative fishes, global climate change, grazing, and altered hydrology (Sredl, et al 1997, Clarkson and Rorabaugh 1987, Rosen, et al 1994).

Leopard frog populations are often small and their habitats are dynamic, resulting in a relatively low probability of long-term population persistence. When populations are relatively close together and numerous, extirpated sites can be recolonized (USFWS 2002). Although the species does not occur in the project area at present, the potential exists that the species could recolonized suitable sites in the future if suitable source populations are present. No nearby populations are known, but the area has not been extensively surveyed. Watershed and riparian conditions are good throughout the project area, but permanent water is quite limited. The best suitable habitats associated with Paige Creek are fenced. Elsewhere, effects would be limited to minor disturbance associated with seasonal livestock grazing.

Cestus Skipper (*Atrytonopsis cestus*). This butterfly ranges from northern Mexico into southern Arizona. Habitat is upper Sonoran grassy thorn forest and open woodland. It is variously referred to as "fairly common" to "rare and local" in southern Arizona mountain ranges (NatureServe 2007). There are no known threats and the effects of grazing are undetermined. Larvae are thought to feed on various grasses and adults are

nectivorous. Effects would be limited to trampling or consumption of larvae found on grass plants when grazed by cattle.

Chihuahuan sedge (*Carex chihuahuensis*). This species grows in wet soil of drainages in pine-oak forests and riparian woodlands. There are records from the Santa Catalina EMA and adjacent Saguaro National Park, but no records from the project area. Suitable habitats are found in major drainages in the project area. If it occurs, individual plants could be grazed.

Counter clockwise fishhook cactus (*Mammillaria mainiae*). This small cactus occurs in sandy soils in desert grassland and oak woodlands. It is unknown from the Rincon Mountains, but suitable sites are present in the project area. Populations would be susceptible to heavy grazing that degrades watersheds or individuals may be susceptible to trampling. Light seasonal grazing as proposed should maintain watershed conditions.

Lemmon's stevia (*Stevia lemmonii*). This woody shrub is found in rock slopes and streambeds in pine-oak woodlands, desert grasslands and upper Sonoran foothills. Known locations are at low elevations on the Happy Valley Allotment. It would be susceptible to heavy grazing that degrades watersheds or individuals may be susceptible to trampling. Light seasonal grazing as proposed should maintain watershed conditions.

Shade violet (*Viola umbraticola*). This is a perennial herb that grows in shady canyon bottoms in riparian pine-oak forest. Specimens have been collected in upper Sabino and Bear canyons (Malusa 2001), but not from the project area. Suitable habitats may be found in larger drainages in the project area. If the species occurs, individuals might be grazed.

For the following species, a Forest Service Biologist has determined that the proposed action would have *no impact*.

White-nosed coati (*Nasua narica*). This species is fairly common oak woodlands and riparian habitats throughout the Forest, including the Santa Catalina EMA. The species is considered imperiled in New Mexico, but is relatively common 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 is not expected to affect woodland habitats for this species.

Mexican long-tongued bat, California leaf-nosed bat, Western yellow bat, Western red bat, Allen's lappet-browed bat, Pale Townsend's big-eared bat, pocketed free-tailed bat, Greater western mastiff bat. All eight bat species are considered together because habitat needs and effects are similar. Populations of bats occurring in the project area would be affected primarily by disturbance or destruction of roost sites, which are primarily caves, crevices, abandoned mines or, in the case of the western red bat and western yellow bat, riparian trees. Bat roosts 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. Therefore, the proposed action would not affect caves or mines. Grazing in riparian areas would not be of sufficient intensity or duration to alter the composition or recruitment of mature riparian trees.

Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) (CFPO).

Throughout its range the CFPO occurs at low elevations, generally below 4000 feet. Two allotments – The Rincon and Agua Verde Allotments – include lands below 4000 feet that could provide potential habitat. A single CFPO was found by Forest Service personnel in Posta Quemada Canyon on the Rincon Allotment on April and June of 1998. Subsequent surveys of several canyons in the southern Rincon allotments (Rincon, Agua Verde, Rock Pile and Cumero) failed to detect the species. The 1998 observation likely represented a dispersing individual and no nesting territory was established. At the most, portions of the allotments represent potential habitat for occasional dispersing individuals. Managed grazing will not affect the composition of the habitat in such a way to prevent its use by dispersing individual owls.

Northern beardless tyrannulet. The Northern beardless tyrannulet is the only U.S. representative of a subfamily of tropical flycatchers that extends to South America. The species' range is centered in Mexico and Central America where it is found in lowland tropical deciduous forests. It only reaches the U.S. in extreme southern Arizona, and only in small numbers (Tenney 2000). Mesquite, hackberry, and cottonwood thickets in valleys are the preferred habitat for this species during the breeding season (Taylor 1995a, b). Preferred habitats for the species are generally at lower elevations than are found in the project area. The species is considered critically imperiled in New Mexico based on its extremely limited distribution. In Arizona it is considered fairly common and breeds regularly along the lower San Pedro River, Sonoita Creek and, on the Forest in Sycamore Canyon in the Atascosa Mountains. Arizona Game and Fish Department records indicate only two occurrences in or near the project area. These are in low elevation drainages in the Redington and Bellota allotments. Potential habitat for this species occurs on Happy Valley and Cumero Allotments.

The primary threats to the species are related to deforestation of lowland deciduous riparian habitats in Mexico and Central America. Managed seasonal livestock grazing as proposed is not expected to affect riparian regeneration. Riparian monitoring indicates that riparian conditions are stable or upward in the project area, under current management.

Abert's towhee (*Pipilo aberti*). This species is widely distributed throughout southern and western Arizona, nesting in dense vegetation ranging from riparian thickets to suburban back yards (Corman and Wise-Gervais 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 and the species is common in suitable habitat throughout the project area.

The proposed action should not affect the density or distribution of woody vegetation preferred by this species. It appears to tolerate disturbance, as evidenced by its ability to nest in urban and agricultural settings.

Western barking frog (*Eleutherodactylus augusti cactorum*). The western barking frog is associated with porous outcroppings of limestone or rhyolite on hillsides within the Madrean evergreen woodlands. This nocturnal species remains in rock crevices most

of the year, emerging only during the summer rains, when males call in groups on rainy nights (Goldberg and Schwalbe 2005). Within the CNF, they have been documented in the Huachuca, Pajarito and Santa Rita Mountains but not in the Rincon Mountains. Potentially suitable habitat exists in the Happy Valley Allotment. There is no information available on the effects of grazing on the species, but based on the species' tendency to remain in rock crevices, its nocturnal habit and the lack of records in the project area, no impacts are expected.

Reticulate gila monster (*Heloderma suspectum suspectum*). This species is threatened by illegal collecting and, in urbanized areas, loss of habitat. The species occurs in lower elevations throughout the project area. There are no known effects related to livestock grazing.

Aravaipa (Galiuro) sage (*Salvia amissa*). This species occupies areas from 1,500-5,000 feet elevation in shady canyon bottoms near streams. Vegetation associations usually include an understory of mature sycamore, ash, walnut, and mesquite. Surveys in 1992 failed to locate plants. It is believed to be extirpated from the Santa Catalina EMA. Most suitable habitats in the project area are fenced.

Bartram stonecrop (*Graptopetalum bartramii*). Habitat is rocky outcrops and cliffs in shrub live oak-grassland communities along meandering arroyos on the sides of rugged canyons, often in litter and shade with Madrean evergreen woodland at 3,900 to 6,700 feet elevation. The species has been recorded in the Santa Catalina EMA in the Molino Basin area and northern half of Saguaro National Park. Potential habitat is present in the project areas. Plants are unlikely to be susceptible to trampling by livestock, because most specimens are found on cliffs.

Chiricahua mountain brookweed (*Samolus vegans*). This plant grows in moist sandy soil around springs, seeps and along streams at elevations of 4,000-7,200 feet. There is a very old (1916) record from the vicinity of Mount Bigelow near the top of the Santa Catalina Mountain range and another from near Mica Mountain on the Saguaro National Park. The species is not known from the project area.

Management Indicator Species.

Effects to management indicator species have been assessed in a separate report (PR 52) and are summarized below. Based on the following discussions, neither alternative is expected to cause a detectable change in species populations or a loss of occupied habitat for any of the species considered.

Cavity nesters. Cavity nesters generally benefit from conditions that promote uneven aged forests with older age trees for cavities and sufficient recruitment of younger trees. Grazing-related activities would affect cavity nesters only if they are of sufficient scale and intensity to change the rate of regeneration of cavity bearing trees. Much of the uplands in the project area are wooded, and dead standing snags are abundant as a result of fires from the mid 1990s to the present. No activities are proposed that would change the amount or distribution of cavity bearing trees in upland sites. In riparian areas, grazing potentially affects the recruitment of trees through trampling or browsing on small trees by livestock. Many riparian areas are fenced and riparian monitoring data

indicate that riparian recruitment is good, showing little effect of livestock grazing (PR 57). Pasture rest and deferment and/or growing season rest will limit the amount of time livestock are in any pasture, allowing for recruitment of riparian vegetation where the potential exists. The proposed action is not anticipated to affect the amount or distribution of trees in the project area.

Bell's vireo. The species is affected by the loss of dense riparian nesting habitat. Riparian areas in the project area are stable and in many places, fenced to exclude cattle. No actions are proposed that would reduce available dense riparian canopy cover. Much of the project area is above the normal elevational range for the species (below 3,500 feet).

Northern Beardless Tyrannulet. Effects of the alternatives to the species are identified above under Sensitive Species. Riparian areas in the project area are stable, and no actions are proposed that would reduce available dense riparian canopy cover.

Montezuma Quail. Overgrazing has been shown to be deleterious to Montezuma' quail due to its effects on cover. The maintenance of grass height over 6" is necessary to provide sufficient cover for the birds to hide from predators (Heffelfinger and Olding 2000). In a study of the effects of human activities and habitat conditions on Montezuma' quail populations from 1997 to 2000, Bristow and Ockenfels (2000) (PR 50) found no clear population trends in any of four study areas which included both moderately grazed and ungrazed sites. Their study and other studies suggest that population trends of this species appear to be dependent upon summer monsoon and winter rains (Brown 1989, Stromberg 1990) and there may be significant population fluctuations on an annual basis. Bristow and Ockenfels (2000) concluded that grazing management as practiced on the Coronado National Forest was not significantly affecting Montezuma' quail populations.

Montezuma' quail occur only in low densities in the project area and primarily in the Happy Valley, Cumero and Fresno allotments. *Alternative 1* is expected to result in the greatest development of herbaceous vegetation over the life of the project. This alternative would maximize the amount of residual herbaceous cover that provides Montezuma' quail habitat. However, light to moderate grazing that leaves adequate cover apparently benefits habitat quality when compared to ungrazed areas by increasing the availability of food resources (Brown 1982, Bristow and Ockenfels 2000). Therefore, the No Action alternative may not be optimum for Montezuma' quail. In addition, Montezuma' quail populations are highly correlated to the amount and timing of summer precipitation. In the absence of sufficient precipitation, the effects of management changes alone on long-term trends for quail populations may not be discernable. *Alternative 2* should maintain sufficient levels of herbaceous cover by restricting utilization to 45% or less across the landscape.

White-tailed Deer. Heavy grazing prior to and during the fawning period reduces hiding cover and may reduce fawn survival and recruitment (Ockenfels et al. 1991). Overgrazing by livestock may also reduce available grass forage and lead to increased livestock use of browse plants and forbs used by deer. However, grazing as proposed would not be of sufficient intensity or duration to affect large scale reductions in cover or result in competition. Grazing as proposed continues management practices that have been in place for several years and that have allowed white-tailed deer to persist.

Black Bear. Black bear populations are highly correlated to annual precipitation and its effect on the production of preferred foods such as oak acorns and manzanita berries (mast). Manzanita, oak and other mast-producing plants are abundant throughout the project area. Grass can be seasonally important in black bear diets, especially in the spring. Given the moderate use grazing levels and rest and deferment proposed, competition for forage would not be expected under any of the action alternatives. Bear depredation on livestock has been reported in some of the allotments and there would be a potential that this would continue to occur under *Alternative 2*. The take of depredating bears is regulated by the Arizona Game and Fish Department. No depredation harvest was reported from the project area for the period of 2002-2006 (AGFD 2008)

Neotropical Migratory Birds and Important Bird Areas

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

Species of Concern

The Arizona State Partners in Flight Bird Conservation Plan (Latta 1999) lists priority species of concern by vegetation type. Eleven species have been identified that may occur in or near the project area. Several of these species are also Sensitive or MIS. Potential effects to these species are summarized in Table 4.

Table 4. 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
Buff-breasted Flycatcher	Madrean Pine-Oak Woodland	Apache and Chihuahua pines with herbaceous understory	Suitable habitats ungrazed (See MIS analysis and biological evaluation)
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.
Cactus Ferruginous Pygmy-owl	Sonoran Desertscrub	Arizona Upland with high foliage height diversity and high plant species diversity.	Elevations and topographic relief tend to limit habitat suitability. No nesting records

Species	Habitat Type	Habitat Description	Effects
		Flats and alluvial fans below 4,000 feet.	from project area. No effects due to lack of suitable habitat. (See biological evaluation).
Costa's Hummingbird	Sonoran Desertscrub	Lower Sonoran life zone. Small dense trees and shrubs below 3,300 feet.	Project area is above elevation range of the species. No effects due to lack of suitable habitat
Gilded Flicker	Sonoran Desertscrub	Associated with saguaro in Sonoran desert uplands.	Project actions will not affect saguaro densities.
Purple Martin	Sonoran Desertscrub	Associated with saguaro in Sonoran desert uplands.	Project actions will not affect saguaro densities.
Rufous-winged Sparrow	Sonoran Desertscrub Desert Grassland	Grass and thorny brush in Sonoran desert. Prefers flatter sites and avoids hillsides.	Moderate grazing intensities should retain sufficient grass cover. Suitable habitats limited to the edge of the project area.
Common Black-hawk	Low Elevation Riparian	Sycamore, cottonwood gallery riparian near open water.	Growing season rest in most riparian areas should assure recruitment of young trees. No removal of mature trees proposed. (See biological evaluation).
Lucy's Warbler	Low Elevation Riparian	Cottonwood-willow riparian and dry washes with dense vegetation (mesquite bosques). Cavity nester.	Proposed action will not affect nesting habitat. No thinning or tree removal proposed.
Red-faced Warbler	High Elevation Riparian	High elevation canyons containing maple, oak and sycamore with dense midstory. Ground-nester.	Primary threat is logging; suitable habitats largely ungrazed. Project will not affect woody species needed by the bird.

Important Bird Areas (IBA)

No portions of the proposed project area are identified as an IBA by the National Audubon Society (<http://www.tucsonaudubon.org/azibaprogram/ibalist.htm>).

Important Overwintering Areas

The Rincon Mountains are in the northern end of the Basin and Range region of southwestern North America where vegetation influences from the Rocky Mountain, Sierra Madrean, Chihuahuan and Sonoran deserts and plains grasslands converge. These influences combined with high topographic relief result in high diversity of plant, insect, and animal species over relatively small areas. The mountains are located in an important migratory corridor for numerous avian species. Over 100 species are typically counted

during the Christmas bird count in the adjacent Santa Catalina Mountains (Audubon CBC website) and similar diversity may be expected in the Rincon Mountains.

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.

Cumulative Effects – Wildlife. High levels of recreational activity in the vicinity of Happy Valley will continue to result in short-term disturbance and minor displacement of wildlife. These activities are generally confined to existing roads and trails. The direct and indirect effects of implementing either of the alternatives are not expected to contribute additional disturbance effects to those associated with other activities. Future development of private inholdings in the Happy Valley allotment could result in some loss of habitat; however, these parcels have been degraded by past development and vegetation clearing, and do not considered important habitats due to poor conditions. Overall, the direct and indirect effects of the alternatives will be minimal. As such, they are not expected to result in significant cumulative effects to other actions.

Upland Vegetation Condition

Affected Environment

Grazing by domestic livestock can impact vegetation by changing the mix of species in the plant community being grazed (vegetation composition), by changing the density and frequency of perennial forage plants, and by changing the vigor of grazed plants. The combined effects of composition, density and plant vigor can be used to measure the condition and trend of rangeland plant communities.

Range condition is evaluated in terms of its ecological status, which is an evaluation of the status or health of the vegetation and soil relative to their combined potential to produce a stable biotic community. For the purposes of determining rangeland condition, permanent vegetation transects have been evaluated periodically since the 1970s and again between 2005 and 2007 using the dry weight rank methodology (PRs 18-33). The reference sites used for the analysis include several ecological sites in the Semidesert Grassland Major Land Resource Area (41-3) in the 12 to 16 inch precipitation zone. Monitoring data indicate that upland vegetation condition is improving and is meeting Forest Plan standards. All allotments currently meet Forest Plan standards for vegetation condition. Monitoring results are summarized below by allotment.

Last Chance. Vegetation analysis data collected in 2007 at two monitoring sites (PR 18, 26) indicate that sites are in good condition with stable or upward trends.

Barney. Monitoring data collected in 2007 indicate good conditions at one site and fair conditions at a second (PR 19, 27). The allotment burned in 1994 and is still showing the benefits of the fire.

Fresno. Vegetation analysis data collected in 2007 at two monitoring sites (PR 21, 28) indicate that sites are in good condition with upward trends. Groundcover measurements

have improved significantly over those measured in the 1980s. The allotment has been in non-use status for several years.

Happy Valley. Monitoring data collected in 2006 indicate good conditions throughout the allotment (PR 20, 29) with stable trends.

Cumero. Data collected in 2007 indicated fair condition at three sites and good condition at one site (PR 22, 30). Indicators of watershed condition such as the amount of bare soil and litter show positive trends, indicating that conditions have improved over those documented in the 1980s.

Rockpile. Permanent condition and trend transects were established on this allotment in 2007. Monitoring data from these transects indicate that conditions are fair to good (PR 23, 31). No trend data are available.

Rincon. Data collected at permanent monitoring locations indicate good condition with stable or upward trends (PR 24, 32).

Agua Verde. Range analysis data collected in 2007 indicate the allotment is in fair to good condition with stable or upward trends compared to conditions assessed in the 1980s (PR 25, 33).

Environmental Consequences

Utilization by grazing animals affects vegetation composition and productivity. Defoliation on a repeated basis (frequency), in excessive amounts (intensity) or for extended periods without recovery (duration) can cause changes in the vigor of preferred forage plants. Vegetation condition can be improved through reductions in the frequency and intensity of utilization or by increasing the amount of rest to allow for grazed plant recovery.

Under *Alternative 1* there would be no direct or indirect effects as a result of livestock utilization. Some light use by wildlife may occur, but there are no large wild grazing herbivores in the project area, so use would be negligible. Over the long term, the effects of this alternative would be increases in herbaceous plant frequency, plant density and plant vigor in most areas. Lehman lovegrass would persist on sites where it currently occurs and would continue to suppress vegetation condition, even in the absence of grazing. Over time, litter accumulations on the soil surface would increase, which would provide soil protection.

Alternative 2 continues management currently in place and would be expected to contribute to continued positive trends in vegetation condition. Design features incorporated into the proposed action include light to moderate utilization and regular rest or deferment of grazed pastures, which are intended to promote plant vigor and aid grazed plant recovery. Adaptive management strategies combined with monitoring should allow management to respond proactively to changing conditions before problems occur. Range sites dominated by Lehmann lovegrass would persist. On these sites, rangeland condition assessments based on plant species composition alone would continue to be less than optimal because non-native species are not considered part of the potential natural community. Indicators of soil condition should continue to improve or

remain stable because lovegrass will provide soil cover under the moderate use levels proposed.

Cumulative Effects – Past land use practices, especially long duration, high intensity grazing and fire suppression will continue to affect vegetation condition at some sites. Both alternatives would maintain or improve understory vegetation based on no or conservative use, and would not contribute significant cumulative effects to conditions resulting from past practices. Fires in 2008 resulted in short-term loss of groundcover and soil on the Agua Verde, Rock Pile and Cumero allotments. Over the long term (2-10 years) post-fire plant regrowth and recovery are expected to result in an increase in the frequency and vigor of herbaceous plants and a reduction in woody species, which should contribute positively to vegetation condition. High levels of recreational activity, especially ATV use, will contribute to reduced vegetation cover on small sites in the Happy Valley and Cumero allotments. However, neither alternative will contribute significantly to these ongoing effects. Invasive species in the project area include Lehmann lovegrass at many sites and one known patch of buffelgrass in the Agua Verde allotment. This population is located on a steep site that is not grazed to any degree. The buffelgrass patch is thought to be a result of wind-blown seeds from off-forest. The Forest may propose to eradicate buffelgrass in accordance with the Forest's Invasive Plant Management Program. Eradication would involve spot treatment with herbicides, but would not result in significant direct or indirect effect to non-target vegetation resources and therefore would not result in cumulative effects. Failure to treat buffelgrass could result in significant expansion of the species in the project area and significant changes in the plant community over the long term. These effects would occur independent of either alternative and would not add to the effects of the proposal. Therefore, they would not be cumulative.

Riparian Condition

Affected Environment

The project area includes numerous ephemeral and intermittent watercourses and springs. There are no perennial streams or wetlands within the project area, although larger drainages such as Paige Creek and Ash Creek retain permanent pools year round. Sub-surface flows sustain well developed riparian vegetation in many of the larger drainages. Portions of Ash, Paige and Turkey Creek are fenced to protect riparian resources.

Riparian condition data have been collected periodically since 1985 at permanent monitoring locations. These points were assessed using a variety of sampling techniques including the Riparian Area Survey and Evaluation System (RASES) data collection technique (USDA, 1989). The RASES protocol is a way to monitor changes to canyon bottom vegetation and stream channel morphology over time.

The Rincon, Redington, and Mack Fires (all in 1994) burned in the watersheds of the riparian areas in the Barney, Last Chance, Fresno, Happy Valley, and Cumero allotments. Many of these riparian areas have been altered by flooding following fire. Riparian areas appear to be recovering and moving toward Forest Plan goals and objectives for

vegetation. In many cases, roads are located in the terrace area near the channel, and in some locations in the channel, minimizing the opportunity for riparian and channel development. Recreation impacts related primarily to ATV use were identified in Ash Creek and Paige Creek in both 1985 and 1998 (PR 57). Nevertheless, recruitment of riparian vegetation is good and vigor is fair to good throughout the project area (Table 5). Livestock-related impacts were not identified as significant effects in any of the riparian surveys.

Table 5. Existing condition of riparian areas: Rincon Mountains Allotments.

Allotment	Stream Name	Year	Recruitment (Number of seedlings compared to total species found)	Percent Canopy	Vigor
Barney	Deer Creek	1998	4 of 4 (1 riparian species)	50%	Good
Happy Valley	Upper Turkey Creek	1998	6 of 7 (4 riparian species)	76%	Good
	Middle Turkey Creek	1998	5 of 5 (3 riparian species)	58%	Good
	Lower Turkey Creek	1998	4 of 7 (4 riparian species)	45%	Good
	Upper Miller Canyon	1998	4 of 4 (1 riparian species)	94%	Good
	Lower Miller Canyon	1998	3 of 3 (2 riparian species)	40%	Good
	Upper Paige Creek	1985, 1998	5 of 9 (4 riparian species) in 1985, 6 of 7 (2 riparian species) in 1998	"Open, multilayered" in 1985, 37% in 1998	Good both 1985 and 1998
	Lower Paige Creek	1998	5 of 5 (3 riparian species)	31%	Fair
Fresno	Bear Creek	1998	5 of 6 (3 riparian species)	42%	Good
Cumero	Ash Creek	1985, 1998	5 of 6 (3 riparian species) in 1985, 3 of 3 (2 riparian species) in 1998	"Open, multilayered" in 1985, 27% in 1998	Fair in 1985, Good in 1998
Rincon	Posta Quemada Canyon	1998	4 of 4 (3 riparian species)	5%	No data
Agua Verde	Distillery Canyon	1998	4 of 4 (3 riparian species)	41%	No data
	Chimney Canyon	1998	3 of 3 (2 riparian species)	61%	No data

Environmental Consequences

The grazing-related factors most likely to affect riparian condition are grazing intensity and frequency. These factors are associated more with ungulate distribution patterns than overall stocking numbers. The timing of grazing is also important. Alternating rest and use of a pasture annually and or seasonally can help riparian species recover following grazing. The important consideration for riparian plants is residual plant material, and the potential for plants to regrow prior to precipitation events. Plants grazed late in the fall or early winter generally do not regrow in time for winter rains. Plants grazed in the spring need adequate regrowth time before summer monsoons.

Under *Alternative 1*, livestock grazing-related effects would not occur. Existing livestock enclosure fences would not be maintained and would fall into disrepair over time. On Paige Creek and Ash Creek, these fences also serve to deter ATV use in the stream channels and would need to be maintained using Forest Service funds. If fences are not maintained, riparian areas could degrade as a result of vehicle use. The substrate of Turkey and Miller Creeks will continue to be dominated by areas of very fine material (silt or fine sand) contributed by burned areas within the watersheds. The fine material will continue to move through the system into Paige Creek and off of the National Forest. Improved bank stability will trap some of this material onsite, creating a more sustainable riparian channel over time.

Effects of *Alternative 2* are described below by allotment.

Last Chance. There are no true riparian areas in this allotment and limited potential due to the absence of surface and subsurface water. Proposed light to moderate grazing intensities and pasture rotations will allow for limited riparian and channel development in Tres Pipas and Espiritu Canyons.

Barney. Rotational grazing and light to moderate utilization will allow for improved bank stability and riparian obligate tree reproduction in the riparian area of Deer Creek.

Fresno. Short-term non-use will maintain currently good riparian condition in Bear Creek. Should the allotment be re-stocked, light to moderate utilization should maintain existing conditions.

Happy Valley. Rotational grazing and moderate utilization will allow for improved bank stability and continued riparian obligate tree reproduction in the riparian areas of Miller Creek, Turkey Creek, and Paige Creek. The substrate of Turkey and Miller Creeks will continue to be dominated by areas of very fine material (silt or fine sand) contributed by burned areas within the watersheds. The fine material will continue to move through the system into Paige Creek and out to the reaches off the National Forest. Improved bank stability will trap some of this material onsite, creating a more sustainable riparian area channel over time.

Cumero/Keith. The use of the pasture containing Ash Creek has been limited for some time. Grazing occurs only when cattle are moved through the pasture from one side of the allotment to the other. Continued use in this manner will result in continued improvement in overall vigor and continued improvement of bank stabilization and riparian obligate plant regeneration. The addition of the former Keith allotment to the

area of the Cumero allotment will not affect riparian resources because no new use of Ash Creek is needed to manage this addition.

Rock Pile. There are no riparian areas in this allotment and limited potential due to the absence of surface and subsurface water. Limited winter use would have no effect.

Rincon. Grazing this allotment in the winter at 35% utilization (it is nearly entirely within wilderness) will allow for riparian obligate plant reproduction and bank stabilization in Posta Quemada Canyon.

Agua Verde. Light utilization with rotational management will allow the riparian areas of Distillery and Chimney Canyons to maintain their currently good conditions.

Cumulative Effects. Trails, roads and dispersed camping areas are often located in or near riparian areas. In addition, some unauthorized ATV use occurs outside of the fenced portion of Paige Creek. These uses result in channel alteration and impacts to riparian vegetation. As noted, fine sediment resulting from past fires will continue to move through the stream systems and may contribute to the effects of actions taking place off of the Forest in the Paige Creek and Cienega Creek watersheds. However, the effects of the alternatives are minimal and largely beneficial, so they would not be expected to contribute significant cumulative effects to ongoing sediment movement.

Soils and Watershed

Affected Environment

The geology underlying the allotments is diverse. As a consequence, the soils are highly diverse. In general, the central highlands of the mountain range have granite derived soils of various depths and near the fringe of the mountains there is alluvium of various depths.

Previously reported soil condition on the allotments (e.g.: the 2002 grazing biological opinion) were based on General Ecosystem Survey (GES) data published in 1991. GES data are based on a statistical analysis of soil properties such as soil type, slope and precipitation, which provide an estimate of risk, but actual soil condition was not assessed on the ground. To address this data gap, site specific soil condition monitoring (PR 59, 60) was completed in 2008 using protocols from Forest Service Soil Management Handbook (FSH 2509.18-99-1 R3 Supplement). Interpretations of soil condition are based on site visits, historical livestock use patterns, soil properties, and slope characteristics. The soil condition rating procedure evaluates soil quality based on an interpretation of factors that affect three interrelated primary soil functions: soil stability, soil hydrology and nutrient cycling. Based on interpretation of these soil functions, soil condition is broken out into one of three condition classes:

Satisfactory. Indicators signify that soil function is being sustained and soil is functioning properly and normally.

Impaired. Indicators signify a reduction in soil function. The ability of the soil to function properly and normally has been reduced and/or there exists an increased

vulnerability to degradation. Changes in land management practices or other preventative measures may be appropriate.

Unsatisfactory. Indicators signify that a loss of soil function has occurred. Degradation of vital soil functions result in the inability of the soil to maintain resource values, sustain outputs or recover from impacts.

Soil condition ratings by allotment are displayed in Table 6 and Figure 6. Soil condition was found to be satisfactory on all sites examined (PR 59, 60).

Table 6. Soil Condition, Rincon Mountains Allotments.

Allotment	Acres in Satisfactory Soil Condition	Acres in Impaired Soil Condition	Total Acres	Percent Impaired
Agua Verde	7,789	0	7,789	0.0%
Barney	3,378	0	3,378	0.0%
Cumero	12,132	0	12,132	0.0%
Fresno	1,631	0	1,631	0.0%
Happy Valley	12,086	0	12,086	0.0%
Keith	837	0	837	0.0%
Last Chance	6,151	0	6,151	0.0%
Rincon	4,176	0	4,176	0.0%
Rock Pile	2,152	0	2,152	0.0%
Total	50,332	0	50,332	0.0%

Environmental Consequences

Livestock grazing may impact soil function by compacting the soil surface, removing plant material or changing the plant community composition. *Alternative 1* will lead to improved soil quality in small areas such as cattle bed grounds and around water sources where cattle tend to concentrate. Over time soil bulk density and structure would return to natural levels, but changes would be slow. Under *Alternative 2*, pasture rest and rotation and light to moderate utilization should maintain adequate vegetation cover and contribute to satisfactory nutrient cycling and soil structure. Monitoring data indicate that grazing as currently practiced is not affecting soil quality; continuation of these practices should maintain satisfactory conditions. No significant changes in soil condition are expected under either alternative. Monitoring actions identified under the proposed action, Best Management Practices and adaptive management strategies will allow more flexibility in herd management and will allow soil condition to continue to meet Forest Plan standards. Soil disturbance in small areas such as bed grounds, salt grounds or watering sites may continue, but these areas would remain small and isolated and do not impact overall soil condition.

Cumulative Effects. Because there would be no direct or indirect effects, no associated cumulative effects would occur.

Water Quality and Quantity

Affected Environment

The analysis area is located within five fifth code watersheds (Figure 7): Agua Verde Creek-Pantano Wash, Ash Creek-Upper San Pedro, Cienega Creek, Paige Creek-Lower San Pedro and Redfield Canyon-Lower San Pedro River. Average annual precipitation is 14.03 inches at Redington on the northeast side of the project area, but can be quite variable from year to year.

Water quality is assessed by comparing existing conditions with desired conditions that are set by the States under the authority of the Clean Water Act. The Arizona Department of Environmental Quality (ADEQ) is the regulating authority for water quality in Arizona (<http://www.azdeq.gov/enviro/water/assessment/>). Water quality has not been assessed in any streams within the project area. The San Pedro River downstream from the project area has been assessed as inconclusive. There were no exceedances for any parameter, but insufficient core parameters were sampled. Cienega Creek downstream from the Cumero allotment has been assessed as Category 1 "attaining all uses." (ADEQ 2006).

Water quantity (surface water yield or runoff) is controlled by annual precipitation and hydrologic conditions on the watershed. Hydrologic conditions are in turn influenced by vegetation type and density on the watershed and soil condition. Adequate cover in the form of standing vegetation and litter is necessary to intercept raindrops and arrest the overland flow of water. Soils that have been degraded through compaction or erosion cannot effectively capture, hold and release water. On compromised watersheds, water quantity in the form of runoff increases. The result is generally an increase in peak flow discharges (flooding). Hydrologic function across the project area appears to be satisfactory based on groundcover data collected as part of range condition monitoring (PRs 18-25) and soil condition assessments completed in 2008 (PR 59). Across the project area, approximately 30 dams and spring developments capture and hold water that would otherwise run off of the allotments or percolate into the ground. These diversions account for less than 1 percent of the water yield in the project area. On the basis of available water quality assessments and watershed condition data, ongoing livestock management is not significantly affecting water quality or quantity in the project area.

Environmental Consequences

Water Quality. Surface water quality is affected by the properties of the soil surface. Adequate vegetation groundcover is necessary to slow the movement of water and trap and filter sediments. *Alternative 1* would maintain or increase vegetation groundcover (VGC) on the watershed and would contribute to maintaining a satisfactory hydrological function. Runoff would continue to be satisfactory. In small areas where livestock concentrate, the potential increase of VGC and elimination of livestock-caused soil compaction would contribute to an incremental improvement in hydrological function resulting in less runoff, better infiltration and an improvement in water quality due to less sediment and lower turbidity. However, these areas are small and any change is unlikely

to be discernable from natural processes. Under *Alternative 2*, areas of livestock concentration would continue to contribute small amounts of sediment downstream and surface runoff would be expected to be slightly greater, relative to no grazing. Allowable use levels of 30-45% are expected to provide sufficient residual biomass to protect upland areas and drainage systems over time. The potential increase of VGC and slight reduction in compaction would contribute to an incremental improvement in hydrological function resulting in less peak runoff. However, the changes are unlikely to be measurable. Riparian fencing would continue to exclude cattle from the majority of Paige, Ash and Turkey creeks, which should avoid effects of grazing in seasonally wet stream bottoms.

Other analyses on the Forest have identified a concern with bacterial contamination of water bodies from *escherichia coli* bacteria. Arizona DEQ sampling has detected *E. coli* in some samples downstream from the project area in Cienega Creek, but levels do not exceed acceptable limits. Water quality in Cienega Creek meets the ADEQ standard for full body contact.

Water Quantity. Under *Alternative 1*, adequate vegetation groundcover would contribute to satisfactory hydrological function and runoff would continue to be satisfactory. Water currently consumed by livestock would continue to be captured and stored in stock ponds but would not be consumed. However the total amount of water stored and consumed by cattle accounts for less than 1% of the total water yield on the analysis area and the change is unlikely to be significant. Under *Alternative 2*, light to moderate use should provide sufficient residual plant material to protect uplands and drainages and contribute to soil stability over time. Existing water developments would divert and store water. Livestock would consume some of the stored water that would otherwise percolate back into the ground. However, this amount is unlikely to significantly affect total water yield.

Cumulative Effects. Activities that potentially affect water quality and quantity in the project area include uses on private inholdings in Happy Valley. Such uses could include residential development or water diversions that could affect the hydrological regime in Paige Creek and Turkey Creek. New wells to support development on private lands could potentially affect shallow aquifers that contribute to instream flows in these drainages. Ongoing recreational activity affects watershed condition in small areas where activities are concentrated, potentially increasing runoff and sedimentation. However, the direct and indirect effects of the alternatives are identified as minimal. Neither alternative would contribute significant cumulative affects that would combine with these ongoing and potential future activities.

Air Quality

Affected Environment

The project area is in a Class II air shed. Air quality in and around the area is high due to the 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.

Environmental Consequences

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.

Special Management Areas

Affected Environment

The analysis area does not contain potentially eligible wild and scenic rivers, zoological/botanical areas, research natural areas or other features that require special management. However, nearly all of the allotments fall partially or entirely within the Rincon Mountain Wilderness, which was created in 1984 (Figure 2). The Rincon Mountain Wilderness is bordered on the west by the Saguaro Wilderness, managed by the National Park Service. Trails into the wilderness provide access to the solitude-rich canyon bottoms and the high ridgelines of the Rincon Mountains. Reaching trailheads can be difficult, except via a well-developed trail system that originates in Saguaro National Park. Vehicles can access the eastern boundary on Forest Service Road 35 in Happy Valley. Off the trails, especially at higher elevations, the terrain makes foot travel difficult and horse travel virtually impossible. The lower elevations are rolling and rocky with desert grasses, while the upper elevations consist of rock outcroppings and steep hillsides of pinyon, juniper, and oak above deep canyons.

The Last Chance, Barney, Rock Pile, Rincon and Agua Verde allotments fall almost entirely within designated wilderness. Facilities within the wilderness include fences and water systems (spring boxes and earthen stock tanks) that were in place prior to the 1984 designation of the wilderness. In some places, old two-track roads extend into the interior of the wilderness, and these have traditionally been used by grazing permittees to maintain livestock facilities. Livestock grazing and management are accomplished in compliance with Forest Plan direction and the Congressional Grazing Guidelines (FSM 2323.22). In general, management in wilderness areas is currently meeting Forest Plan standards (Forest Plan, pp. 81-82). Use where it occurs is within capacity, improvements are minimal and riparian and upland vegetation is not being affected by grazing (PR 12-17). On the Last Chance allotment, high utilization levels (>45%) were recorded in 2002 (PR 11). This situation is no longer occurring, based on recent implementation monitoring, and the allotment has since changed management.

Environmental Consequences

Under *Alternative 1*, no livestock-related effects to wilderness would occur. Allotment fences and water developments would remain in place but would not be maintained.

Under *Alternative 2*, light grazing would continue to occur in the wilderness on the Last Chance, Barney, Cumero, Happy Valley, Rock Pile, Rincon and Agua Verde allotments.

Grazing would occur primarily on the margins of the Rincon Mountain Wilderness because steep slopes and lack of water prevent use of much of the interior of the wilderness. Moderate utilization levels (<45%) and management practices that include dormant season grazing and extended rest periods following use would keep use within present capacity. Maintenance of existing necessary range improvements will continue.

The need for one additional water source in the uplands of the Rincon allotment has been identified in order to keep cattle from concentrating in the bottom of Posta Quemada Canyon and thereby improve riparian resource condition. Direct effects would be caused by short term disturbance related to the transportation and placement of a water storage tank and a trough at a site located approximately one mile into the wilderness northeast of Papago Well. A pipeline to the new storage from Papago Well would be laid above ground using horses and human labor. The project would result in the placement of a permanent structure in the wilderness. The facilities would be constructed to harmonize with the natural features in the area as required by Forest Service policy (FSM 2323.26a). The project may require short term use of motorized equipment to transport material and supplies to the location within the wilderness. Prior to implementation of this project, the Forest will conduct a minimum tool analysis using the Minimum Requirement Decision Guide (USDA-FS 2006) to ensure that wilderness values are protected. If the use of motorized equipment is deemed necessary to accomplish the project, the action will require prior approval of the Regional Forester.

One comment on the draft EA expressed opposition to new improvements in the wilderness, indicating that there are "legal obstacles" to the proposal (PR 71, 73). Forest Service policy (FSM 2323.22) specifies that construction of improvements in wilderness is permissible in accordance with management plans governing the area involved. By policy, the construction of new improvements "should be primarily for the purposes of resource protection and the more effective management of these resources rather than to accommodate increased numbers of livestock." (FSM 2323.22(4)). The Coronado National Forest Plan (PR 1) specifies that "Range improvements may be constructed to protect and enhance the wilderness resource in the presence of grazing" (Forest Plan, p. 82).

The new water is intended to change livestock distribution by pulling cattle out of a riparian bottom into uplands within the Rincon Mountain Wilderness. Changes in distribution would result in overall improved riparian, upland vegetation and soil condition in the Rincon allotment by reducing use around Papago Well. Based on this, the proposed development is in compliance with Forest Service policy and Forest Plan standards. No increases in numbers of livestock are proposed for the Rincon allotment (see, Proposed Action, pp. 16-17 above). The proposed water would result in a slight increase in the amount of time cattle spend in the wilderness during dry years. In wet years, there would be no change in grazing use because cattle readily distribute through uplands on the allotment on their own.

No additional activities have been identified that would contribute additional effects. Therefore, there would be no cumulative effects.

Heritage Resources

Affected Environment

Heritage resources (also called “cultural resources”) include archaeological and historical sites and other properties important to maintaining the traditional beliefs and lifeways of local social groups (“traditional cultural properties”). Prior to European contact, extensive Native American occupation occurred in the nearby San Pedro and Santa Cruz valleys. Within Saguaro National Park, a number of precontact sites have been identified. The Coronado National Forest portion of the Rincon Mountains has been less intensively surveyed. The most important Historic period uses of the area have been mining and grazing, which began in Spanish Colonial times. Twenty seven cultural resource sites have been recorded within the allotment group. Four of the sites are known to include an historic component, 23 sites have been confirmed to include prehistoric components, and one contains both prehistoric and historic remains. Most of the historic remains are associated with mining and ranching. There are undoubtedly many more undocumented sites located throughout the allotments. There are no known impacts occurring on sites within the eight allotments and no sites are known to be at risk should cattle grazing continue to be permitted at current levels (PR 66).

Environmental Consequences

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

Adoption of *Alternative 1* would result in no direct or indirect effects from livestock grazing on heritage resources. Continuing to permit cattle grazing (*Alternative 2*) is unlikely to have a significant effect on archaeological sites. Grazing effects to known sites are characterized as minimal and grazing intensities recommended in the allotments are well below historical levels. The proposed action would require implementation of the mitigation measures identified as part of the proposed action in order to insure that there would be no adverse effects to heritage resources as the result of new range improvements. Implementation of range facilities will occur in accordance with Section 2(c) of the *Standard Consultation Protocol for Rangeland Management, Appendix H of the Forest Service Region 3 First Amended Programmatic Agreement Regarding Historic Property Protection* (PR 67). Specific design details and a precise location have not been identified for the proposed water facility on the Rincon allotment. When these details have been established, the site will be surveyed for cultural resources prior to ground-disturbing activities in accordance with the consultation protocol and mitigation features included in the proposed action. Because no direct or indirect effects have been identified, no cumulative effects are anticipated.

A Heritage Resources report (PR 66) was completed for the proposed action and was submitted for consultation with the Arizona State Historic Preservation Office (SHPO) with a determination of "no adverse effect" on cultural resources. A copy of the report was sent to twelve Native American groups with traditional ties to the project area. Concurrence was received from SHPO on June 27, 2008. No concerns were expressed by tribal groups.

Socio-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 on the eastern edge of Pima County, Arizona. The Happy Valley and Cumero allotments extend into western Cochise County. The economy of Pima County is dominated by manufacturing, trade and services associated with the City of Tucson. Farm and ranch employment accounts for 3.3% of employment in Cochise County and less than 1% of employment in Pima County (USDA Forest Service, 2005, Headwaters Economics, 2007). Forest-wide, grazing accounts for an estimated 4% of the direct and indirect employment generated in the local economy associated with the Coronado National Forest (USDA Forest Service, 2005). Compared to other sectors such as recreation (which accounts for 60%), this contribution is relatively minor.

Environmental Consequences

Decisions relative to livestock grazing on individual allotments can potentially 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 administer the allotments. Local communities may also benefit to some degree through the purchase and sale of goods and services associated with ranching operations.

Termination of the grazing authorizations (*Alternative 1*) would likely result in negative economic effects on the individual permittees. Although they would no longer pay grazing fees or expend money to maintain the allotments, the permittees would be dependant on adjacent private or state land, if available, to maintain ranching operations. They would no longer have access to Forest Service lands with which to generate ranching income. *Alternative 2* would maintain ranch income at or near current levels. Annual grazing receipts to the Forest Service would vary from zero under *Alternative 1* to approximately \$9,400 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

¹³ Estimates based on the 2008 grazing fee of \$1.35/AM. Actual receipts would vary somewhat based on changes in the grazing fee.

Betterment Funds used to construct range improvements. These funds (approximately \$2,350/year under full stocking) would not be available to the Forest Service under *Alternative 1*. This amount would be approximately 3-5% of the Forest's range betterment funding, based on FY 2008 funding levels.

In general, *Alternative 1* would have the lowest cost as neither the Forest Service nor the permittees would expend money for new improvements and only limited maintenance would occur. There would, however, still be costs associated with management of the allotments. Maintenance of improvements is typically the responsibility of the permittee. In the absence of a permittee, maintenance or removal of existing structural improvements may become necessary and costs would be borne by the Forest Service. Allotment and National Forest boundary fences would need to be maintained to keep livestock from entering the allotments from adjacent non-federal land. It is also likely that some fences in Paige Creek and Ash Creek would require maintenance to deter unauthorized vehicle use. Under *Alternative 2*, structural range improvements would require ongoing maintenance and one new improvement may be constructed in the Rincon allotment. Thus the costs of facility maintenance and construction would be greater than under *Alternative 1*.

One comment on the EA (PR 71) questioned whether estimated grazing receipts would be sufficient to cover the costs of monitoring the proposed action and asked what would happen if future funding was insufficient to support monitoring activities. Monitoring activities identified consist largely of activities already being carried out under current staffing and funding levels. The analysis assumes that these levels will continue and that staffing and funding will be sufficient to accomplish continued monitoring. Detailed cost estimates for monitoring these allotments have not been developed and the economic effects of the proposal were not identified as a key issue for the analysis. It is well documented that, nationwide, the costs of administering livestock grazing programs exceed the receipts to the government by a significant amount (GAO 2005). However, grazing fees are set by Congress and are beyond the scope of this decision. Any analysis of future significant changes in funding levels would be too speculative to be meaningful.

Environmental Justice

Affected Environment

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.

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].”

Environmental Consequences

Implementation of either of the alternatives evaluated in this EA would not result in adverse impacts to environmental resources and socioeconomic conditions. The ranching operations are not a significant source of employment for low income or minority communities. Therefore, disproportionate direct, indirect or cumulative adverse impacts on low income or minority populations would not occur.

4. CONSULTATION AND COORDINATION

ID TEAM MEMBERS:

Stan Helin, Acting District Ranger Sherry Tune, Deputy District Ranger	Responsible Official
Richard Gerhart, Team Leader	Writer/Editor, wildlife analyses
Tim Connor, Range and Watershed Staff, James Heitholt, Range Conservationist, Santa Catalina Ranger District	Proposed Action, vegetation analysis
Joshua Taiz, Wildlife Biologist	Wildlife analyses
Salek Shafiqullah, Soils scientist/Hydrologist, and Robert Lefevre, Forestry Program Manager, Supervisor's Office	Soils/watershed/riparian/air/water analyses
Kathy Makansi, Archeologist	Heritage effects analysis

The Forest Service consulted with a variety of Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment. A partial listing of these parties is shown below. Complete mailing lists for the public outreach portions of this analysis are found in the project record.

FEDERAL, STATE, AND LOCAL AGENCIES:

Arizona Game and Fish Department Arizona Department of Agriculture
Arizona Cooperative Extension Service Arizona State Land Department
Arizona Department of Environmental Quality
USDI Fish and Wildlife Service
USDI National Park Service – Saguaro National Park

TRIBES:

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

OTHERS:

Center for Biological Diversity	Western Watersheds Project
Wild Earth Guardians	Arizona Cattle Growers Association

REFERENCES AND LITERATURE CITED

- Arizona Department of Environmental Quality. 2006. The Status of Water Quality in Arizona. Arizona's Integrated 305(b) Assessment and 303(d) Listing Report. Revised July 2005. ADEQ, Phoenix, Arizona.
- Arizona Game and Fish Department. 2005. Mearns' quail habitat management guidelines. Arizona Game and Fish Department. Phoenix.
- Arizona Game and Fish Department. 2008. Hunt Arizona: Survey, harvest and hunt data for big and small game. Phoenix, AZ.
- Bowers, J.E. and S.P. McLaughlin. 2001. Effects of livestock grazing on *Agave palmeri* within the Coronado National Forest, AZ. Annual report submitted to USGS Sonoran Desert Field Station, 125 Biological Sciences East, The University of Arizona, Tucson, AZ. 85721.
- Bristow, Kirby D. and Richard A. Ockenfels. 2000. Effects of human activity and habitat conditions on Mearns' quail populations. Arizona Game and Fish Department. Phoenix, Arizona. Research Branch Technical Guidance Bulletin No. 4 (August 2000). 27pp.
- Brown, D.E. 1989. Arizona Game Birds. The University of Arizona Press. Tucson
- Brown, R.L. 1982. Effects of livestock grazing on Mearns' quail in southeastern Arizona. *Journal of Range Management* 35:727-732.
- Clarkson, R.W., and J.C. Rorabaugh. 1989. Status of leopard frogs (*Rana pipiens* Complex) in Arizona and southeastern California. *Southwestern Naturalist* 34(4):531-538.
- Corman, T.E. and C. Wise-Gervais. 2006 Arizona Breeding Bird Atlas. University of New Mexico Press.
- Government Accountability Office. 2005. Livestock Grazing: Federal Expenditures and Receipts Vary, Depending on the Agency and the Purpose of the Fee Charged. GAO-05-969. Washington, DC.
- Goldberg, C.S., and C. Schwalbe. 2004. Considerations for monitoring a rare anuran (*Eleutherodactylus augusti*). *The Southwest Naturalist*. 49(4): 442-448.
- Headwaters Economics. 2007. A SocioEconomic Profile of Cochise County, Arizona. Produced by the Economic Profile System (www.headwaterseconomics.org).
- Headwaters Economics. 2007. A SocioEconomic Profile of Pima County, Arizona. Produced by the Economic Profile System (www.headwaterseconomics.org).
- Heffelfinger, James R. and Ronald J. Olding. 2000. Montezuma quail management in Arizona. Pages 183-190 in L.A. Brennan, W.E. Palmer, L.W. Burger, Jr., and T.L. Pruden (eds.). *Quail IV: Proceedings of the Fourth National Quail Symposium*. Tall Timbers Research Station, Tallahassee, FL.

- Hoffmeister, Donald F. 1986. Mammals of Arizona. The University of Arizona Press and Arizona Game and Fish Department, Tucson, AZ. 602 pp.
- Holechek, J.L., T.T Baker and J.C, Boren. 2004. Impacts of controlled grazing verses grazing exclusion: What we have learned. Range Improvement Task Force Report # 57. New Mexico State University, Las Cruces, NM.
- Latta, M. J., C.J. Beardmore, and T. E. Corman. 1999. Arizona Partners in Flight Bird conservation Plan. Version 1.0. Nongame and Endangered Wildlife Technical Report 142. Arizona Game and Fish Department, Phoenix, Arizona.
- Malusa, Jim, D. F. Gori, P. Warren and E. S. Monarque. 1992. Population Studies of Rare Plants on the Coronado National Forest. Unpubl. Report in Coronado National Forest Files.
- Malusa, J.P., 2001. Surveys of Sensitive Plants of the Coronado National Forest. USFS contract 43-8-97-0-0083. unpubl.
- McLaughlin, S.P. 1995. An overview of the flora of the sky islands, southeastern Arizona: diversity, affinities, and insularity. Pages 60-70 in DeBano et al., eds. Biodiversity and management of the Madrean archipelago: the sky islands of southwestern United States and northwestern Mexico. Gen. Tech. Rep. RM-GTR-264. U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
- Ober, Holly K., R. Steidl, and V. Dalton. 2000. Foraging Ecology of Lesser Long-nosed Bats. Final Report. University of Arizona School of Renewable Natural Resources. Tucson, AZ.
- Ockenfels, R.A., D.E. Brooks, and C.H. Lewis. 1991. General Ecology of Coues White-tailed Deer in the Santa Rita Mountains. Arizona Game and Fish Department Research Branch Technical Report No. 6. Phoenix, AZ.
- Rosen, P.C., C.R. Schwalbe, D.A. Parizek, P.A. Holm, and C.H. Lowe. 1994. Introduced aquatic vertebrates in the Chiricahua region: effects on declining native ranid frogs. Pages 251-261 in L.F. DeBano, G.J. Gottfried, R.H. Hamre, C.B. Edminster, P.F. Ffolliott, and A. Ortega-Rubio (tech. coords.), Biodiversity and management of the Madrean Archipelago. USDA Forest Service, General Technical Report RM-GTR-264.
- Sauer, J. R., J. E. Hines, and J. Fallon. 2004. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2003. Version 2004.1. USGS Patuxent Wildlife Research Center, Laurel, MD.*
- Sidner, R. and R. Davis 1995. Bat inventory of the Rincon Mountain riparian areas of the Coronado National Forest: 1993-1994. AGFD Heritage Fund IIPAM Project No. 192041.
- Smith, L., G. Ruyle, J. Maynard, S. Barker, W. Meyer, D. Stewart, B. Coulloudon, S. Williams and J. Dyess. 2007. Principles of obtaining and interpreting utilization data

- on rangelands. University of Arizona Cooperative Extension Service Publication AZ1375.
- Society for Range Management, 1998. Glossary of Terms used in Range Management. Fourth Edition, edited by the Glossary Update Task Group, Society for Range Management. Thomas E. Bedell, Chairman. 32 pp.
- Sredl, M.J., J.M. Howland, J.E. Wallace, and L.S. Saylor. 1997. Status and distribution of Arizona's native ranid frogs. Pages 45-101 in M.J. Sredl (Ed). Ranid frog conservation and management. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program, Technical Report 121. Phoenix, Arizona.
- Stromberg, M.R. 1990. Habitat, movements and roost characteristics of Montezuma quail in southeastern Arizona. Condor 56:123-125.
- Taylor, Richard Cachor. 1995a. A birder's guide to southeastern Arizona. American Birding Association, Inc. Colorado Springs, Colorado. 341pp.
- Tenney, C.R. 2000. Northern Beardless Tyrannulet (*Camptostoma imberbe*). in The Birds of North America, No. 519. A. Poole and F. Gill, eds. Philadelphia, PA.
- USDA Forest Service. 1986. Coronado National Forest land and resource management plan. USDA Forest Service, Southwest Region. Albuquerque, New Mexico. 130pp + Amendments.
- USDA Forest Service. 1989. Riparian Area Survey and Evaluation System. Southwestern Region. Albuquerque, NM.
- USDA Forest Service, 1997. Rangeland Analysis and Management Training Guide Glossary. Southwestern Region. Albuquerque, NM.
- USDA Forest Service, 1998 and 2002. Biological Assessment of Ongoing and Long-term Grazing on the Coronado National Forest, Coronado National Forest, Tucson.
- USDA Forest Service. 2004a. Programmatic Biological Assessment. Continued implementation of the land and resource management plans for the eleven National Forests and National Grasslands of the Southwestern Region. Region 3. Albuquerque, NM.
- USDA Forest Service. 2004b. Framework for streamlining informal consultation for livestock grazing activities. USDA Forest Service, Southwestern Region. Albuquerque, NM.
- USDA Forest Service. 2004c. Biological assessment of ongoing and long-term grazing on proposed Mexican spotted owl critical habitat on the Coronado National Forest. Coronado National Forest. Tucson, AZ.
- USDA Forest Service. 2005. Socio-Economic Assessment of the Coronado National Forest. Prepared for the Southwestern Region by the University of Arizona School of Renewable Natural Resources. Tucson, AZ.
- USDA Forest Service 2006. Coronado National Forest Management Indicator Species Population Status and Trends. Tucson, AZ.

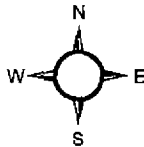
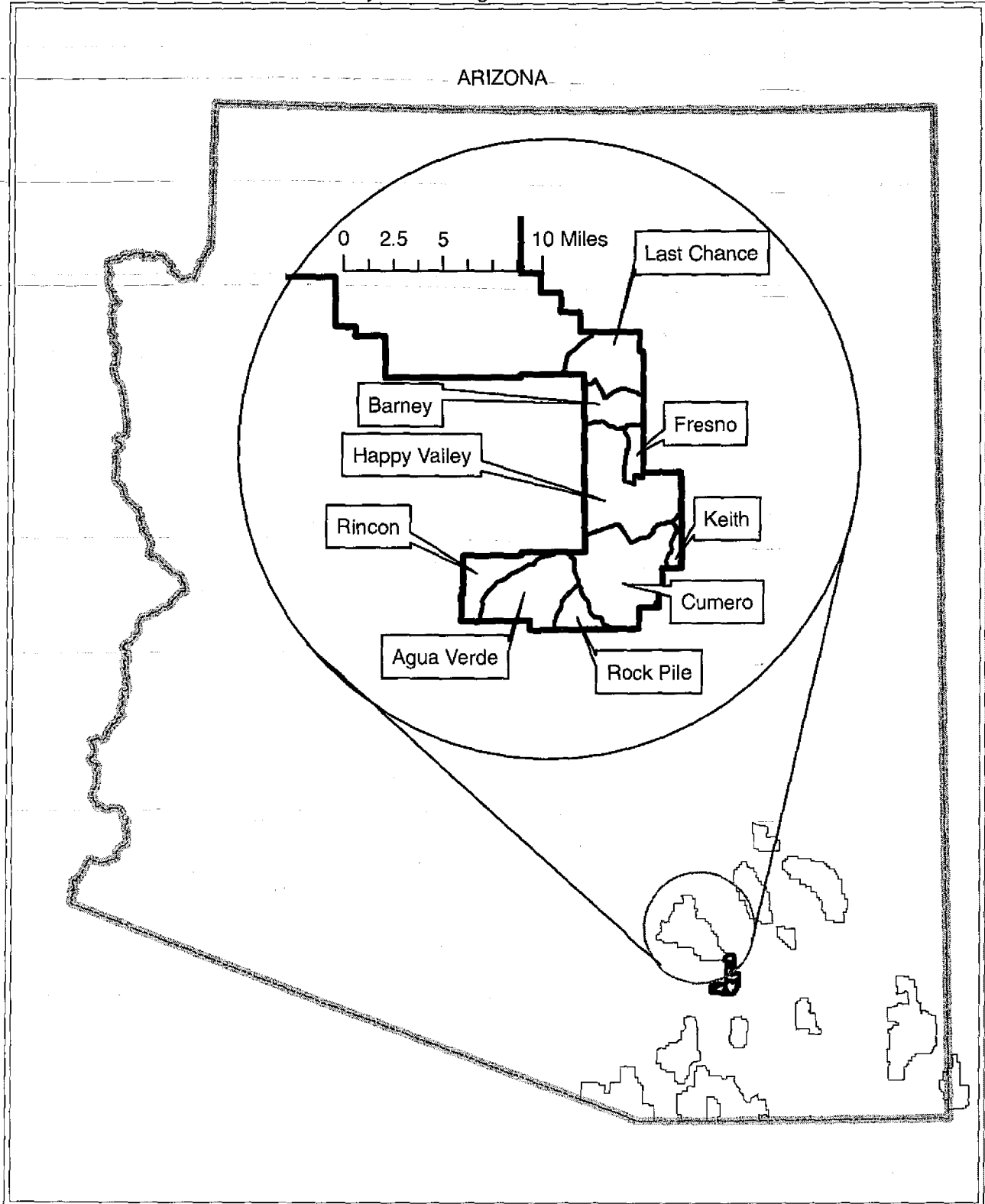
- USDA Forest Service. 2007. Regional Forester's List of Sensitive Plant and Animal Species. USDA Forest Service Southwestern Region. Albuquerque NM.
- USDI Fish and Wildlife Service, 1999 and 2002. Biological Opinion 2-21-98-F-399-R1, Continuation of Livestock Grazing on the Coronado National Forest, U.S. Fish and Wildlife Service, Phoenix, AZ.
- USDI Fish and Wildlife Service. 2001. Final Designation of Critical Habitat for the Mexican Spotted Owl. Federal Register 66:8530-8553.
- USDI Fish and Wildlife Service. 2005. Programmatic Biological and Conference Opinion. Continued implementation of the land and resource management plans for the eleven National Forests and National Grasslands of the Southwestern Region. Region 2 Office, Albuquerque, NM.
- Widmer, K.A. 2001. The relationship between *Agave palmeri* flower stalk herbivory and livestock management on the Coronado National Forest. MS Thesis. University of Arizona School of Renewable Natural Resources. 2002

LIST OF FIGURES

- Figure 1** **Project Location and Vicinity.**
- Figure 2** **Project Area.**
- Figure 3** **Project Area Vegetation Cover.**
- Figure 4** **Forest Land Management Plan Areas**
- Figure 5a, b** **Allotment and Pasture Boundaries**
- Figure 6** **Soil Condition**
- Figure 7** **Fifth Code Watersheds**
- Figure 8** **Slope Classes**
- Figure 9** **Inventoried Roadless Areas**
- Figure 10** **Mexican Spotted Owl Critical Habitat**

Figure 1

Project Location and Vicinity
Last Chance, Barney, Fresno, Cumero, Happy Valley,
Keith, Rock Pile, Rincon, Agua Verde Allotments
Santa Catalina Ecosystem Management Area-Santa Catalina Ranger District

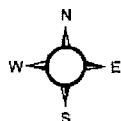
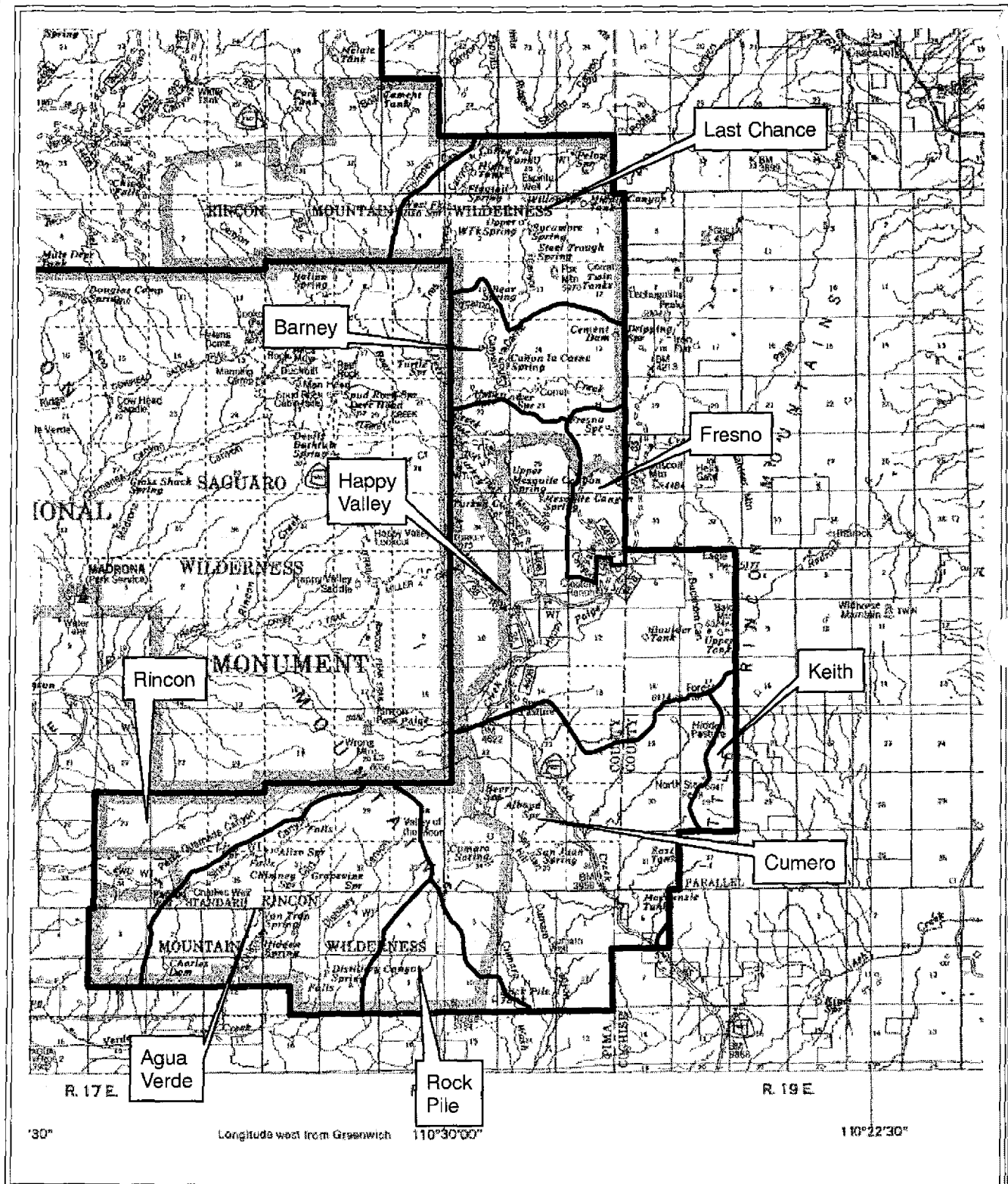


0 35 70 140 Miles

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Figure 2

Project Area
 Last Chance, Barney, Fresno, Cumero, Happy Valley,
 Keith, Rock Pile, Rincon, Agua Verde Allotments
 Santa Catalina Ecosystem Management Area-Santa Catalina Ranger District

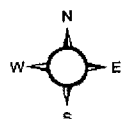
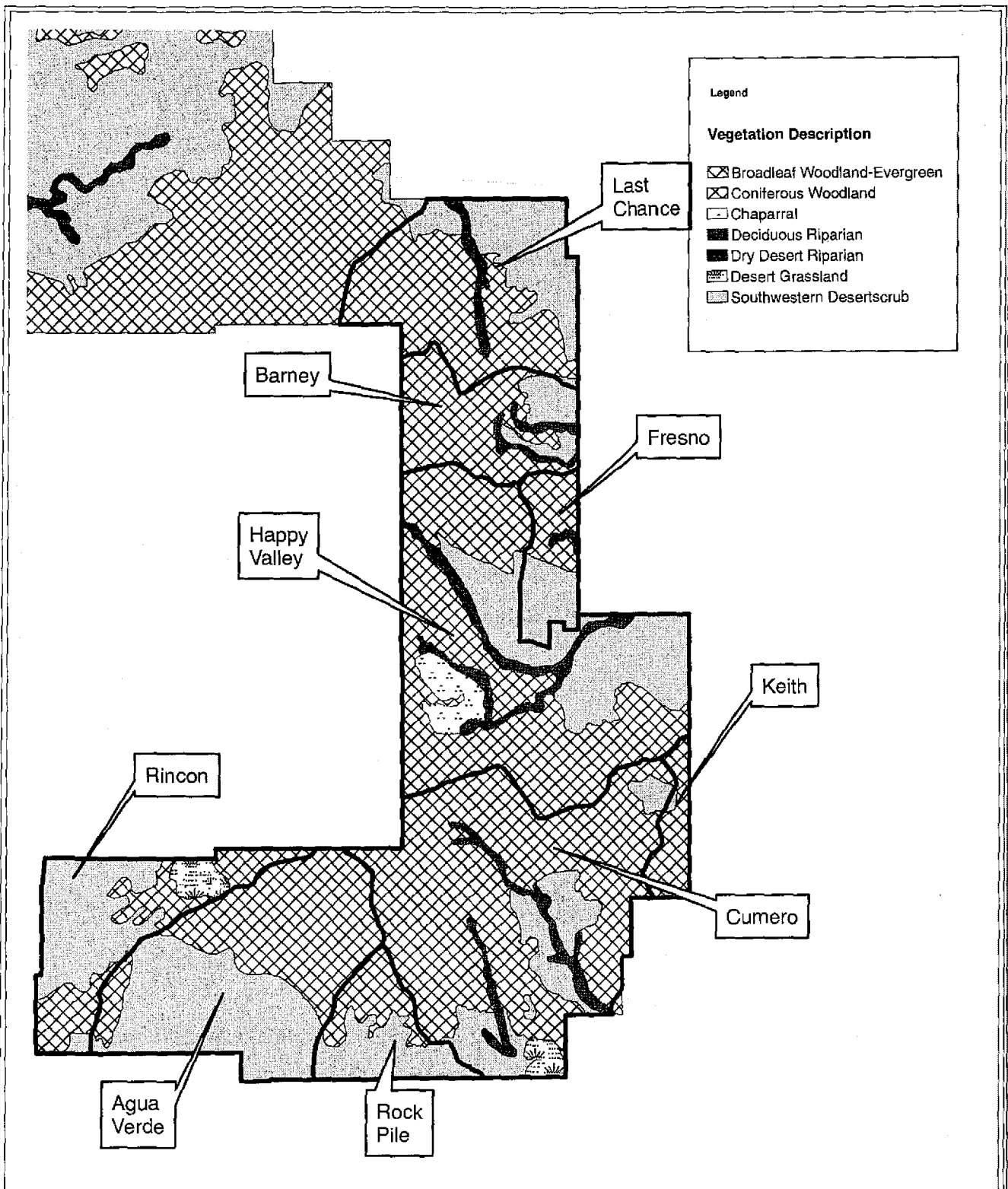


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0 1.25 2.5 5 Miles

Figure 3

Project Area Vegetation Cover
Last Chance, Barney, Fresno, Cumero, Happy Valley,
Keith, Rock Pile, Agua Verde Allotments
Santa Catalina Ecosystem Management Area-Santa Catalina Ranger District

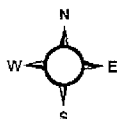
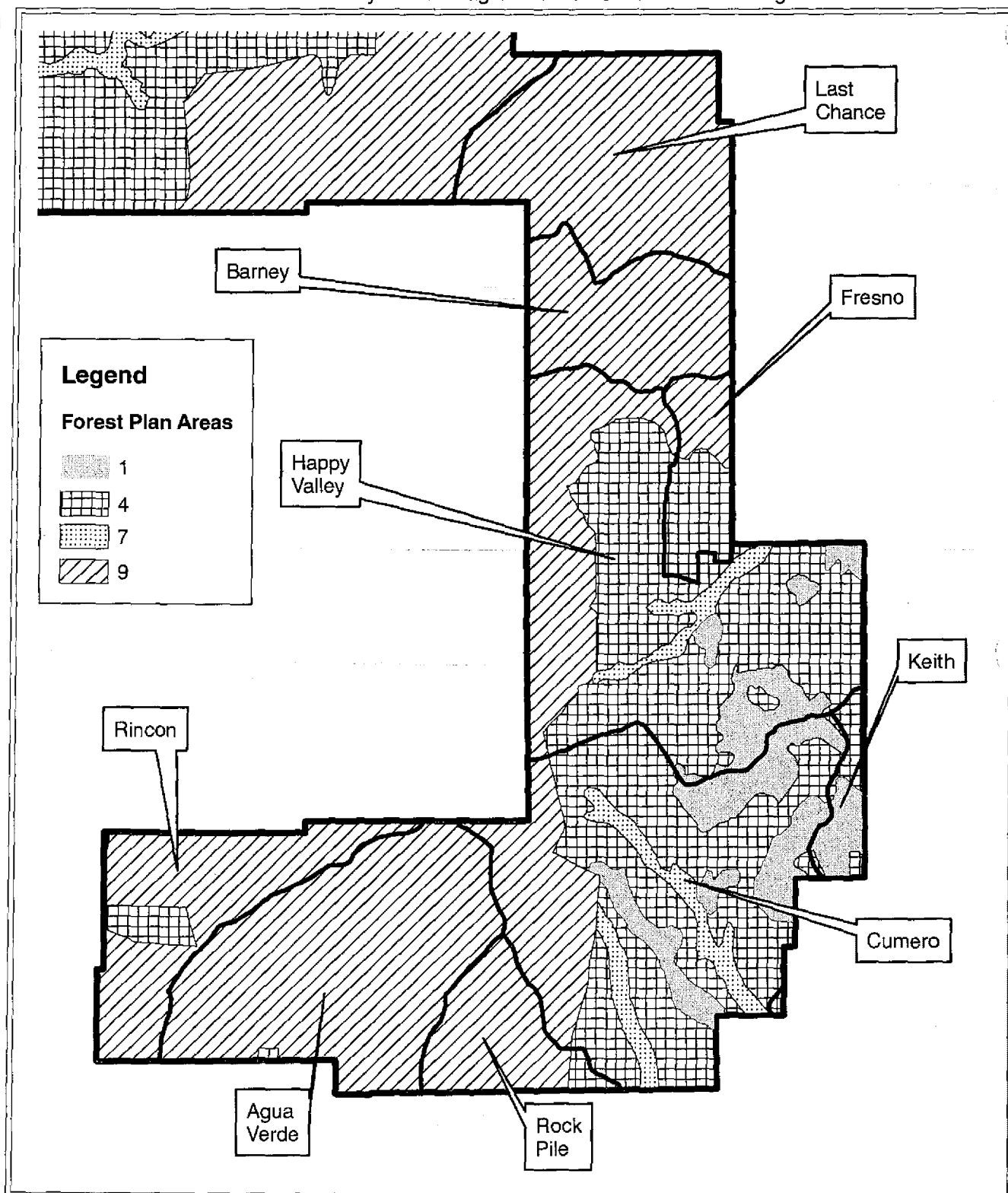


0 1.25 2.5 5 Miles

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Figure 4

Forest Land Management Plan Areas
 Last Chance, Barney, Fresno, Cumero, Happy Valley,
 Keith, Rock Pile, Rincon, Agua Verde Allotments
 Santa Catalina Ecosystem Management Area-Santa Catalina Ranger District

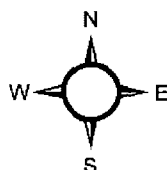
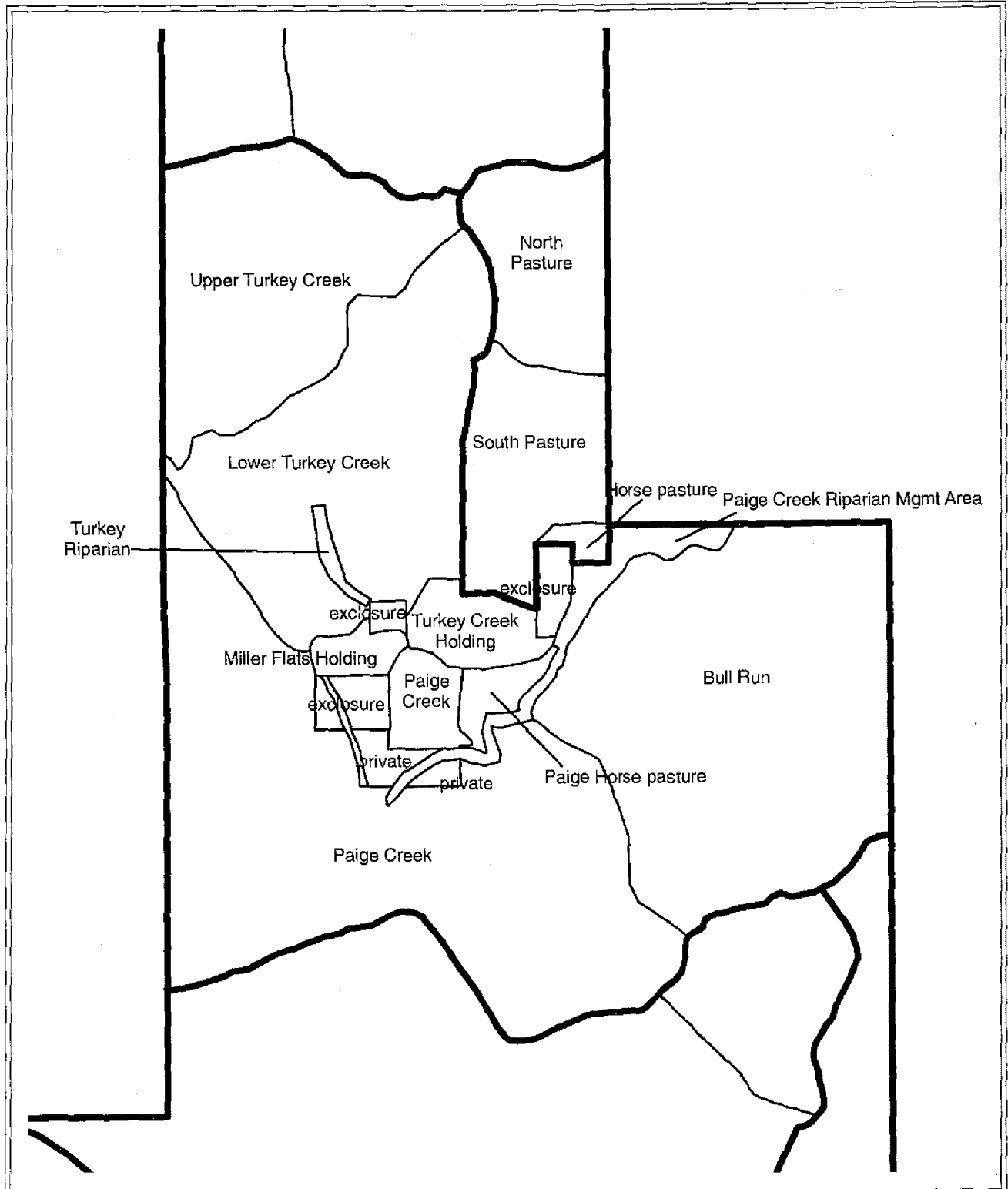


0 0.5 1 2 Miles

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Figure 5a

Allotment and Pasture Boundaries
Happy Valley and Fresno Allotments
Santa Catalina Ecosystem Management Area-Santa Catalina Ranger District

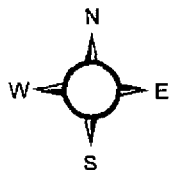
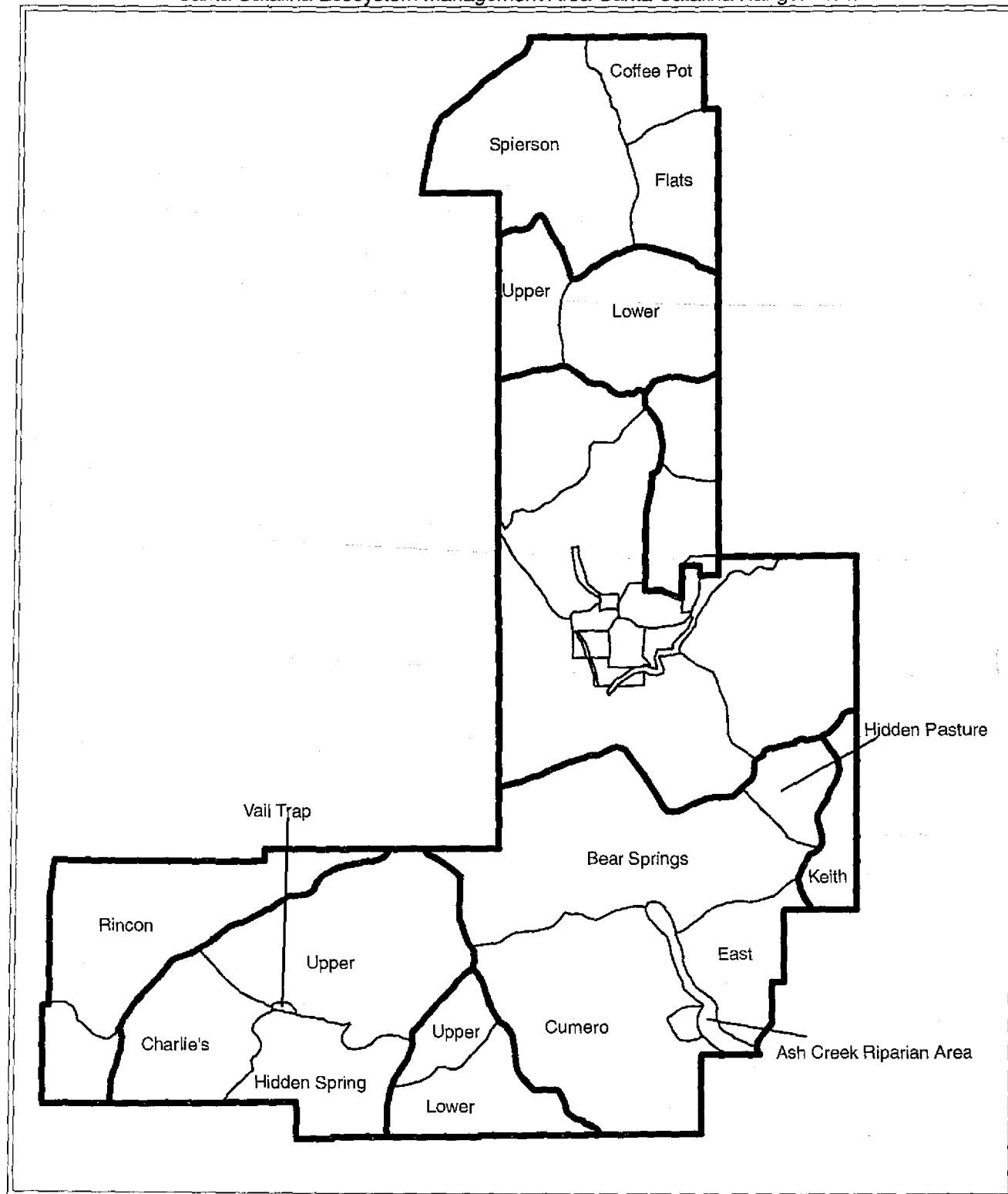


0 0.5 1 2 Miles

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Figure 5b

Allotment and Pasture Boundaries
 Last Chance, Barney, Cumero, Rincon,
 Keith, Rock Pile, Agua Verde Allotments
 Santa Catalina Ecosystem Management Area-Santa Catalina Ranger District

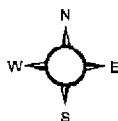
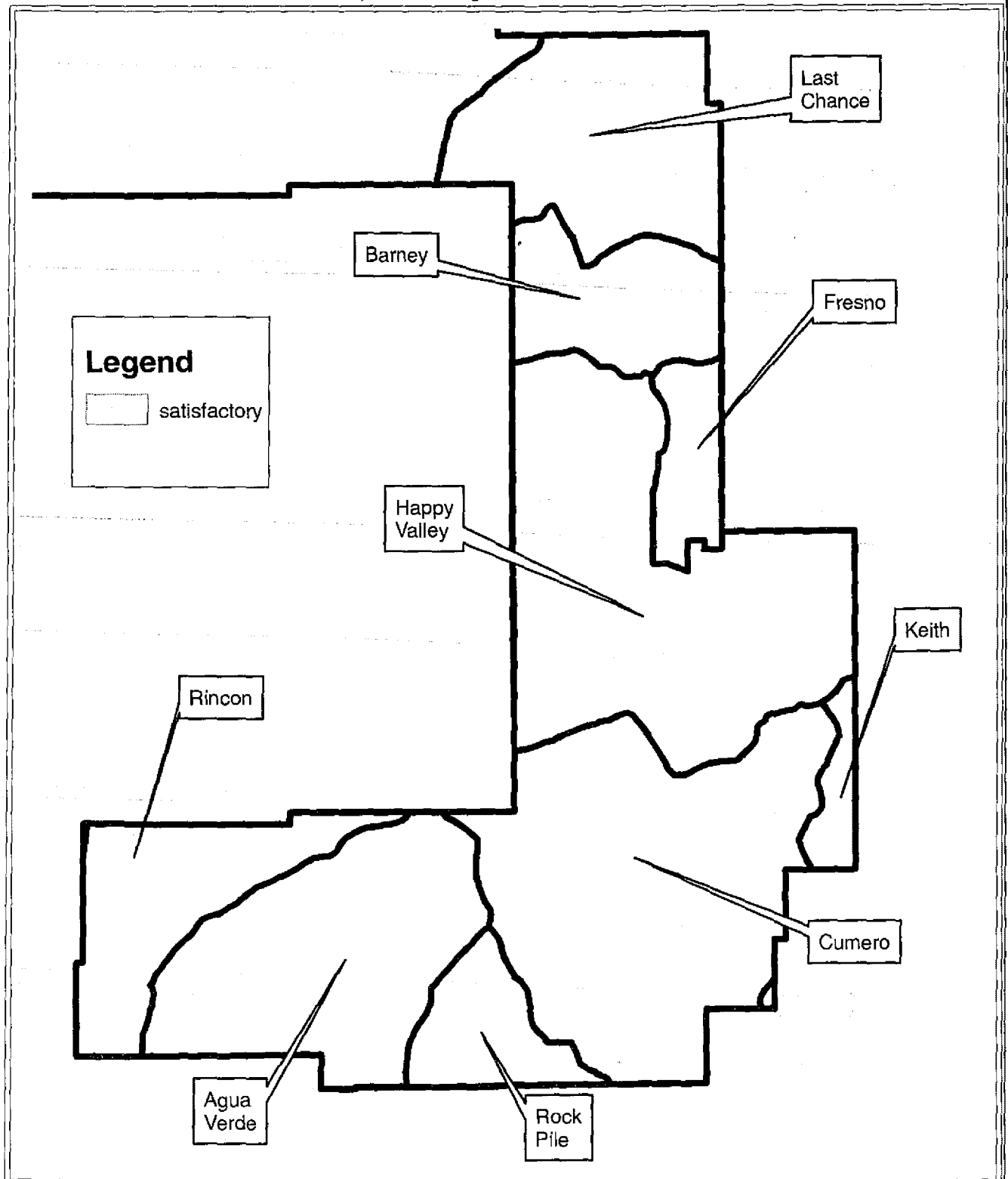


0 1 2 4 Miles

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Figure 6

Soil Condition
Last Chance, Barney, Fresno, Cumero, Happy Valley,
Keith, Rock Pile, Rincon, Agua Verde Allotments
Santa Catalina Ecosystem Management Area-Santa Catalina Ranger District



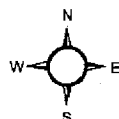
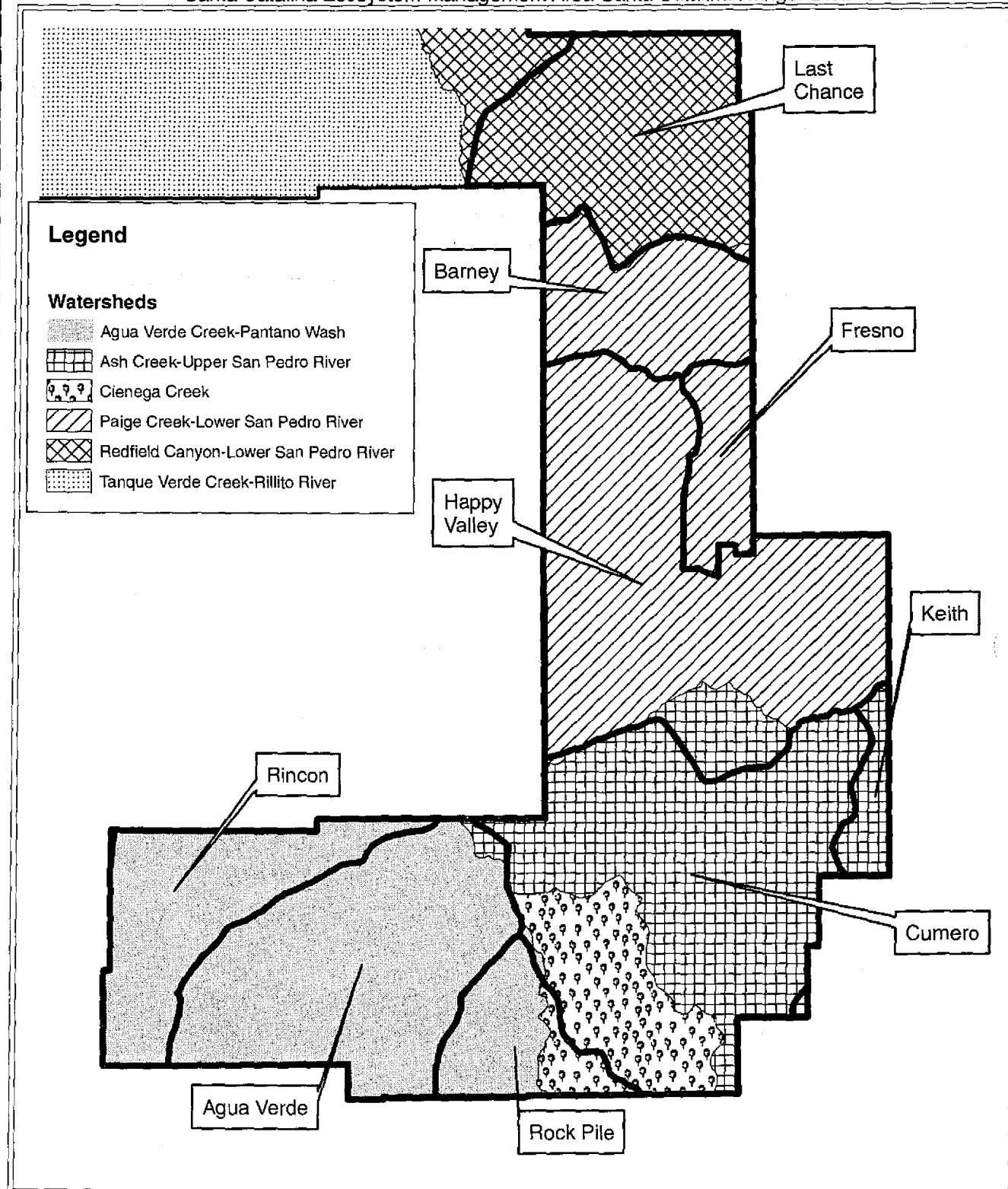
0 1 2 4 Miles

A horizontal scale bar with tick marks at 0, 1, 2, and 4 miles.

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Figure 7

Fifth Code Watersheds
 Last Chance, Barney, Fresno, Cumero, Happy Valley,
 Keith, Rock Pile, Rincon, Agua Verde Allotments
 Santa Catalina Ecosystem Management Area-Santa Catalina Ranger District

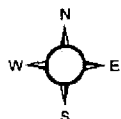
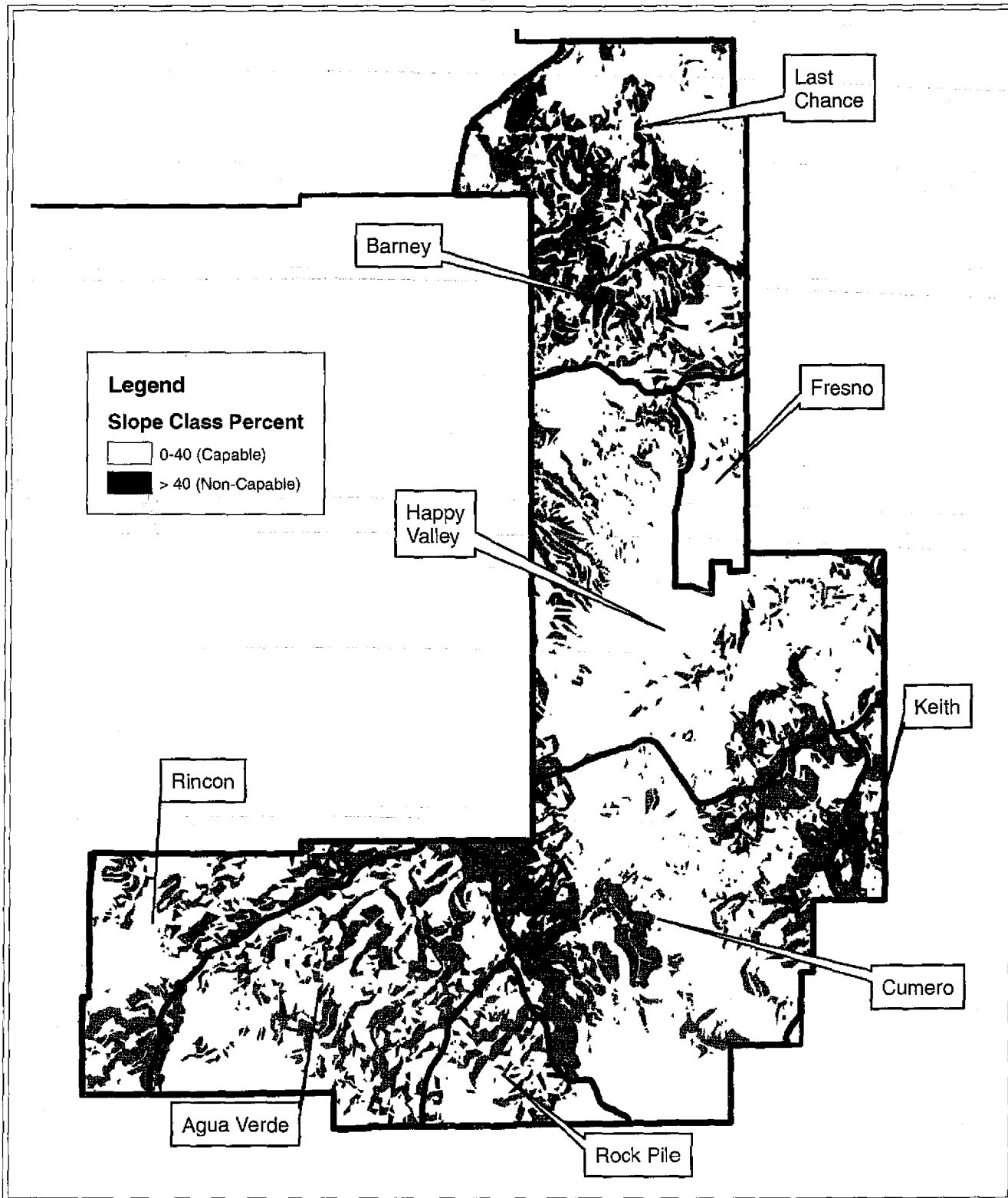


0 0.40.8 1.6 Miles

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Figure 8

Capable Rangelands by Slope Classes
 Last Chance, Barney, Fresno, Cumero, Happy Valley,
 Keith, Rock Pile, Rincon, Agua Verde Allotments
 Santa Catalina Ecosystem Management Area-Santa Catalina Ranger District

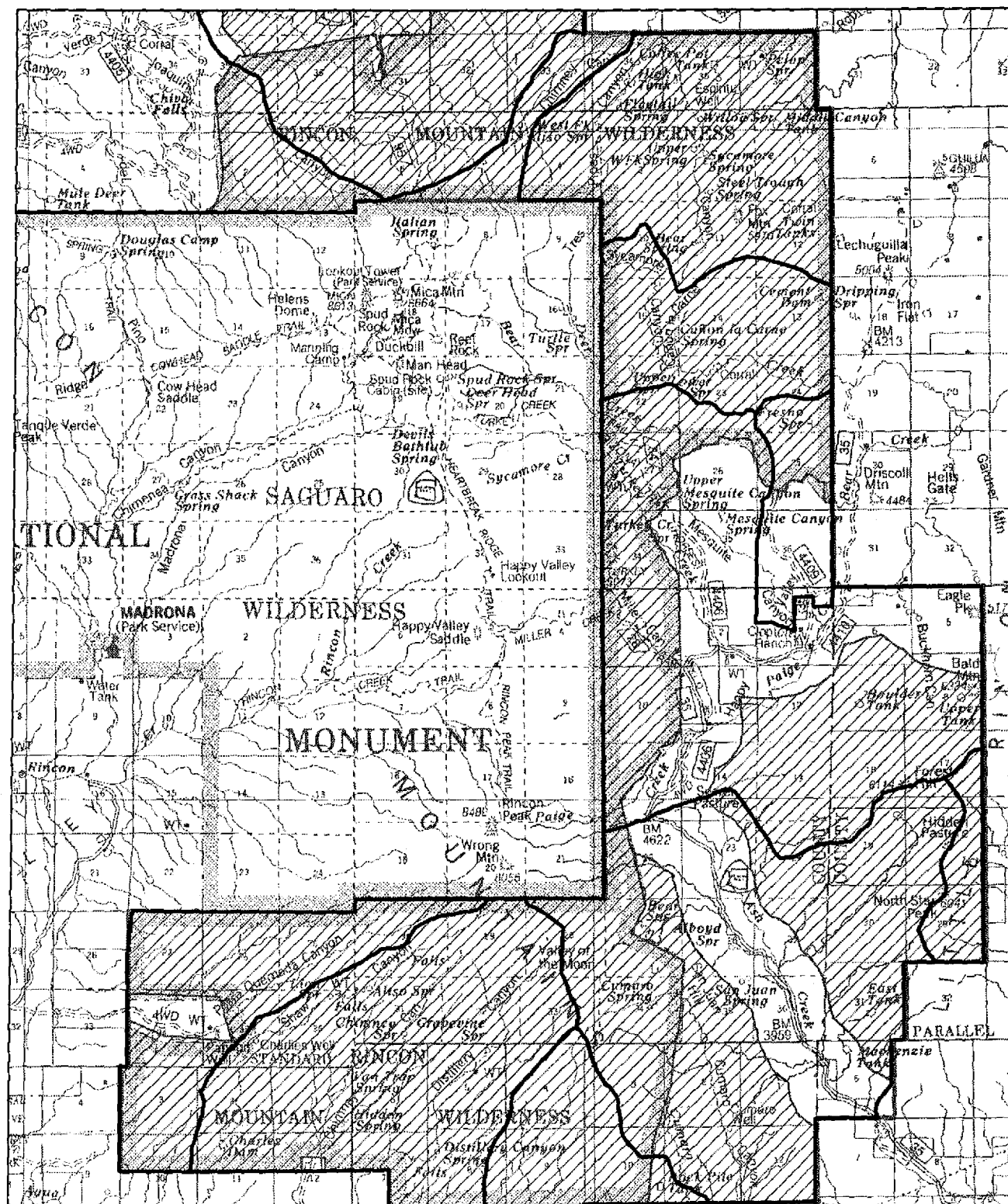


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Figure 9

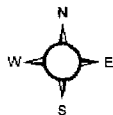
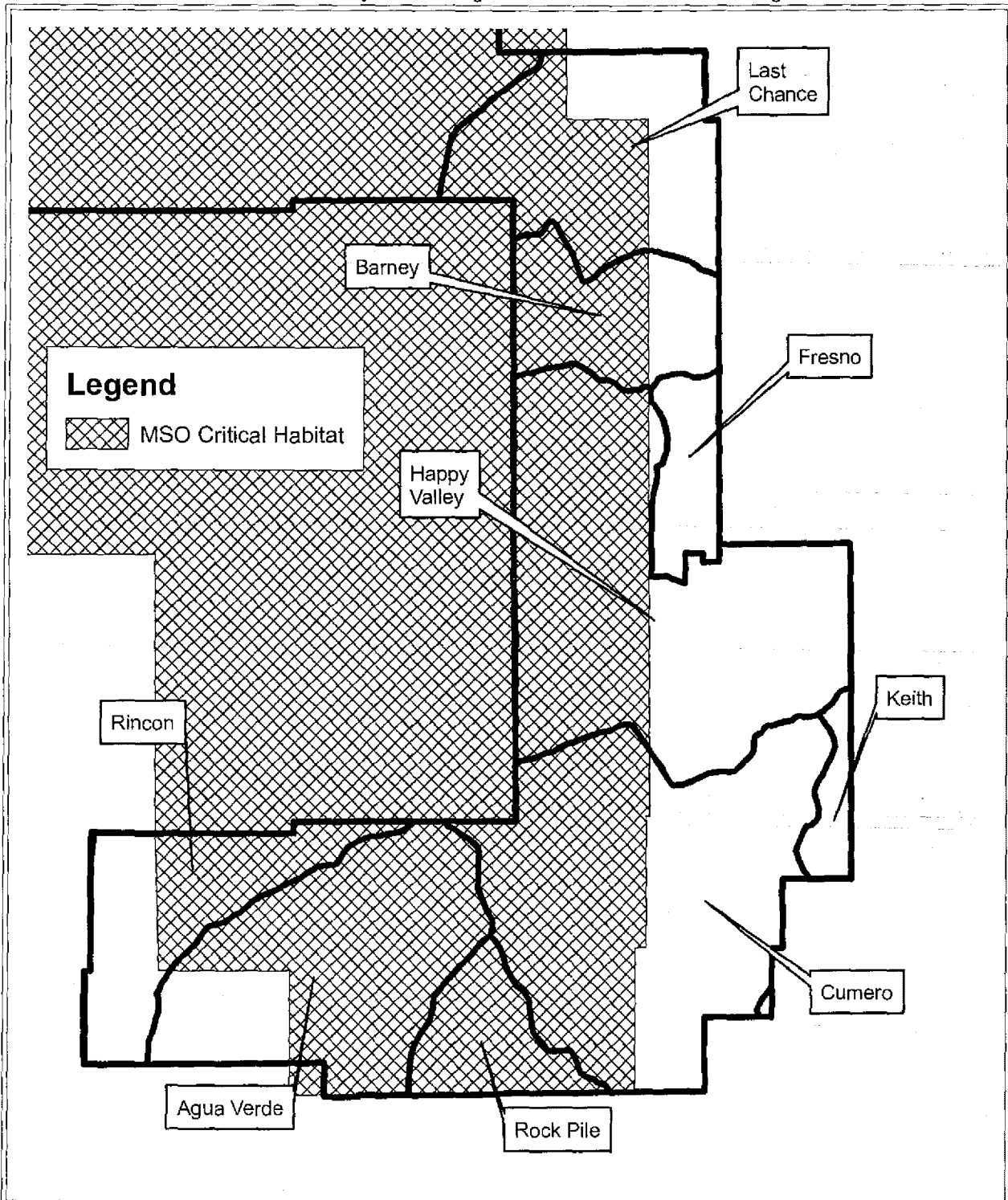
Inventoried Roadless Areas Rincon Mountains Allotments Santa Catalina Ecosystem Management Area - Santa Catalina Ranger District



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Figure 10

Mexican Spotted Owl Critical Habitat
Last Chance, Barney, Fresno, Cumero, Happy Valley,
Keith, Rock Pile, Rincon, Agua Verde Allotments
Santa Catalina Ecosystem Management Area-Santa Catalina Ranger District



0 1 2 4 Miles

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